

# CAR 2018

ANNUAL SCIENTIFIC MEETING | CONGRÈS SCIENTIFIQUE ANNUEL  
APRIL 26-29 AVRIL | MONTRÉAL | LE CENTRE SHERATON

## Artificial Intelligence in Radiology

PRESENT AND FUTURE

## L'intelligence artificielle en matière de radiologie

LE PRÉSENT ET L'AVENIR



Canadian Association of Radiologists  
L'Association canadienne des radiologistes

#CAR2018  
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The Canadian Association of Radiologists gratefully acknowledge the participation of the following corporate sponsors, each of whom has provided an unrestricted educational grant in support of the CAR 2018 Annual Scientific Meeting program. Together, we are working to build a strong radiological community in Canada.

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## Contributors / Contributeurs



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# WELCOME LETTERS MOTS DE BIENVENUE





Dear colleagues,

It is with great pleasure that I welcome you to the CAR 2018 Annual Scientific Meeting, the only national event in Canada dedicated to radiologists.

Developed with an overarching theme of Artificial Intelligence, the meeting will address the various topics that are central to our profession, such as emerging technologies, their application into our current workflows, and how we, as leaders of our profession, can harness the power of AI to improve patient outcomes.

I would like to thank Drs. Jonathon Leipsic and Michael Patlas, co-chairs of the CAR 2018 ASM working group, as well as the members of the working group, for their tremendous work in preparing this strong and topical educational program. I would also like to thank our many speakers, from Canada and abroad, for generously contributing to the success of this meeting through their time and expertise. Lastly, I would like to thank the CAR staff and event management company, Face 2 Face, for putting on what is sure to be a successful event. Our meeting, of course, would not be possible without the support of our industry partners and many event sponsors; I encourage you to visit them in the exhibit hall.

I wish you all a successful meeting.

Chers collègues,

Je suis très heureux de vous souhaiter la bienvenue au Congrès scientifique annuel (CSA) 2018 de la CAR, le seul événement national voué aux radiologistes du Canada.

La réunion, qui a pour thème général l'intelligence artificielle, abordera les sujets variés qui sont au cœur de notre profession, comme les nouvelles technologies, leur place dans notre pratique actuelle ainsi que la façon dont nous pouvons, en tant que chefs de file de la profession, miser sur la puissance de l'intelligence artificielle pour améliorer les résultats pour les patients.

J'aimerais remercier les coprésidents, les Drs Jonathon Leipsic et Michael Patlas, et les membres du groupe de travail du CSA 2018 de la CAR d'avoir su créer un programme de formation aussi rigoureux et actuel. Je remercie également nos nombreux conférenciers, du Canada et d'ailleurs, de contribuer si généreusement à la réussite de cette rencontre en prenant le temps de partager leur expertise. Enfin, je tiens à remercier le personnel de la CAR et l'entreprise de gestion d'événements Face 2 Face d'avoir organisé un événement qui ne manquera pas d'être couronné de succès. Cette réunion n'aurait évidemment pas été possible sans le soutien de nos partenaires de l'industrie et de nos nombreux commanditaires, que je vous invite à aller rencontrer dans le hall d'exposition.

Je vous souhaite un excellent congrès.

Dr. Emil Lee  
President / Président  
Canadian Association of Radiologists / L'Association canadienne des radiologistes



Canadian Association of Radiologists  
L'Association canadienne des radiologistes

Minister of Health



Ministre de la Santé

Ottawa, Canada K1A 0K9



**Message from the Minister of Health  
Canadian Association of Radiologists 81<sup>st</sup> Annual  
Scientific Meeting  
Montreal, Quebec  
April 26 to 29, 2018**

As Minister of Health, it is my great pleasure to welcome you all to the 81<sup>st</sup> Annual Scientific Meeting of the Canadian Association of Radiologists. I am certain that this year's theme, *Artificial Intelligence in Radiology: Present and Future*, will provide the backdrop for a thoughtful discussion about what this emerging technology means to the practice of radiology.

Radiologists play an integral role in the health care system. It is vital that you have opportunities to discuss the latest innovations in your field and to consider how new tools and emerging technologies can help improve patient care.

The Government of Canada is committed to working closely with the provinces, territories and the health care community to ensure that our health care system continues to adapt to serve the needs of Canadians. We believe strongly that innovation is key to improving health care outcomes. Meetings like this allow you to contribute to the conversation on innovation.

On behalf of the Government of Canada, I thank you for your dedication to professional development, and for your commitment to leveraging new technology and innovation to help improve the excellent care you provide to Canadians.

I wish you all a very successful meeting.

**Message de la ministre de la Santé  
81<sup>e</sup> réunion scientifique annuelle de l'Association  
canadienne des radiologistes  
Montréal (Québec)  
Du 26 au 29 avril 2018**

En tant que ministre de la Santé, c'est avec grand plaisir que je vous souhaite la bienvenue à la 81<sup>e</sup> réunion scientifique annuelle de l'Association canadienne des radiologistes. Je suis convaincue que le thème de cette année, *L'intelligence artificielle en matière de radiologie : Le présent et l'avenir*, constituera la toile de fond d'une discussion réfléchie sur les répercussions de cette nouvelle technologie sur la pratique de la radiologie.

Les radiologistes jouent un rôle essentiel dans notre système de santé. Vous devez absolument avoir l'occasion de discuter des dernières innovations dans votre domaine et de vous pencher sur la façon dont les nouveaux outils et les technologies émergentes peuvent améliorer les soins offerts aux patients.

Le gouvernement du Canada est résolu à travailler en étroite collaboration avec les provinces, les territoires et le milieu des soins de santé pour veiller à ce que notre système de santé continue de s'adapter aux besoins des Canadiens. Nous croyons fermement que l'amélioration des résultats pour la santé passe par l'innovation. Des réunions comme celle-ci vous permettent de contribuer à la conversation sur l'innovation.

Au nom du gouvernement du Canada, je vous remercie pour votre dévouement à l'égard du perfectionnement professionnel et pour votre engagement à tirer profit des nouvelles technologies et l'innovation afin d'améliorer les excellents soins que vous offrez aux Canadiens.

Je vous souhaite une réunion des plus fructueuses.

The Honourable Ginette Petitpas Taylor, P.C., M.P. / L'honorable Ginette Petitpas Taylor, C.P., députée

Canada



**MESSAGE DU MINISTRE DE LA SANTÉ ET DES SERVICES SOCIAUX**  
**MESSAGE FROM THE MINISTER OF HEALTH AND SOCIAL SERVICES**

Le 81<sup>e</sup> Congrès scientifique annuel de l'Association canadienne des radiologistes, sur le thème de l'intelligence artificielle en matière de radiologie, démontre sans équivoque la volonté de l'Association de rester à l'affût des nouveaux enjeux et d'intégrer les pratiques les plus novatrices au bénéfice des usagers.

L'innovation est un enjeu central en santé et synonyme de performance et de compétitivité. À titre d'experts dans l'utilisation de l'imagerie pour le diagnostic et le traitement de diverses pathologies, vous êtes aux premières loges pour constater ces changements et toutes les possibilités qu'offrent les nouvelles technologies de pointe. Le monde de la santé est en perpétuelle évolution, et un congrès comme celui-ci est une belle occasion pour alimenter notre réflexion sur l'intégration et l'utilisation de ces technologies afin d'améliorer les résultats cliniques et d'en faire bénéficier les usagers du réseau.

Je tiens à remercier tous ceux et celles qui ont participé à l'organisation de ce congrès d'envergure, qui réunit à nouveau cette année à la fois des radiologistes, des futurs professionnels et des partenaires de l'industrie. Cet événement annuel s'inscrit parfaitement dans cette volonté collective de faire évoluer notre système de santé, notamment par le partage des connaissances et du savoir-faire.

Merci et bon congrès à toutes et à tous!

The Canadian Association of Radiologists' 81<sup>st</sup> Annual Scientific Meeting on the theme of artificial intelligence in radiology clearly reflects the Association's aim to stay current on emerging issues and implement the most up-to-date practices for the benefit of users.

A key issue in health care, innovation is synonymous with performance and competitiveness. As experts in the use of imaging for the diagnosis and treatment of various diseases and disorders, you see these changes first-hand, along with all the opportunities created by new leading-edge technologies. The health care industry is constantly evolving, and a symposium such as this one is a great opportunity to learn more about utilizing and integrating these technologies to improve clinical outcomes and deliver the benefits to network users.

I would like to thank everyone who helped organize this major conference, which once again this year, brings together radiologists, future health care professionals and industry partners. This yearly event aligns perfectly with our collective determination to upgrade our health care system, notably through the sharing of knowledge and expertise.

Thank you and enjoy the conference!

Gaétan Barrette  
Ministre de la Santé et des Services sociaux / Minister of Health and Social Services  
Gouvernement du Québec / Government of Québec



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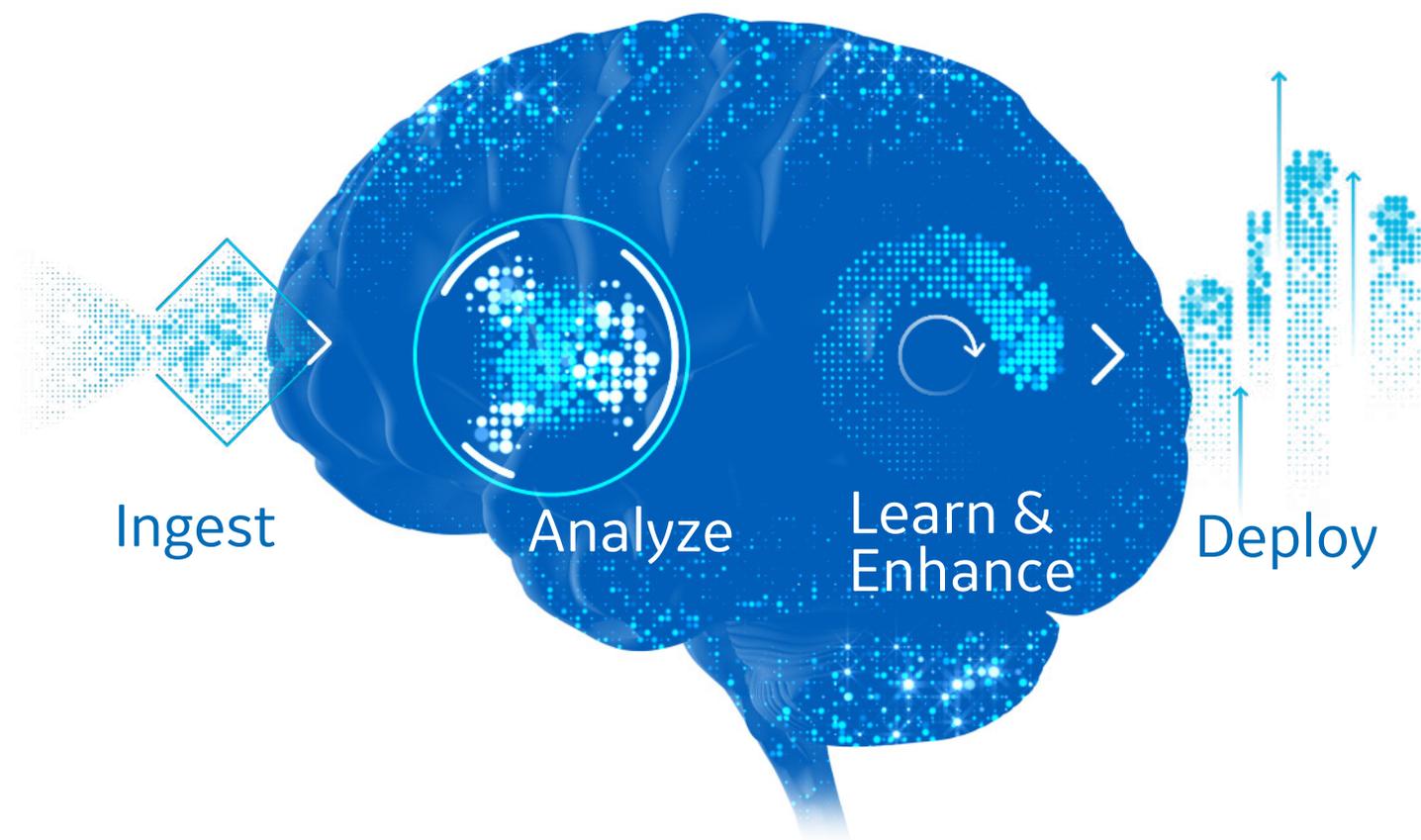
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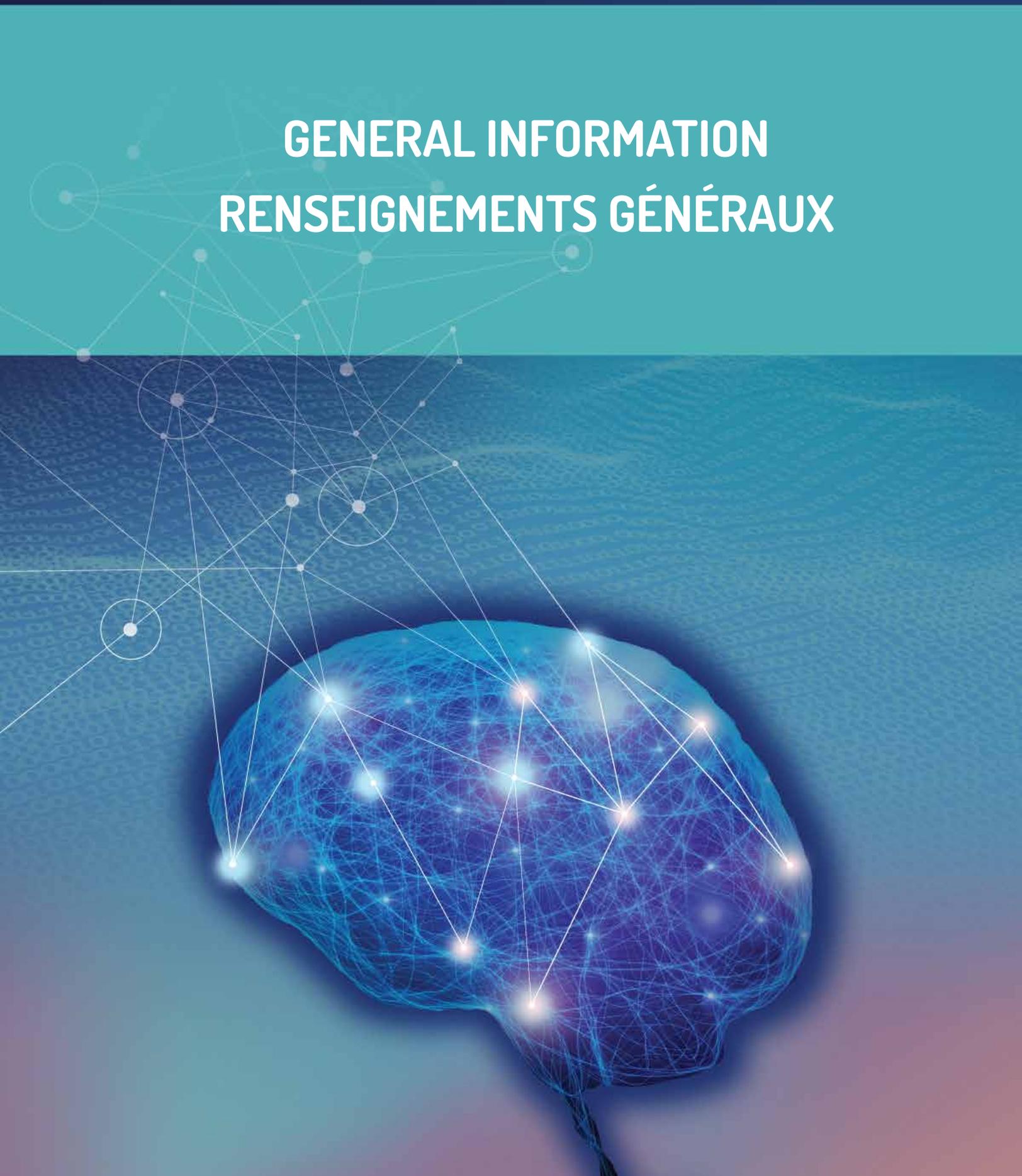
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# GENERAL INFORMATION

# RENSEIGNEMENTS GÉNÉRAUX



# GENERAL INFORMATION

## CAR 2018 Venue and Host Hotel

Le Centre Sheraton  
1201 René-Lévesque Blvd W, Montreal, QC H3B 2L7  
[www.sheratoncentremontreal.com](http://www.sheratoncentremontreal.com)

## Registration and Information Desk

### LOCATION

Level 4

### HOURS\*

Thursday, April 26 16:00 – 20:30  
Friday, April 27 06:30 – 18:30  
Saturday, April 28 06:30 – 19:30  
Sunday, April 29 06:30 – 12:45

*\*Hours are subject to change*

## Badges

CAR 2018 name badges must be worn and visible at all times by all delegates. They are required to access all scientific sessions and official CAR social functions.

Name badges are not transferable. Please do not alter or deface the badge, and avoid covering your name with business cards, pins, or stickers.

## Speaker-Ready Room

The speaker-ready room (SRR) is in Level 4 Ballroom Foyer. All presentations must be reviewed, edited and saved as the final version at least two (2) hours prior to the start of the speaker's scheduled session.

The speaker-ready room will be open during the following dates and times:

Thursday, April 26 16:00 – 20:30  
Friday, April 27 06:30 – 18:30  
Saturday, April 28 06:30 – 19:30  
Sunday, April 29 06:30 – 12:45

## Mobile Application

CAR is going green for 2018! The conference app is at your fingertips for iOS and Android device users. See the registration desk if you require assistance with the app.

# RENSEIGNEMENTS GÉNÉRAUX

## Installations et hôtel hôte du Congrès CAR 2018

Le Centre Sheraton  
1201, boul. René-Lévesque Ouest, Montréal (Québec) H3B 2L7  
[www.sheratoncentremontreal.com](http://www.sheratoncentremontreal.com)

## Bureau d'inscription et d'information

### LIEU

4<sup>e</sup> étage

### HORAIRE\*

Jeudi 26 avril 16 h à 20 h 30  
Vendredi 27 avril 6 h 30 à 18 h 30  
Samedi 28 avril 6 h 30 à 19 h 30  
Dimanche 29 avril 6 h 30 à 12 h 45

*\*Les horaires sont sujets à changements*

## Porte-nom

Les délégués sont priés de porter le porte-nom du Congrès de la CAR 2018 de manière visible, en tout temps. Les porte-nom sont exigés pour participer aux séances scientifiques et aux activités sociales officielles de la CAR.

Les porte-nom ne sont pas transférables. Il est interdit de les modifier ainsi que de les recouvrir ou d'y apposer des cartes professionnelles, des épinglettes, des autocollants ou autre.

## Salle de préparation des conférenciers

La salle de préparation des conférenciers est située dans la salle de bal, au 4<sup>e</sup> étage. Les conférenciers devront avoir passé en revue, modifié et enregistré leurs documents en version définitive au moins deux heures avant le début de leur présentation.

Heures d'ouverture de la salle de préparation des conférenciers :

Jeudi 26 avril 16 h à 20 h 30  
Vendredi 27 avril 6 h 30 à 18 h 30  
Samedi 28 avril 6 h 30 à 19 h 30  
Dimanche 29 avril 6 h 30 à 12 h 45

## Application mobile

La CAR prend le virage vert en 2018! Téléchargez l'application du Congrès sur votre appareil iOS ou Android. Pour obtenir de l'aide au sujet de l'application, rendez-vous au bureau d'inscription.

### Overall Learning Objectives

After attending this conference, attendees will be able to:

- Discuss the importance of radiologists maintaining an active role on clinical teams. (CanMEDS roles: Collaborator, Communicator, Health Advocate, Leader, Professional)
- Discuss the recent changes that have occurred in imaging as a result of the implementation of artificial intelligence, deep learning, and machine learning in imaging workflows. (CanMEDS roles: Health Advocate, Leader, Professional)
- Discuss the opportunities of big data and artificial intelligence to improve on the diagnostic performance and predictive value of imaging. (CanMEDS Roles: Communicator, Health Advocate, Scholar)
- Define the role and utilization of advanced technology in clinical imaging. (CanMEDS Roles: Communicator, Leader, Medical Expert)
- Discuss how imaging can help inform therapeutic decision making that help improve outcomes. (CanMEDS Roles: Health Advocate, Leader)
- Identify strategies to engage in academic activities and contribute to the academic life of a Radiology department. (CanMEDS role: Professional, Leader, Scholar)

### Abstracts (ePoster Sessions)

The CAR will be showcasing posters in four categories: Educational Exhibit, Scientific Research Project, the Value of Radiology Project and Radiologists-in-Training Research Project using digital screens. The ePoster sessions will take place on the 4th Floor annex. The Royal College has determined that viewing ePosters meets the criteria for a Self-Learning Scanning Activity and is eligible for Section 2 credits under the MOC program. ePosters are available for viewing on a self-serve basis throughout the day and during health breaks.

### Accreditation

CAR 2018 is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada (RCPSC) and approved by the Canadian Association of Radiologists for a maximum of 15.5 hours (credits are automatically calculated).

Participants in the **Prostate MRI and PIRADsv2 Practical Workshop** may claim a maximum of 3 hours under Section 3, Simulation Activity of the RCPSC MOC program (credits are automatically calculated).

*Participants should only claim the credits commensurate with the extent of their participation in the activity.*

### Objectifs d'apprentissage généraux

Au terme du Congrès, les participants seront en mesure de :

- Discuter de l'importance du rôle actif des radiologistes au sein des équipes cliniques. (Rôles CanMEDS : collaborateur, communicateur, promoteur de la santé, leader, professionnel)
- Discuter des changements récents survenus en raison de l'utilisation de l'intelligence artificielle, de l'apprentissage approfondi et de l'apprentissage machine dans la pratique de la radiologie. (Rôles CanMEDS : promoteur de la santé, leader, professionnel)
- Discuter des possibilités offertes par les mégadonnées et l'intelligence artificielle pour améliorer l'efficacité diagnostique et la valeur prédictive de l'imagerie. (Rôles CanMEDS : communicateur, promoteur de la santé, érudit)
- Définir le rôle et l'utilisation de la technologie de pointe en imagerie clinique (Rôles CanMEDS : communicateur, leader, expert médical)
- Discuter de la façon dont l'imagerie peut aider à prendre des décisions thérapeutiques qui amélioreront les résultats. (Rôles CanMEDS : promoteur de la santé, leader)
- Établir des stratégies pour participer aux activités du milieu universitaire et contribuer à la vie scolaire d'un département de radiologie (Rôles CanMEDS : professionnel, leader, érudit)

### Communications (séances sur les affiches numériques)

La CAR présentera, sur des écrans numériques, des affiches électroniques dans les quatre catégories suivantes : expositions éducatives, projets de recherche scientifique, projets démontrant la valeur de la radiologie et projets de recherche de radiologistes en formation. Les séances de visionnement des affiches numériques auront lieu à l'annexe du 4e étage. Le Collège royal a déterminé que le visionnement d'affiches électroniques constitue une activité d'auto-apprentissage en dépistage admissible aux crédits de la section 2 du programme de Maintien du certificat (MDC). Les affiches électroniques pourront être consultées en libre-service tout au long de la journée et pendant les pauses.

### Agrément

Le Congrès scientifique annuel de la CAR est reconnu comme une activité d'apprentissage de groupe (section 1) par le programme de Maintien du certificat (MDC) du Collège royal des médecins et chirurgiens du Canada (CRMCC), et est approuvé par la CAR. Un maximum de 18 heures-crédits est approuvé pour le programme scientifique du Congrès 2018 de la CAR (les crédits sont calculés automatiquement).

Les participants à l'**atelier pratique sur l'IRM de la prostate et sur la technique PI-RADS v2** peuvent obtenir, au maximum, 9 heures-crédits dans la section 3 (activités d'apprentissage par simulation) du programme de MDC du CRMCC (les crédits sont calculés automatiquement).

### AMA Accreditation Statement

Through an agreement between the Royal College of Physicians and Surgeons of Canada and the American Medical Association, physicians may convert Royal College MOC credits to AMA PRA Category 1 Credits™.

### UEMS Accreditation Statement

Live educational activities, occurring in Canada, recognized by the Royal College of Physicians and Surgeons of Canada as Accredited Group Learning Activities (Section 1) are deemed by the European Union of Medical Specialists (UEMS) eligible for ECMEC®.

### Certificate of Attendance

A certificate of attendance is available for all delegates attending the conference. An email will be sent to you following the conference.

Participants can document their learning in the RCPSC MAINPORT at <https://login.royalcollege.ca/oamlogin/login.jsp>

### Session Evaluation

The CAR values your feedback! By completing evaluations for the individual sessions, you will have a direct impact on the quality of programming at CAR and ensure the CAR will continue to meet your educational needs. Session evaluations can be accessed in the event app and will be sent to participants at the conclusion of the conference.

### Disclosure of Conflict of Interest

The CAR has a formal policy regarding the need for authors and presenters to inform CAR attendees of any Conflict of Interest (COI). A COI includes, but is not limited to, employment, ownership of stock, membership on a standing advisory council or committee, or being on the board of directors or publicly associated with a company or its products. Other potential areas of real or perceived conflict of interest could include receiving honoraria, consulting fees, or grants.

### Énoncé d'agrément de l'AMA

En vertu d'une entente entre le Collège royal des médecins et chirurgiens du Canada et l'American Medical Association, les médecins peuvent convertir les crédits du programme de MDC en crédits de catégorie 1 de l'AMA PRAMC.

### Énoncé d'agrément de l'UEMS

La participation en direct à des activités éducatives reconnues par le Collège royal des médecins et chirurgiens du Canada rend les participants admissibles à des crédits européens de formation continue (ECMEC®) attribués par l'Union européenne des médecins spécialistes (UEMS).

### Certificat de participation

Un certificat de participation sera remis aux délégués assistant à la conférence. Un courriel vous sera envoyé après la conférence.

Les participants peuvent documenter leur apprentissage sur le portail MAINPORT du Collège royal des médecins et chirurgiens du Canada (CRMCC) au <https://login.royalcollege.ca/oamlogin/login.jsp>.

### Évaluation des séances

La CAR accorde une grande importance à vos commentaires! En remplissant une évaluation après chacune des séances auxquelles vous participez, vous nous aidez à améliorer la qualité du programme de la CAR afin que nous puissions continuer de répondre à vos besoins de perfectionnement professionnel et sera envoyé aux participants à la fin de la conférence.

### Déclaration de conflit d'intérêts

En vertu de la politique de la CAR, les auteurs et les conférenciers doivent aviser les participants du Congrès de tout conflit d'intérêts. Les conflits d'intérêts incluent, sans s'y limiter, l'emploi, la propriété d'actions, l'appartenance à un conseil ou à un comité consultatif permanent, ou la participation au conseil d'administration d'une entreprise, ou toute affiliation publique à celle-ci ou à ses produits. Il peut également y avoir conflit d'intérêts réel ou perçu si le conférencier reçoit des honoraires, des frais d'expert-conseil ou des subventions.

Highlights of | Grands moments du Congrès

# CAR 2018

## Opening Cocktail

### Cocktail d'ouverture

Thursday, 6:00 pm | Jeudi, 18 h

## Cocktail with Vendors

### Cocktail avec les vendeurs

Friday, 5:00 pm | Vendredi, 17 h

## Reception for Radiologists-in-Training

### Réception pour les radiologists en formation

Friday, 6:30 pm | Vendredi, 18 h 30



## 5K Fun Run Course amicale de 5 km

Friday, 6:30 am  
Vendredi, 6 h 30

## Cocktail and Awards Ceremony

### Cocktail et Remise des prix de la CAR

Saturday, 5:00-7:00 pm

Samedi, de 17 h à 19 h

The CAR invites all participants to join us in celebrating this year's distinguished award winners and successful abstract winners. We will also be honouring our many volunteers.

La CAR convie tous les délégués à la soirée organisée en l'honneur des lauréats des prix de la CAR et des gagnants des communications. Nous soulignerons également la contribution de nos bénévoles.

## CAR / CRF Annual General Meetings | Assemblées générales annuelles de la CAR et de la FRC

Saturday, 7:00 am, Jarry/Joyce Rooms Salon Jarry/Joyce, Level/Niveau A | Samedi, 7 h

Join us for this year's CAR and CRF AGMs, to be held during breakfast. Don't miss your opportunity to vote!

Joignez-vous à nous lors des AGA de la CAR et de la FRC, qui se dérouleront pendant le petit-déjeuner. Ne ratez pas votre chance de voter!

## Featured Sessions | Séances en vedette

*Les séances se déroulent en anglais seulement*

### The Impact of Deep Learning and Artificial Intelligence on Radiology

Thursday, 7:00 pm | Jeudi, 19 h

Keynote Speaker: Dr. Ron Summers

Conférencier d'honneur : Dr Ron Summers

### Hot Topics: AI in Canada: Investment, Implementation, and Regulation

Friday, 3:30 pm | Vendredi, 15 h 30

Moderated by Dr. An Tang

Animée par le Dr An Tang

### Image Interpretation Session

Saturday, 3:30 pm | Samedi, 15 h 30

Hosted by Dr. Bruce Forster, two teams of radiologists compete to read and interpret unknown cases across a variety of body systems.

Lors de cette rencontre animée par le Dr Bruce Forster, deux équipes de radiologistes s'affronteront en lisant des cas inconnus et en interprétant les images de divers systèmes de l'organisme.

### Mistakes We All Make

Sunday, 8:45 am | Dimanche, 8 h 45

Moderated by Dr. Caitlin McGregor, this is a returning favourite; six talks covering common errors and strategies to reduce them.

Un événement populaire de retour cette année, animé par la Dre Caitlin McGregor : six exposés sur des erreurs courantes et les stratégies pour les éviter.

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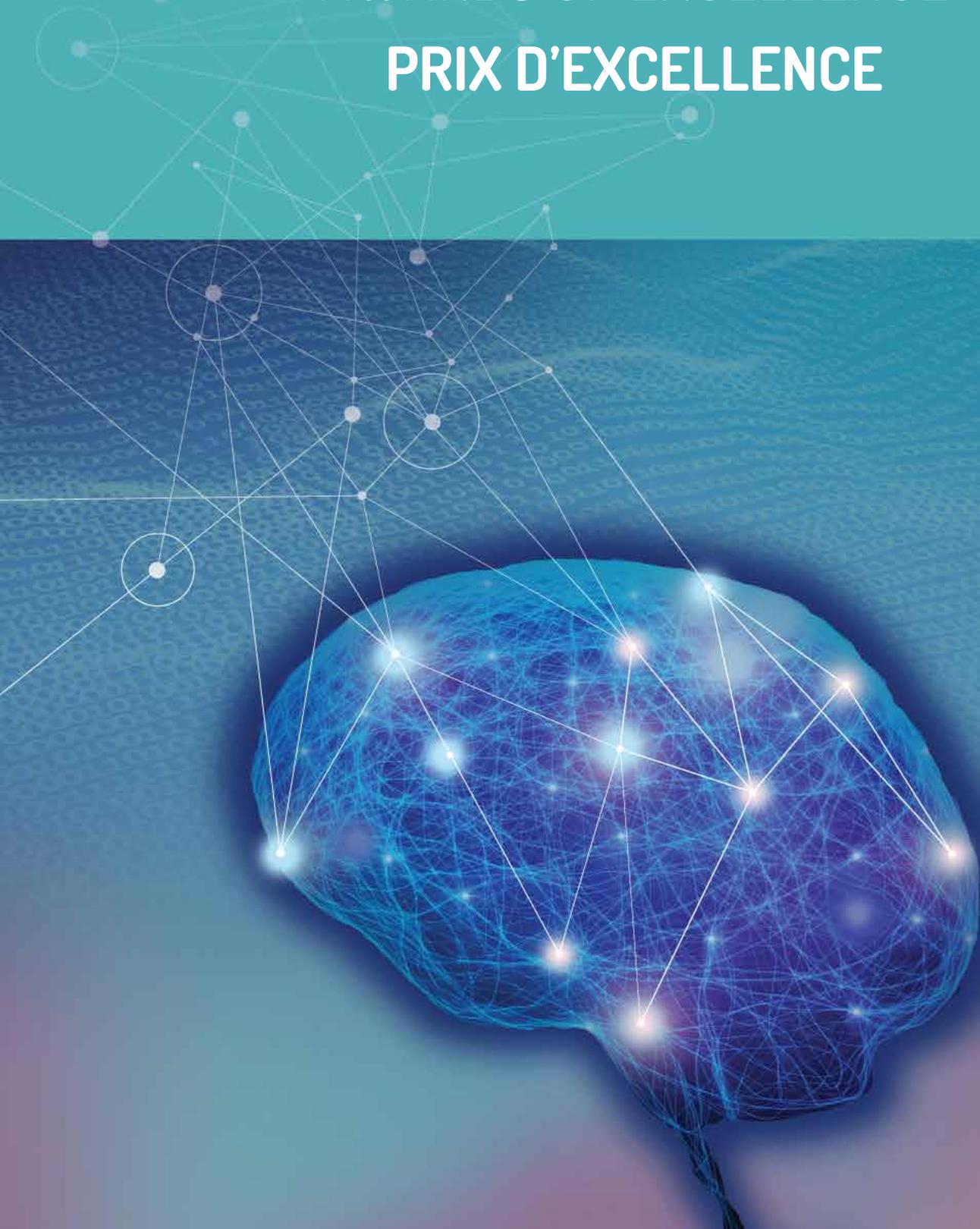
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# AWARDS OF EXCELLENCE

## PRIX D'EXCELLENCE





## **2018 CAR DISTINGUISHED CAREER ACHIEVEMENT AWARD DR. MAYANK GOYAL**

The Canadian Association of Radiologists (CAR) is pleased to present the 2018 CAR Distinguished Career Achievement Award to Dr. Mayank Goyal for his outstanding contributions to clinical research in acute stroke triage, diagnosis and endovascular therapy.

Dr. Mayank Goyal personifies excellence in academic radiology, demonstrating leadership through hard work, dedication and innovation. His collaborations with stroke neurologists, interventional neurosurgeons and acute care physicians have led to the design and execution of multiple randomized, multicenter clinical trials in acute stroke research: ESCAPE and SWIFT PRIME (both published in NEJM). He was also the core-lab for the REVASCAT trial (published in NEJM), and the Co-PI of a CIHR-funded study called PROVE IT.

The ESCAPE Trial stands as one of the most significant trials of its kind evaluating endovascular treatment (EVT) with mechanical thrombectomy in large artery occlusion. The trial demonstrated a remarkable treatment benefit for EVT in reducing disability and demonstrating a reduction in stroke mortality. Partway through the trial, the data were so overwhelming that the trial was stopped early because randomizing patients to the control arm would have been unethical in the face of such a strongly positive endovascular treatment arm. The establishment of endovascular treatment in acute stroke through his leadership is a discovery that will change the lives of individuals and families forever worldwide.

Dr. Goyal also pioneered multiphase CT angiography, an imaging technique in acute stroke that was implemented globally as part of the ESCAPE study, and subsequently became the basis for the PROVE IT study, which consists of a head-to-head comparison between multiphase CTA and CT perfusion. Initial results and feedback published in Radiology suggest that the technique is extremely useful and saves on average 20 minutes in acute stroke treatment.

The global impact and collaborative spirit at the heart of Dr. Goyal's research is further evidenced in his role as the lead organizer/researcher of the HERMES collaboration, which has brought together 7 randomized trials evaluating endovascular treatment from 7 countries. Dr. Goyal has spearheaded an environment of trust and cooperation among trialists that has allowed for pooling of patient level clinical data and central adjudication of all imaging data (over 5000 CT or MRI studies). Research from the HERMES collaboration has been published in JAMA and the Lancet, with more publications forthcoming.

Closer to home, Dr. Goyal is the chair of the Calgary Stroke Program 5T course (Teamwork, Technique, Transport, Technology and Training) that emphasizes their multi-modal approach to acute stroke assessment and treatment. He and his colleagues have published extensively on the importance of a coordinated, streamlined approach to the acute stroke patient, likely an important factor that differentiated the successful ESCAPE Trial from previous trials that failed to demonstrate the benefit of endovascular therapy.

Dr. Goyal's excellence as a scientist, diagnostic and interventional neuroradiologist have increased the international profile of Canadian radiology research. In addition to his record as a researcher, teacher, and mentor he is recognized as an outstanding clinician with exceptional interventional neuroradiology skill and expertise, often noted to have perhaps the fastest puncture to clot retrieval time among his peers.

In light of his achievements, demonstrated impact on stroke care around the world, and contributions to Canadian radiology research, the Canadian Association of Radiologists is incredibly honoured to present Dr. Mayank Goyal with this award.



## PRIX D'EXCELLENCE DE LA CAR POUR UNE ÉMINENTE CARRIÈRE 2018 DR MAYANK GOYAL

L'Association canadienne des radiologistes (CAR) est heureuse de remettre le Prix d'excellence de la CAR pour une éminente carrière 2018 au Dr Mayank Goyal, afin de souligner sa contribution remarquable en recherche clinique sur le triage, le diagnostic et le traitement endovasculaire des accidents vasculaires cérébraux (AVC) aigus.

Le Dr Mayank Goyal incarne l'excellence en enseignement de la radiologie et, par son travail soutenu, sa détermination et sa volonté d'innover, fait preuve d'un leadership exceptionnel. Ses collaborations avec des neurologues spécialisés en AVC, des neurochirurgiens d'intervention et des médecins en soins de courte durée ont mené à la création et à la mise en œuvre de plusieurs essais cliniques multicentriques à répartition aléatoire sur les AVC aigus, dont les essais ESCAPE et SWIFT PRIME (tous deux publiés dans le *New England Journal of Medicine* [NEJM]). Il a aussi été responsable du laboratoire principal dans le cadre de l'essai REVASCAT (publié dans le NEJM) et cochercheur principal de l'étude PROVE IT financée par les Instituts de recherche en santé du Canada (IRSC).

L'essai ESCAPE, l'un des plus importants en son genre, visait à évaluer le traitement endovasculaire par thrombectomie mécanique des occlusions artérielles importantes. Il a permis de démontrer l'efficacité remarquable du traitement endovasculaire pour réduire l'invalidité et la mortalité associée à l'AVC. Les données recueillies au cours de l'essai étaient si exceptionnelles que ce dernier a dû être interrompu prématurément, car il ne semblait pas éthique de répartir aléatoirement des patients dans le groupe témoin à la lumière des résultats extrêmement positifs du traitement. Le traitement endovasculaire des AVC aigus adopté sous la gouverne du Dr Goyal constitue une découverte qui changera pour toujours la vie de personnes et de familles du monde entier.

Le Dr Goyal est aussi un pionnier de l'angiographie par tomographie assistée par ordinateur (ATDM) en plusieurs étapes, une technique d'imagerie des AVC aigus qui a été mise en place à grande échelle dans le cadre de l'étude ESCAPE, puis est devenue le sujet de base de l'étude PROVE IT, qui la comparait directement avec la perfusion par tomographie assistée par ordinateur (TDM). Les premiers résultats et commentaires publiés dans *Radiology* suggèrent que la technique est extrêmement utile et permet en moyenne de réduire le traitement des AVC aigus de 20 minutes.

Les répercussions mondiales et l'esprit de collaboration caractéristiques des recherches du Dr Goyal se reflètent également dans sa participation, à titre de chercheur et d'organisateur principal, à la collaboration HERMES, qui rassemble sept essais à répartition aléatoire réalisés dans sept pays sur le traitement endovasculaire. Le Dr Goyal a su instaurer un environnement de confiance et de coopération pour les participants, ce qui a permis de mettre en commun des données cliniques sur les patients et de centraliser l'évaluation de toutes les données d'imagerie (plus de 5 000 examens de TDM et d'IRM). La recherche issue de la collaboration HERMES a été publiée dans le *Journal of the American Medical Association (JAMA)* et dans *The Lancet*, et ce n'est qu'un début.

Plus près de chez nous, le Dr Goyal est président du cours 5T (travail d'équipe, technique, transport, technologie et travail de formation) du Calgary Stroke Program, qui met l'accent sur une approche multimodale de l'évaluation et du traitement de l'AVC aigu. Avec ses collègues, il a publié de nombreux articles sur l'importance d'une approche coordonnée et simplifiée des AVC aigus. Cette dernière a probablement joué un rôle clé dans la réussite de l'essai ESCAPE, alors que les tentatives précédentes de démontrer les avantages du traitement endovasculaire avaient échoué.

Le parcours d'excellence du Dr Goyal dans les domaines de la science et de la neuroradiologie diagnostique et interventionnelle a rehaussé la renommée internationale de la recherche canadienne en radiologie. Il est reconnu non seulement pour son travail de chercheur, de professeur et de mentor, mais aussi pour ses compétences et son expertise exceptionnelles en neuroradiologie interventionnelle auprès de ses pairs, qui soulignent souvent qu'il est peut-être le plus rapide pour retirer les caillots.

La CAR est extrêmement fière de remettre ce prix au Dr Mayank Goyal en raison de ses réalisations, de son apport reconnu dans le traitement des AVC à l'échelle mondiale et de ses contributions à la recherche en radiologie au Canada.



## **GOLD MEDAL AWARD** **DR. LAWRENCE A. STEIN**

The Canadian Association of Radiologists (CAR) is very proud to present the 2018 CAR Gold Medal Award to Dr. Lawrence Stein. He is recognized as a leader by his peers by virtue of his long and successful career in academia, teaching, and his outstanding contributions to the advancement of radiology as a specialty.

Dr. Stein was born and raised in Montreal, Quebec, and attended McGill University for a Bachelor of Science degree prior to completing his medical training there in 1968. He completed his residency at the Royal Victoria Hospital in 1973, followed by a fellowship at the University of California. After his fellowship, Dr. Stein returned to Montreal, McGill, and the Royal Vic, where he has been a committed member of the imaging department for over 40 years.

During his career, he has published many peer-reviewed papers, been involved in a large number of research projects and given over two hundred invited lectures, a testimony to his talents as an outstanding educator. He is a tireless and enthusiastic teacher who has influenced countless students and residents. Over the course of his career, many medical students have entered into careers as radiologists after working with him on elective and being drawn into the profession by his encouragement and enthusiasm. A statesman in all respects, Dr. Stein has left a positive mark on everyone who has been fortunate enough to interact with him over the years.

In his work with patients, Dr. Stein is a model of professionalism and compassion that his colleagues and peers strive to emulate. His kindness, patience and clinical skills have made a lasting and unique impact on countless members of the Montreal community that he has helped over the years. Dr. Stein has been a tireless ambassador and champion of radiology. He constantly seeks to educate and collaborate with other clinical services, showing them the true value that radiology can bring to patient care. He has been a member of many hospital committees and boards of directors at McGill, always striving to provide the best in patient care, cutting edge research, and a world class teaching institution.

Dr. Stein has been a lifelong supporter of the CAR, involved with numerous committees and working groups. His dedication to his professional association culminated in a term as CAR President from 2003-2005.

As he approaches retirement in 2018, it is absolutely fitting that the CAR would honour one of its members who has given so much to the profession over the past 40 years, while epitomizing the qualities of a truly excellent radiologist on every personal and professional level.



## **PRIX DE LA MÉDAILLE D'OR** **DR LAWRENCE STEIN**

L'Association canadienne des radiologistes (CAR) est très heureuse de remettre le Prix de la Médaille d'or de la CAR 2018 au Dr Lawrence Stein. Le Dr Stein est reconnu comme un leader par ses pairs en raison de sa longue et prolifique carrière dans le milieu universitaire et en enseignement, ainsi que de sa contribution aux progrès de la radiologie en tant que spécialité.

Né et éduqué à Montréal, au Québec, le Dr Stein a obtenu un baccalauréat ès sciences à l'Université McGill et y a poursuivi sa formation médicale jusqu'en 1968. Après avoir terminé sa résidence à l'hôpital Royal Victoria en 1973, il a suivi un programme de formation postdoctorale à l'Université de la Californie. Il est ensuite revenu à Montréal, à l'Université McGill et à l'hôpital Royal Victoria, à titre de membre engagé du département d'imagerie depuis plus de 40 ans.

Au fil de sa carrière, il a publié de nombreux articles évalués par les pairs, participé à un grand nombre de projets de recherche et, preuve de son exceptionnel talent d'enseignant, animé plus de 200 conférences. Son énergie intarissable et son enthousiasme ont influencé d'innombrables étudiants et résidents et, au fil de sa carrière, il a amené beaucoup de ceux qui l'ont côtoyé lors de cours facultatifs à faire de la radiologie leur profession. Grand diplomate, le Dr Stein a laissé une empreinte positive sur toutes les personnes qui ont eu la chance d'interagir avec lui.

Avec les patients, le Dr Stein est un modèle de professionnalisme et de compassion et une véritable inspiration pour ses collègues et ses pairs. Sa gentillesse, sa patience et ses compétences cliniques ont marqué de façon unique et durable les innombrables membres de la communauté montréalaise qu'il a aidés au fil des ans. Le Dr Stein a été un ambassadeur et un défenseur infatigable de la radiologie. Il cherche constamment à transmettre son savoir aux autres services cliniques et à collaborer avec eux pour leur montrer l'importance de la radiologie dans les soins aux patients. Il a fait partie de nombreux comités en milieu hospitalier et de conseils d'administration à l'Université McGill en raison de sa volonté constante d'offrir les meilleurs soins possible aux patients, de favoriser la recherche de pointe et de créer un milieu d'enseignement de calibre mondial.

Le Dr Stein a toujours soutenu la CAR et s'est joint à de nombreux comités et groupes de travail, allant jusqu'à occuper la présidence de l'association professionnelle de 2003 à 2005.

Le Dr Stein prendra sa retraite en 2018, et il est tout naturel que la CAR rende hommage à un membre qui a tant donné à la profession au cours des 40 dernières années et qui incarne les qualités d'un excellent radiologiste, tant sur le plan personnel que professionnel.



## 2018 CAR YOUNG INVESTIGATOR AWARD DR. JACOB JAREMKO

Dr. Jaremko is an Associate Professor in the Department of Radiology & Diagnostic Imaging in the Faculty of Medicine and Dentistry at the University of Alberta. He is a graduate of the University of Calgary where he completed a B.Sc. in Engineering (1996) and a combined MD- PhD (2003). Following his training in Diagnostic Radiology at the University of Alberta (2008), he took the unusual step of pursuing two separate and independent fellowships at prestigious institutions in Pediatric Radiology at the Royal Children's Hospital in Melbourne Australia (2010) and in Musculoskeletal Radiology at Massachusetts General Hospital, Harvard University (2011). In September 2011 Dr. Jaremko was awarded the position of Capital Health Chair in Diagnostic Imaging and became an Assistant Professor in the Department of Radiology and Diagnostic Imaging. In September 2013, he became an Adjunct Assistant Professor in the Department of Biomedical Engineering.

Dr. Jaremko is an exemplary clinician scientist, a rare accomplishment among radiologists. His strength as a researcher have led to collaborations with a diverse disciplinary range of departments and faculties nationally and internationally. He has a remarkable publication record, with 88 published manuscripts, 25 of which are as first author. Furthermore, he has secured grant support of \$837,454 as a primary investigator and over \$6 million as co-investigator or collaborator.

Dr. Jaremko's research focuses on adult/pediatric musculoskeletal radiology, particularly the influence of anatomy and childhood development of joints on the development of adult morbidity such as premature osteoarthritis. A key focus of his current research is on advanced ultrasound imaging, including 3D ultrasound for diagnosis and management of infant hip dysplasia. Dr. Jaremko has shown that 30 infant hip ultrasound is feasible and that 30 acetabular shape indices can reliably indicate hip dysplasia. He has also shown that bone marrow edema in the lateral knee in osteoarthritis predicts arthroplasty 5 years later, that flatter lumbar spinal curvature can triple the stresses on lower lumbar facet joints, and that magnetic resonance imaging is insensitive to inflammatory sacroiliitis.

In 2015, Dr. Jaremko co-founded the **Collaborative for Ultrasound Deep Learning (CUDL)**, a multidisciplinary, multi-national team of researchers and clinicians who share a vision that advanced machine learning techniques can be used to analyze uploaded ultrasound images (2D or 3D) to help clinicians optimize diagnosis and management of medical problems ranging from hip dysplasia to soft tissue tumors, cardiac and atherosclerotic disease, and other musculoskeletal and solid organ diseases.

Dr. Jaremko has also excelled as an educator. His approach involves case-based teaching in a clinical environment with learners from a variety of clinical backgrounds and levels of training. His teaching is of consistently high-quality, and his ability to engage learners is a credit to his passion for education, research, and radiology. Additionally, Dr. Jaremko has supervised a total of 45 students on research projects, and his mentorship of the next generation of radiology researchers has had a positive impact on the early careers of other young clinician scientists along the way.

In addition to his accolades as a scientist and educator, Dr. Jaremko is recognized by his peers and colleagues as an excellent clinician, a stalwart citizen of his department, and credit to his profession.

We are delighted to honour him with the 2018 CAR Young Investigator Award.



## PRIX DU JEUNE CHERCHEUR DE LA CAR 2018

### DR JACOB JAREMKO

Le Dr Jaremko est professeur agrégé au département de radiologie et d'imagerie diagnostique de la Faculté de médecine et de médecine dentaire de l'Université de l'Alberta. Il est diplômé de l'Université de Calgary, où il a obtenu un baccalauréat ès sciences en génie en 1996 et un doctorat combiné en médecine en 2003. Après sa formation en radiologie à l'Université de l'Alberta (2008), il s'est lancé le défi inhabituel d'entreprendre deux programmes de formation postdoctorale distincts et indépendants dans de prestigieux établissements : d'abord en radiologie pédiatrique au Royal Children's Hospital de Melbourne, en Australie (2010), puis en radiologie musculosquelettique au Massachusetts General Hospital à l'Université Harvard (2011). En septembre 2011, le Dr Jaremko a obtenu la chaire de recherche Capital Health en imagerie diagnostique et son poste actuel de professeur agrégé. Il a aussi été nommé professeur agrégé auxiliaire au département de génie biomédical de l'Université de l'Alberta en septembre 2013.

Le Dr Jaremko est un clinicien-chercheur exemplaire, ce qui est rare en radiologie. Ses capacités de chercheur l'ont amené à collaborer avec des départements et des facultés d'une foule de disciplines aux échelles nationale et internationale. Avec 88 manuscrits publiés, dont 25 en tant qu'auteur principal, il a un nombre remarquable de publications à son actif. Il a en outre obtenu des subventions d'une valeur de 837 454 \$ à titre de chercheur principal et de plus de six millions de dollars en tant que cochercheur ou collaborateur.

Les recherches du Dr Jaremko portent sur la radiologie musculosquelettique chez l'enfant et l'adulte, et s'intéressent particulièrement à l'influence de l'anatomie et du développement des articulations pendant l'enfance sur l'apparition d'affections comme l'arthrose précoce à l'âge adulte. Ses travaux actuels accordent une attention importante à l'échographie avancée, y compris à l'utilisation de l'échographie 3D pour diagnostiquer et prendre en charge la dysplasie de la hanche chez le nouveau-né. Le Dr Jaremko a démontré que l'examen de l'index acétabulaire des nouveau-nés au moyen d'une échographie 3D était un moyen fiable de détecter la dysplasie de la hanche. Il a aussi prouvé que la présence d'un œdème médullaire sur le côté du genou en cas d'arthrose permettait de prédire cinq ans à l'avance le recours à l'arthroplastie, qu'un rachis lombaire plat pouvait tripler la pression exercée sur les facettes des vertèbres lombaires et que l'imagerie par résonance magnétique (IRM) ne permet pas de détecter la sacro-iliite.

En 2015, le Dr Jaremko a cofondé le **Collaborative for Ultrasound Deep Learning (CUDL)**, un groupe composé de chercheurs et de cliniciens multidisciplinaires de divers pays qui croient que les techniques d'apprentissage machine avancées peuvent servir à analyser les images échographiques téléversées (2D ou 3D) et ainsi aider les cliniciens à optimiser le diagnostic et la prise en charge de problèmes de santé allant de la dysplasie de la hanche aux tumeurs des tissus mous, en passant par les maladies cardiaques et athéroscléreuses, les affections musculosquelettiques et les troubles touchant les organes solides.

Le Dr Jaremko a aussi fait ses preuves à titre d'enseignant. Il privilégie une méthode axée sur des cas dans un environnement clinique où évoluent des apprenants aux expériences variées et à divers stades de leur formation. La qualité constante de son enseignement et sa capacité à susciter l'intérêt de son auditoire témoignent de sa passion pour l'éducation, la recherche et la radiologie. Par ailleurs, le Dr Jaremko a supervisé les projets de recherche de 45 étudiants, et son rôle de mentor auprès de la prochaine génération de chercheurs en radiologie a eu une incidence positive sur la carrière d'autres jeunes cliniciens-chercheurs.

En plus d'être un scientifique et un enseignant reconnu, le Dr Jaremko est considéré par ses pairs et collègues comme un excellent clinicien, un membre exemplaire de son département et un digne représentant de la profession.

Nous sommes ravis de lui décerner le Prix du jeune chercheur de la CAR 2018.



## ANNUAL GENERAL MEETINGS

All members are invited to attend the Canadian Association of Radiologists and Canadian Radiological Foundation Annual General Meetings. Breakfast will be served.

Saturday, April 28 | 7:00 – 8:00 am  
Salon Jarry Joyce, Level A

## ASSEMBLÉES GÉNÉRALES ANNUELLES

Tous les membres sont invités à assister aux assemblées générales annuelles de l'Association canadienne des radiologistes et de la Fondation radiologique canadienne. Le petit déjeuner sera servi.

Samedi 28 avril | de 7 h à 8 h  
Salon Jarry Joyce, Niveau A

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## Recent Highlights

- The Ottawa Hospital Radiologist Activity Reporting (RADAR) Productivity Metric: Effects on Radiologist Productivity
- Variable Appearances of Ductal Carcinoma In Situ Calcifications on Digital Mammography, Synthesized Mammography, and Tomosynthesis: A Pictorial Essay
- Clinical Decision Support in Computerized Providers' Order Entry for Imaging Tests in Canada
- Peer Review in Radiology: How Can We Learn From Our Mistakes?

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# THE CAR PARTNER PROGRAM

## LE PROGRAMME DES PARTENAIRES DE LA CAR

The Canadian Association of Radiologists places tremendous value on the industry partnerships it has cultivated. These partnerships are essential for the CAR in achieving its goal of advancing the profession through leadership in healthcare and excellence in patient care. We would like to extend our sincere gratitude to the following CAR partners and supporter for their leadership and continued support.

L'Association canadienne des radiologistes accorde une extrême importance aux partenariats qu'elle forge dans l'industrie. Aux yeux de la CAR, en stimulant le leadership et en encourageant l'excellence en soins de santé, ces ententes sont essentielles à l'avancement de notre profession. C'est pourquoi nous souhaitons exprimer notre sincère reconnaissance envers les partenaires et le sympathisant de la CAR en considération de leurs qualités de leader et de leur appui constant.

### CAR PARTNERS | PARTENAIRES DE LA CAR



# AGENDA

## SOMMAIRE DU PROGRAMME





## AGENDA | SOMMAIRE DU PROGRAMME

- Plenaries | Séances plénières
- Educational Sessions | Séances éducatives
- Research Presentations | Présentations de recherche
- Resident Sessions | Séances réservées aux résidents
- Workshop | Atelier
- Nutritional Breaks | Pauses santé
- CAR and CRF AGMs | Assemblées générales de la CAR et de la FRC
- Social Events | Événements sociaux

### THURSDAY, APRIL 26 | LE JEUDI 26 AVRIL

16:00	Registration Opens	Level 4 Annex
18:00 – 19:00	Opening Cocktail	Level 4 Annex
19:00 – 20:00	<b>Opening Lecture: The Impact of Deep Learning and Artificial Intelligence on Radiology – Ron Summers</b>	Salle de bal ouest, Level 4

### FRIDAY, APRIL 27 | LE VENDREDI 27 AVRIL

06:30 – 07:30	5k Fun Run	Hotel Lobby
07:00 – 07:50	Breakfast	Salle de bal centre, Level 4
07:50 – 08:00	<b>Welcoming Address: Emil Lee, President of the CAR</b>	Salle de bal ouest, Level 4
08:00 – 08:40	<b>Plenary Lecture: What Defines Better? Machine Learning in Medical Imaging</b> <i>James Min</i>	Salle de bal ouest, Level 4
08:00 – 17:00	Scientific and Educational Posters	Level 4 Annex
	<b>AI: Primer</b> <i>Moderator: An Tang</i>	Salle de bal ouest, Level 4
08:45 – 09:00	AI: What This Means for Our Profession – <i>An Tang</i>	
09:00 – 09:20	AI for Radiologists: A Primer – <i>Chris Pal</i>	
09:20 – 09:40	Neural Networks and Deep Learning for Radiologists: How Does It Work? – <i>Chris Pal</i>	
09:40 – 10:10	Highly Augmented Radiology and the Centaur Radiologist: Integrating Machine Learning Into Radiology Practice – <i>Raym Geis</i>	
08:45 – 10:15	<b>Scientific Research Project Oral Presentations</b> <i>Judges: Emily Pang, Francesca Proulx, Vivek Virmani</i>	Salle de bal est, Level 4
09:00 – 11:40	<b>Departmental Clinical Audit Project Oral Presentations</b> <i>Judges: Sukvinder Dhillon, Najla Fasih, Matt McInnes</i>	Jarry/Joyce, Level A
10:15 – 10:40	Break and Posters	

## FRIDAY, APRIL 27 | LE VENDREDI 27 AVRIL (CONTINUED | SUITE)

	<b>AI: Challenges and Controversies in Clinical Applications</b> <i>Moderator: Robyn Cairns</i>	Salle de bal ouest, Level 4
10:40 – 11:00	State of the Art in Radiology: An Overview – <i>Will Guest</i>	
11:00 – 11:20	MSK: What I Have Learned From the RSNA “Bone Age Challenge” – <i>Alexandre Cadrin-Chênevert in collaboration with Alex Bilbily and Mark Cicero</i>	
11:20 – 11:40	Artificial Intelligence in Breast Imaging – <i>Manisha Bahl</i>	
11:40 – 12:10	Artificial Intelligence in Abdominal Radiology – <i>Ron Summers</i>	
	<b>Innovations and Controversies in Residency Education</b> <i>Moderator: David Barnes</i>	Salle de bal est, Level 4
10:40 – 11:10	Canadian Radiologists’ Perception of the PGY-1 Basic Clinical Year: Results of a National Survey <i>Silvia Chang</i>	
11:10 – 11:40	Online Emergency Radiology Simulation – <i>Eric Bartlett and Linda Probyn</i>	
11:40 – 12:10	The Transition to Competency-Based Medical Education: Opportunities and Challenges – <i>James Clarke</i>	
12:15 – 13:15	Lunch & Posters	Level 4 Annex
13:15 – 14:45	<b>Radiologists-in-Training Research Project Oral Presentations</b> <i>Judges: Marco Essig, Faisal Khosa, Marc Levental</i>	Jarry/Joyce, Level A
13:15 – 14:45	<b>Value of Radiology Research Project Oral Presentations</b> <i>Judges: Scott Harris, Nick Neuheimer, Charlotte Yong-Hing</i>	Kafka/Lamartine, Level A
	<b>AI: Challenges and Controversies in Clinical Applications</b> <i>Moderator: Leonid Chepelev</i>	Salle de bal ouest, Level 4
13:15 – 13:20	Introduction: Issues of Interest and Concern for Radiologists – <i>Leonid Chepelev</i>	
13:20 – 13:45	Radiomics and Oncology: An Overview – Access to Big Data and Open Data for Research: A French Perspective – <i>Laure Fournier (SFR Rising Star)</i>	
13:45 – 14:05	Neuro: Deep Learning of Brain MRIs and Its Application to Neurodegenerative Diseases – <i>Roger Tam</i>	
14:05 – 14:25	Cardiac: Recommender Systems for Cardiovascular Disease Research – <i>James Min</i>	
14:25 – 15:00	Vendor Usage Scenarios and Demos – <i>Florent Chandelier (Imagia Cybernetics), Daniel Zikovitz (GE Healthcare), Alok Gupta (IBM Watson Health)</i>	
	<b>Thoracoabdominal CT in 2018</b> <i>Moderator: Iain Kirkpatrick</i>	Salle de bal est, Level 4
13:30 – 14:00	Contrast Considerations in Thoracoabdominal CT in 2018 – <i>Elsie Nguyen</i>	
14:00 – 14:30	How Low Can You Go? Thoracoabdominal CT in 2018 – <i>Cameron Hague</i>	
14:30 – 15:00	Dual Energy Thoracoabdominal CT in 2018 – <i>Iain Kirkpatrick</i>	
15:00 – 15:25	Break & Posters	
15:30 – 17:00	<b>CAR Hot Topics – AI in Canada: Investment, Implementation, and Regulation</b> <i>Moderator: An Tang</i>  <i>Panelists: Robyn Cairns, Alexandre Le Bouthillier, Jonathan Draper, Vijay Rao</i>	Salle de bal ouest, Level 4
17:00 – 18:00	Vendor Cocktail	Salle de bal centre, Level 4
18:30 – 20:00	Reception for Radiologists-in-Training	Sheraton Club, Level 37

## SATURDAY, APRIL 28 | LE SAMEDI 28 AVRIL

07:00 – 08:00	CAR-CRF Annual General Meeting – Breakfast	Jarry/Joyce, Level A
08:00 – 17:00	Scientific and Educational Posters	Level 4 Annex
08:00 – 08:40	<b>Plenary: Endometrial Imaging</b> – <i>Darcy Wolfman</i>	Salle de bal ouest, Level 4
08:45 – 12:15	<b>Prostate MRI and PIRADsv2 Practical Workshop</b> <i>Moderators: Silvia Chang and Masoom Haider</i>	Salon Drummond, Level 3
	<i>Speakers: Sangeet Ghai and Dan Margolis</i> (Advance Registration Required)	
	<b>Updates and Controversies in Emergency Radiology</b> <i>Moderators: Michael Patlas and Mark Levental</i>	Salle de bal ouest, Level 4
08:45 – 09:15	Unusual Cerebral Embolism – <i>Carlos Torres</i>	
09:15 – 09:45	Computed Tomographic Imaging of Acute Pulmonary Embolism – <i>Demetrios Raptis</i>	
09:45 – 10:15	Controversies in Abdominal Trauma – <i>Michael Patlas</i>	
08:45 – 10:15	<b>Panel Discussion for Residents</b> <i>Moderator: Cameron Hague</i>	Salle de bal est, Level 4
	How to Get a Job: Tips from Radiologists Who Have Done It! <i>Panelists: Arlene Kanigan, Tony Sedlic, Lisa Smyth</i>	
08:45 – 10:15	<b>Radiologists-in-Training Research Project Oral Presentations</b> <i>Judges: Marco Essig, Faisal Khosa, Marc Levental</i>	Jarry/Joyce, Level A
10:45 – 12:15	<b>Scientific Research Project Oral Presentations</b> <i>Judges: Emily Pang, Francesca Proulx, Vivek Virmani</i>	Jarry/Joyce, Level A
10:15 – 10:40	Break & Posters	
	<b>Updates and Controversies in Emergency Radiology</b> <i>Moderators: Michael Patlas and Mark Levental</i>	Salle de bal ouest, Level 4
10:45 – 11:15	Pearls and Pitfalls of Cervical Spine Imaging – <i>Savvas Nicolaou</i>	
11:15 – 11:45	MSK Ultrasound in Emergency Patients – <i>Gina Di Primio</i>	
11:45 – 12:15	First Trimester Obstetrical Emergencies Iceberg Ahead! Looking Below the Surface – <i>Ania Kielar</i>	
	<b>Resident Case Review</b> <i>Moderator: Cameron Hague</i>	Salle de bal est, Level 4
10:45 – 11:15	Chest Xray Interpretation: Case-Based Session – <i>Tony Sedlic</i>	
11:15 – 11:45	Abdominal Xray Interpretation: Case-Based Session – <i>Angus Hartery</i>	
11:45 – 12:15	MSK Xray Interpretation: Case-Based Session – <i>Stephany Pritchett</i>	
12:15 – 13:25	Lunch & Posters	Level 4 Annex
	<b>Quality Improvement</b> <i>Moderator: Santanu Chakraborty</i>	Salle de bal ouest, Level 4
13:30 – 14:00	QI Primer: Starting a Quality Improvement Project in Your Department – <i>Santanu Chakraborty</i>	
14:00 – 14:30	Peer Review and Peer Learning – <i>William Miller</i>	
14:30 – 15:00	Disclosure of Adverse Events in Radiology – The Right Thing To Do! – <i>Lorraine LeGrand Westfall</i>	

## SATURDAY, APRIL 28 | LE SAMEDI 28 AVRIL (CONTINUED | SUITE)

	<b>Ultrasound</b> <i>Moderator: Tanya Chawla</i>	Salle de bal est, Level 4
13:30 – 14:00	Practical Approach to Adnexal Masses – <i>Darcy Wolfman</i>	
14:00 – 14:30	Ultrasound of the Bowel – How I Do It – <i>Tanya Chawla</i>	
14:30 – 15:00	Outpatient Musculoskeletal Ultrasound – <i>Rakesh Mohankumar</i>	
13:30 – 15:00	<b>Junior/Senior Resident Hot Seat Sessions</b> <i>Moderator: Cameron Hague</i>	Salon 4 & 5, Level 2
	Junior Hot Seats PGY-1, 2, 3 <i>Connie Hapgood and Mario Kontolemos</i>	Senior Hot Seats PGY 3, 4, 5 <i>Angus Hartery and Lisa Smyth</i>
15:00 – 15:25	Break & Posters	
15:30 – 17:00	<b>Image Interpretation Panel</b> <i>Moderator: Bruce Forster</i>  <i>Participants: Simon Bicknell, Nathalie Bureau, Carolyn Flegg, Veronique Freire, Angus Hartery, João Inácio, David Lautner, Carlos Torres</i>	Salle de bal ouest, Level 4
17:00 – 17:30	Cocktails	Salle de bal centre, Level 4
17:35 – 19:00	<b>Awards Ceremony</b> Presentation of the Young Investigator Award, Gold Medal, Distinguished Career Achievement Award, Fellowship of the CAR, and prizes for the abstract categories	Salle de bal ouest, Level 4

## SUNDAY, APRIL 29 | LE DIMANCHE 29 AVRIL

07:00 – 08:00	Breakfast	Level 4 Annex
08:00 – 08:40	<b>Plenary: Artificial Intelligence and Medical Legal Issues</b> <i>Lorraine LeGrand Westfall</i>	Salle de bal ouest, Level 4
	<b>Mistakes We All Make</b> <i>Moderator: Caitlin McGregor</i>	Salle de bal ouest, Level 4
08:45 – 09:15	Chest Imaging – <i>Hamid Bayananti</i>	
09:15 – 09:45	Neuroradiology – <i>Maria del Pilar Cortes</i>	
09:45 – 10:15	Musculoskeletal Imaging – <i>Nathalie Bureau</i>	
10:15 – 10:40	Break	
10:45 – 11:15	Emergency Radiology – <i>Michael O'Keefe</i>	
11:15 – 11:45	Abdominal Imaging – <i>Paul Hamilton</i>	
11:45 – 12:15	Breast Imaging – <i>Nancy Wadden</i>	
12:15 – 12:30	<b>Closing Remarks</b> – <i>Michael Patlas</i>	Salle de bal ouest, Level 4

# SCIENTIFIC PROGRAMME COMMITTEE

## COMITÉ DU PROGRAMME SCIENTIFIQUE

The CAR wishes to extend its sincere thanks to the volunteer members of the CAR 2018 ASM Working Group. It is their dedication, expertise and pursuit of excellence that has shaped this year's outstanding educational programme.

La CAR souhaite transmettre ses remerciements les plus sincères aux membres bénévoles du groupe de travail du Congrès scientifique annuel CAR 2018. Leur dévouement, leur expertise et leur volonté d'exceller ont façonné l'excellent programme de formation de cette année.

### Co-Chairs | Coprésidents



Jonathon Leipsic, MD  
(British Columbia | Colombie-Britannique)



Michael Patlas, MD  
(Ontario)

### Working Group Members

Basma Al-Arnawoot, MD (Ontario)

Tanya Chawla, MD (Ontario)

Carole Dennie, MD (Ontario)

Gina Di Primio, MD (Ontario)

Connie Hapgood, MD (Newfoundland and Labrador |  
Terre-Neuve-et-Labrador)

Iain Kirkpatrick, MD (Manitoba)

Mario Kontolemos, MD (Ontario)

Caitlin McGregor, MD (Ontario)

Kyle Moulton, MD (Saskatchewan)

Angela Pickles, MD (Newfoundland and Labrador |  
Terre-Neuve-et-Labrador)

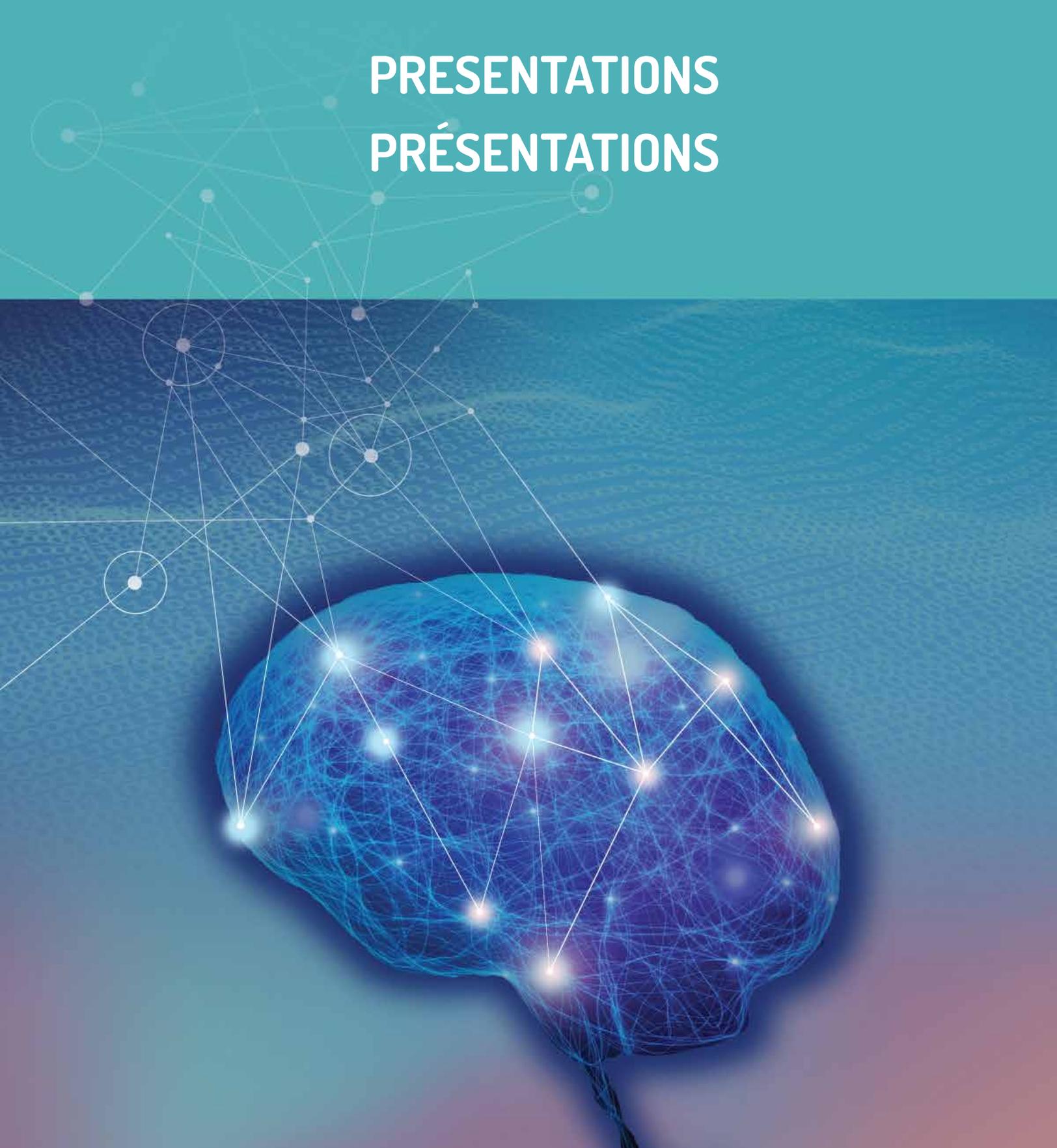
Francesca Proulx, MD (Quebec | Québec)

Elena Scali, MD (British Columbia | Colombie-Britannique)

Gilles Soulez, MD (Quebec | Québec)

Michelle Zhang, MD (Quebec | Québec)

# PRESENTATIONS PRÉSENTATIONS



## OPENING LECTURE – THURSDAY, APRIL 26, 2018

### THE IMPACT OF DEEP LEARNING AND ARTIFICIAL INTELLIGENCE ON RADIOLOGY

Ron Summers, MD, PhD  
19:20 – 20:00  
Salle de bal ouest

**PRESENTATION SUMMARY:** Major advances in computer science and artificial intelligence, in particular “deep learning”, are beginning to have an impact on radiology. There has been an explosion of research interest and number of publications about the use of deep learning in radiology. In this presentation, I will show examples of how deep learning has led to major improvements in automated radiology image analysis, especially for image segmentation and computer aided diagnosis.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe how deep learning has accelerated progress in computer-aided diagnosis in radiology
2. Recognize how the radiology report can be used to train a deep learning system to detect abnormalities in radiology images
3. Identify and assess the breadth of applications of deep learning and AI in radiology

## MORNING TRACKS – FRIDAY, APRIL 27, 2018

### WELCOMING ADDRESS

Emil Lee, MD, President of the Canadian Association of Radiologists

07:50 – 08:00  
Salle de bal ouest

### PLENARY LECTURE: WHAT DEFINES BETTER? MACHINE LEARNING IN MEDICAL IMAGING

James Min, MD  
08:00 – 08:40  
Salle de bal ouest

#### PRESENTATION SUMMARY:

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the basic concepts of machine learning
2. Describe the application of machine learning to medical imaging
3. Assess the application of machine learning to clinical risk prediction

## AI: PRIMER

Moderator: An Tang, MD  
08:45 – 10:10  
Salle de bal ouest

### AI: What This Means for Our Profession

*An Tang, MD 08:45 – 09:00*

**PRESENTATION SUMMARY:** The Canadian Association of Radiologists (CAR) has created an artificial intelligence (AI) working group with the mandate to discuss and deliberate on practice, policy, and patient care issues related to the introduction of AI in radiology. This presentation will discuss key terminology, educational needs of members, research and development, potential clinical applications, and role of radiologists. We will also present an overview of the scientific program of the meeting's theme of AI in Radiology.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify learning strategies to stay informed on technical developments on artificial intelligence (AI) in radiology
2. Describe potential use cases of AI in radiology
3. Recognize that artificial intelligence applications may be used for triage, replacement, or add-on tasks in clinical workflows

### AI for Radiologists: A Primer

*Chris Pal, PhD 09:00 – 09:20*

**PRESENTATION SUMMARY:** This presentation will give a broad overview of Artificial Intelligence (AI) techniques, guiding a radiologist through different situations where different types of AI techniques are applicable. A wide range of techniques will be discussed across the history of technical advances in AI. The relationships of different techniques to their applications in medicine, molecular biology and radiology will be of particular focus. The presentation will end with a discussion of the reasons behind the recent revolution in AI brought about by an approach to machine learning known as deep learning.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify situations where different types of AI techniques can be used
2. Describe the principles behind different types of methods
3. Identify use case scenarios for AI techniques while accounting for strengths, weaknesses and limitations of different techniques

# MORNING TRACKS – FRIDAY, APRIL 27, 2018

## AI: PRIMER (CONTINUED)

Moderator: An Tang, MD  
08:45 – 10:10  
Salle de bal ouest

### Neural Networks and Deep Learning for Radiologists: How Does It Work?

*Chris Pal, PhD 09:20 – 09:40*

**PRESENTATION SUMMARY:** This presentation will provide radiologists with a high level view of deep learning. The general approach to learning model parameters using training data, evaluating models and adjusting model hyper-parameters using validation data and testing models using test data will be examined. This talk will survey different types of deep neural network architectures while drawing connections to their applications to both general purpose problems as well as more specialized problems in radiology.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify situations where different deep learning techniques can be used
2. Describe the principles behind deep learning methods
3. Identify use case scenarios for deep learning techniques

### Highly Augmented Radiology and the Centaur Radiologist: Integrating Machine Learning Into Radiology Practice

*Raym Geis, MD 09:40 – 10:10*

**PRESENTATION SUMMARY:** “Narrow AI,” also known as “Weak AI,” tools will soon be available as focused tools for a variety of image interpretation functions, much like today we use CAD or MPR tools to help us interpret radiology exams. We will discuss issues around evaluating these tools to determine if they are appropriate to include in day-to-day clinical workflow, how to monitor them once they are installed, and things to think about when deciding to use AI in clinical practice.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify where AI will first appear in clinical radiology workflow
2. Describe the basics of how to assess if AI algorithms are ready for clinical practice
3. Assess the issues around monitoring AI algorithms in clinical practice

# MORNING TRACKS – FRIDAY, APRIL 27, 2018

## AI: CHALLENGES AND CONTROVERSIES IN CLINICAL APPLICATIONS

Moderator: Robyn Cairns, MD  
10:40 – 12:10  
Salle de bal ouest

### State of the Art of AI in Radiology: An Overview

*Will Guest, MD, PhD 10:40 – 11:00*

**PRESENTATION SUMMARY:** Artificial intelligence algorithms continue to improve their performance in tasks involving image recognition, segmentation, and classification. I will survey the major technical advances in these domains that have occurred in the past year and discuss their implications for the adoption of machine learning tools in the radiology clinical workflow.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Review recent developments in machine learning research as applied to medical image analysis
2. Discuss the relevance of these developments to the clinical practice of radiology in the medium term

### MSK: What I Have Learned from the RSNA "Bone Age Challenge"

*Alexandre Cadrin-Chênevert, MD, in collaboration with Mark Cicero, MD, and Alex Bilbily, MD 11:00 – 11:20*

**PRESENTATION SUMMARY:** In 2017, RSNA organized its first machine learning research challenge. The goal was to develop an algorithm, trained on previously reported exams, which can most accurately and automatically determine skeletal age on a validation set of pediatric hand radiographs. The competition has led to state of the art results compared to previous research.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify a new research model: public machine learning challenges applied to medical imaging
2. Describe state of the art results from the RSNA bone age challenge
3. List educational resources and learning tools to participate in future competitions

### Artificial Intelligence in Breast Imaging

*Manisha Bahl, MD 11:20 – 11:40*

**PRESENTATION SUMMARY:** Machine learning refers to algorithms that can be designed to evaluate and make predictions on the basis of new and complex features. There is increasing interest in the application of machine learning to radiology to improve clinical practice. In breast imaging, machine learning models could support informed decision-making for patients and their providers with regard to the management of high-risk breast lesions and ductal carcinoma in situ (DCIS).

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Define artificial intelligence, deep learning, and machine learning
2. Identify emerging applications of machine learning to breast imaging

# MORNING TRACKS – FRIDAY, APRIL 27, 2018

## AI: CHALLENGES AND CONTROVERSIES IN CLINICAL APPLICATIONS (CONTINUED)

Moderator: Robyn Cairns, MD  
10:40 – 12:10  
Salle de bal ouest

### Artificial Intelligence in Abdominal Radiology

*Ron Summers, MD, PhD* 11:40 – 12:10

**PRESENTATION SUMMARY:** “Deep learning” has led to major advances in automated analysis of abdominal radiology images. In this presentation, I will show how deep learning has enabled fully-automated interpretation of a diverse spectrum of abdominal radiology images and diagnostic tasks, including prostate MRI biopsy guidance, lymphadenopathy detection, and opportunistic screening for various diseases.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the breadth of applications of deep learning for abdominal radiology
2. Assess how opportunistic screening enabled by AI can benefit patients
3. Identify some of the challenges facing development and adoption of AI in abdominal radiology

## INNOVATIONS AND CONTROVERSIES IN RESIDENCY EDUCATION

David Barnes, MD  
10:40 – 12:10  
Salle de bal est

### Canadian Radiologists’ Perception of the PGY-1 Basic Clinical Year: Results of a National Survey

*Silvia Chang, MD* 10:40 – 11:10

**PRESENTATION SUMMARY:** Most radiologists and radiologists in training are in favour of including a Basic Clinical Year in Radiology Residency Programs. To maximize the value of this year, including more of the top ranked rotations in the PGY-1 Basic Clinical Year should be considered, namely general surgery, surgical subspecialties and emergency medicine. Additionally, residents with a strong desire to pursue subspecialty training may benefit from completing more clinical rotations relevant to their area of interest.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the current status of the Basic Clinical Year (BCY)
2. Recognize the current controversies regarding the BCY
3. Summarize the Canadian data regarding the BCY

# MORNING TRACKS – FRIDAY, APRIL 27, 2018

## INNOVATIONS AND CONTROVERSIES IN RESIDENCY EDUCATION (CONTINUED)

David Barnes, MD  
10:40 – 12:10  
Salle de bal est

### Online Emergency Radiology Simulation

*Eric Bartlett, MD, and Linda Probyn, MD* 11:10 – 11:40

**PRESENTATION SUMMARY:** The presentation will describe various types of simulation that can be used in radiology education including online simulators, ultrasound procedural models, hybrid simulation and in-situ simulation. Specific examples of simulators will be discussed in more detail and how these have been successfully integrated into the radiology curriculum to assess progression through the training continuum. Hybrid simulation is described and how this can be used to teach and assess various CanMEDs roles.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe various types of simulation that can be used in radiology education
2. Discuss how simulation in radiology can be used as an assessment tool to improve performance

### The Transition to Competency-Based Medical Education: Opportunities and Challenges

*James Clarke, MD* 11:40 – 12:10

**PRESENTATION SUMMARY:** This brief presentation will outline the Royal College Competence By Design framework and will highlight some of the discipline specific issues that will be faced by programs as they transition to a competence-based education model.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Discuss the framework for Competence By Design
2. Realize the opportunities and challenges that arise from the implementation of a competency-based education model in a diagnostic imaging environment

# AFTERNOON TRACKS – FRIDAY, APRIL 27, 2018

## AI: CHALLENGES AND CONTROVERSIES IN CLINICAL APPLICATIONS (CONTINUED)

Moderator: Leonid Chepelev, MD  
13:15 – 15:00  
Salle de bal ouest

### Introduction: Issues of Interest and Concern for Radiologists

*Will Guest, MD, PhD* 13:15 – 13:20

**PRESENTATION SUMMARY:** Artificial Intelligence is poised to dramatically transform radiology, potentially widening the range of possible clinical applications of this field while providing improvements in throughput. This introductory presentation will provide a brief overview of several key concepts in radiological AI and discuss some of the potential solutions for radiological AI implementation in clinical practice.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Provide a brief overview of challenges and opportunities in AI implementation in radiology
2. Introduce the concepts of adequate data provenance, appropriate algorithm benchmarking, and the potential AI implementation approaches

### Radiomics and Oncology: An Overview – Access to Big Data and Open Data for Research: A French Perspective

*Laure Fournier, MD (Société Française de Radiologie Rising Star)* 13:25 – 13:45

**PRESENTATION SUMMARY:** Radiomics is a new ‘data-driven’ approach for extracting large sets of complex descriptors from routine (or not) clinical images, such as texture analysis from histograms, co-occurrence matrices, etc. This large set of data can be analysed using bio-informatics and bio-statistics methods defining imaging ‘profiles’ correlated to gene expression profiles, often called radiogenomics, or to outcomes, such as treatment response or survival. The further development of these new methods faces challenges regarding data generation and access.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Apply new methods of image analysis derived from ‘-omics’ methods deriving ‘big data’ from images
2. Interact with bio-informatics specialists to process data derived from images using feature reduction strategies, clustering and heat maps
3. Implement strategies to collect data for future use in radiomics and big data research

### Neuro: Deep Learning of Brain MRIs and Its Application to Neurodegenerative Diseases

*Roger Tam, PhD* 13:45 – 14:05

**PRESENTATION SUMMARY:** This presentation describes the key challenges and limitations with the conventional approach to discovering and using imaging biomarkers, and how machine learning, specifically deep learning, can complement traditional methods by automatic feature extraction and modeling of complex relationships between a large number of variables. Examples of applications in differential diagnosis and clinical prediction in neurodegenerative diseases are described.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify the key challenges and limitations with the conventional approach to discovering and using imaging biomarkers
2. Discuss how deep learning can be used to automatically extract image features that target clinical outcomes, via the process of supervised dimensionality reduction
3. Recognize how deep learning can be applied to brain MRIs to perform differential diagnosis and clinical prediction in neurodegenerative diseases

# AFTERNOON TRACKS – FRIDAY, APRIL 27, 2018

## AI: CHALLENGES AND CONTROVERSIES IN CLINICAL APPLICATIONS (CONTINUED)

Moderator: Leonid Chepelev, MD  
13:15 – 15:00  
Salle de bal ouest

### Cardiac: Recommender Systems for Cardiovascular Disease Research

James Min, MD 14:05 – 14:25

#### PRESENTATION SUMMARY:

#### LEARNING OBJECTIVES:

### Vendor Usage Scenarios and Demos

Florent Chandelier, PhD – *Imagia Cybernetics*, Alok Gupta, PhD – *IBM Watson Health*, Daniel Zikovitz, PhD – *GE Healthcare* 14:25 – 15:00

**PRESENTATION SUMMARY:** Representatives from industrial partners will present on current prototypes and products that are integrating AI, deep learning, and machine learning techniques into clinical workflows for particular usage scenarios. The presentations will give practical and tangible examples of how industry, research, and clinical stakeholders are interacting to enhance radiology workflows using cutting-edge research.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe current industry trends in clinical applications of AI, deep learning, machine learning techniques
2. Assess the relationship between stakeholders engaged in scientific research, industrial applications, and clinical practice
3. Identify the possible opportunities for enhancements to radiology workflows brought by the integration of AI

# AFTERNOON TRACKS – FRIDAY, APRIL 27, 2018

## THORACOABDOMINAL CT IN 2018

Moderator: Iain Kirkpatrick, MD  
13:15 – 15:00  
Salle de bal est

### Contrast Considerations in Thoracoabdominal CT in 2018

*Elsie Nguyen, MD 13:15 – 13:45*

**PRESENTATION SUMMARY:** This presentation will review the literature on the risk of CT contrast nephropathy, how the risk may be considerably lower than what we think and how this should inform CT contrast policies for varying degrees of renal dysfunction, etc. Various clinical scenarios will be presented to show when injecting a small volume of CT contrast would be desirable to highlight certain pathology, and in the context of CTA prior transcatheter aortic valve replacement (TAVR), how the contrast volume injected can be reduced to accommodate patients with moderate to severe renal dysfunction.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Explain why the risk of CT contrast associated nephropathy may be lower than we think
2. Describe one example of a low contrast volume protocol for CT angiography prior to transcatheter aortic valve replacement (TAVR)
3. Describe 2 other clinical scenarios where a low contrast volume CT protocol may be beneficial

### How Low Can You Go? Thoracoabdominal CT in 2018

*Cameron Hague, MD 13:45-13:15*

**PRESENTATION SUMMARY:** This talk is a brief overview of various radiation dose reduction strategies targeted towards the general radiologist. The focus will be on examining the physics behind dose reduction techniques and learning which dose reduction strategy to employ.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Discuss the basic physics of radiation dose reduction
2. Review examples of which dose reduction tools to utilize

### Dual Energy Thoracoabdominal CT in 2018

*Iain Kirkpatrick, BSc, BSc (Med), MD, FRCP(C), DABR, FSAR 14:15 – 14:45*

**PRESENTATION SUMMARY:** The presentation will briefly review the principles behind dual energy CT, followed by discussion of potential real-world applications of dual energy in the chest and abdomen. The focus will be on applications with real world benefits, with an emphasis on how you can add dual energy scanning to your practice with a minimal impact to your daily workflow.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Recognize the principles behind and current techniques of acquiring dual energy CT
2. Discuss dual energy CT applications in thoracic imaging, including CT angiography of the thoracic aorta and pulmonary arteries, as well as stent graft imaging
3. Review abdominal dual energy CT applications, including its benefits for abdominal CT angiography, mesenteric ischemia and GI bleed CT, and multiphase liver and pancreatic CT

# EVENING TRACKS – FRIDAY, APRIL 27, 2018

## CAR HOT TOPICS – AI IN CANADA: INVESTMENT, IMPLEMENTATION AND REGULATION

Moderator: An Tang, MD  
15:30- 17:00  
Salle de bal ouest

Panel session focused on how investment in artificial intelligence is fueling the implementation of the technology medical applications

*Vijay Rao, MD, Alexandre Le Bouthillier, PhD, Robyn Cairns, MD, Jonathan Draper*

**PANEL SUMMARY:** This session will focus on how investment in artificial intelligence is fueling the implementation of the technology medical applications. The imaging community is seeking answers about the pressures created by a rapidly evolving industrial R&D environment, coupled with intensifying investment. The panel will explore how the various stakeholders are reacting to, regulating, and/or accelerating the process of investment and implementation as a whole. There is clearly potential for the value of care; we want to address the question of who is being charged with guiding and managing this process, while putting patients first?

Introductory remarks by each panelist will be followed by a group discussion moderated by Dr. An Tang, including audience Q&A.

# MORNING TRACKS – SATURDAY, APRIL 28, 2018

## PLENARY: ENDOMETRIAL IMAGING

Darcy Wolfman, MD  
08:00 – 08:40  
Salle de bal ouest

**PRESENTATION SUMMARY:** Topics covered will include endometrial polyp and endometrial carcinoma, including diagnosis and staging with an emphasis on radiologic-pathologic correlation.

### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Compare and contrast the underlying pathology of endometrial hyperplasia and endometrial polyp and how this relates to the imaging findings in these disease entities
2. Describe the ultrasound imaging findings of endometrial carcinoma
3. Identify and describe the imaging findings that change management in endometrial cancer staging

## PROSTATE MRI AND PIRADSV2 PRACTICAL WORKSHOP

Moderators: Silvia Chang, MD, and Masoom Haider, MD  
Speakers: Sangeet Ghai, MD and Daniel Margolis, MD  
08:45 – 12:15  
Salon Drummond, Level 3  
**Pre-registration is required.**

**PRESENTATION SUMMARY:** Short high-impact didactic sessions will be followed by hands-on review of complete prostate MRI image files. Participants will be able to simulate real case-reporting with the benefit of individualized feedback from instructors. The workshop will cover PIRADSV2 technique with examples of good and poor-quality images, PIRADSV2 interpretation of cases with an official template, and the opportunity to review cases. The workshop will close with an interactive group session with using an audience response system to examine additional and particularly challenging cases. The session will conclude with an audience response system for additional case-based learning.

### LEARNING OBJECTIVES:

At the end of this simulation workshop, the participants should be able to:

1. Perform and interpret prostate MRI in accordance to PIRADSV2
2. Create a standardized template report and
3. Recognize pitfalls and mimics in interpreting multi-parametric prostate MRI.

## UPDATES AND CONTROVERSIES IN EMERGENCY RADIOLOGY

Moderators: Michael Patlas, MD, and  
Mark Levental, MD  
08:45 – 10:15  
Salle de bal ouest

### Unusual Cerebral Embolism

*Carlos Torres, MD 08:45 – 09:15*

**PRESENTATION SUMMARY:** The heart and the carotid arteries are the most common sites of origin of embolic disease to the brain. These emboli consist mainly of red blood cells, platelets and fibrin. However, there are other less common cerebral emboli with different composition including air, fat, calcium and tumor cells. Some of these emboli could have a different site of origin, including the venous system. While infarcts can be the final result of any type of embolism, here we describe the ancillary and sometimes unique imaging features of less common types of cerebral emboli that may allow for a specific diagnosis to be made or at least suspected in many patients.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the general features of cerebral emboli
2. Review multiple uncommon sources of cerebral embolism and describe their key imaging features on CT and MRI

### Computed Tomographic Imaging of Acute Pulmonary Embolism

*Demetrios Raptis, MD 09:15 – 09:45*

**PRESENTATION SUMMARY:** Acute pulmonary embolism is a potentially life-threatening condition. In the era of CT, the radiologist plays an essential role in making a timely diagnosis. This talk aims to review the computed tomographic findings of acute pulmonary embolism while briefly discussing imaging technique in the emergency setting. While discussing the findings of acute pulmonary embolism, we will also discuss alternative diagnoses, as well as imaging artifacts and mimickers.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Review the imaging findings of pulmonary embolism
2. Identify alternative diagnoses to explain clinical symptoms
3. Discuss imaging artifacts encountered when evaluating for pulmonary embolism

### Controversies in Abdominal Trauma

*Michael Patlas, MD 09:45 – 10:15*

**PRESENTATION SUMMARY:** Multi-detector computed tomography (MDCT) is the modality of choice for the comprehensive imaging evaluation of patients with blunt abdominal and pelvic trauma. Errors in the interpretation of trauma MDCT may cause disastrous consequences. This presentation will discuss the most challenging MDCT findings in abdominal and pelvic trauma patients and will emphasize the practical solutions to avoid delayed diagnosis of these potentially life-threatening injuries.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Explain current concepts of MDCT technique in patients with blunt abdominal trauma
2. List critical abdominal imaging findings in trauma patients
3. Discuss common mistakes in interpretation of cases of blunt abdominal trauma

# MORNING TRACKS – SATURDAY, APRIL 28, 2018

## PANEL DISCUSSION FOR RESIDENTS

Moderator: Cameron Hague, MD  
08:45 – 10:15  
Salle de bal est

### How to Get a Job: Tips From Radiologists Who Have Done It!

Panelists: Arlene Kanigan, MD, Tony Sedlic, MD, and Lisa Smyth, MD

**PRESENTATION SUMMARY:** This is a panel discussion will cover common scenarios experienced by other residents as they enter the second half of their residency and consider career options. It will review how to begin thinking about a career, finding the fit, considering a fellowship, and the radiology job interview. This will include commonly asked questions, interview tips, techniques, things to avoid and interview pitfalls.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Apply strategies to prepare for life after residency
2. Assess and evaluate career options and pathways
3. Anticipate and prepare for questions likely to be asked at a radiology job interview
4. Apply methods that will help mitigate interview pitfalls
5. Practice technique tips for a successful interview

# MORNING TRACKS – SATURDAY, APRIL 28, 2018

## UPDATES AND CONTROVERSIES IN EMERGENCY RADIOLOGY

Moderators: Michael Patlas, MD, and  
Mark Levental, MD  
10:45 – 12:15  
Salle de bal ouest

**PRESENTATION SUMMARY:** Multi-detector computed tomography (MDCT) is the modality of choice for the comprehensive imaging evaluation of patients with blunt abdominal and pelvic trauma. Errors in the interpretation of trauma MDCT may cause disastrous consequences. This presentation will discuss the most challenging MDCT findings in abdominal and pelvic trauma patients and will emphasize the practical solutions to avoid delayed diagnosis of these potentially life-threatening injuries.

### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Explain current concepts of MDCT technique in patients with blunt abdominal trauma
2. List critical abdominal imaging findings in trauma patients
3. Discuss common mistakes in interpretation of cases of blunt abdominal trauma

## Pearls and Pitfalls of Cervical Spine Imaging

*Savvas Nicolaou, MD 10:45 – 11:15*

### PRESENTATION SUMMARY:

The presentation will outline the following:

- Occipital Condyle Fracture:
  - Avulsion of alar ligaments- type 3 unstable Coronal CT key image
- C1 Jefferson:
  - Classic vs. Atypical
  - Anterior tubercle avulsion injuries
  - Rule of Spence > 7mm unstable TL rupture
- C2 Odontoid:
  - Harris Ring if disrupted indicates type 3, type 2 highest non-union rates unstable
- C2 Hangman Fracture:
  - Hyperflexion component involved look for vascular injury, CTA is a must, most common C spine fracture
- Hyperflexion Injury:
  - It is a spectrum
  - Interspinous widening, be on the lookout for a disc protrusion on soft tissue windows
- Hyperextension dislocation Injury:
  - Facial Injury
  - Prevertebral Soft Tissue Swelling danger sign
  - Small horizontal bone density at the anterior inferior corner, width greater than height
  - Central Cord Syndrome

### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the mechanism of injury involved in common c-spine injuries Identify optimal imaging strategies in the investigation of neck trauma
2. Describe a systematic approach in identifying c-spine injuries on CT
3. Describe the utility for screening for blunt cerebrovascular injuries Identify potential pitfalls in interpreting c-spine imaging exams

# MORNING TRACKS – SATURDAY, APRIL 28, 2018

## UPDATES AND CONTROVERSIES IN EMERGENCY RADIOLOGY

(CONTINUED)

Moderators: Michael Patlas, MD, and  
Mark Levental, MD  
10:45 – 12:15  
Salle de bal ouest

### MSK Ultrasound in Emergency Patients

*Gina Di Primio, MD* 11:15 – 11:45

**PRESENTATION SUMMARY:** The presentation will review the advantages of ultrasound use in the Emergency department for musculoskeletal concerns. It will also demonstrate when Ultrasound is best for confirming a specific diagnosis and how it can be used to manage the diagnosis and treatment of foreign bodies.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify when ultrasound is most useful in establishing a confirmed diagnosis requiring immediate attention for the ER patient
2. Differentiate the difference between partial & full thickness tears
3. Recommend the appropriate imaging test and protocol for patients who present with musculoskeletal emergencies.

### First Trimester Obstetrical Emergencies Iceberg ahead! Looking below the surface

*Ania Kielar, MD* 11:45 – 12:15

**PRESENTATION SUMMARY:** This didactic presentation will have a case-based theme to illustrate a spectrum of 1st trimester obstetrical emergencies. Most appropriate imaging, including MR imaging protocols, will be reviewed in order to efficiently diagnose these potentially life-threatening conditions.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Create a list of conditions that can occur in first trimester of pregnancy that are life threatening to the mother
2. Describe imaging findings that are diagnostic of key 1st trimester obstetric emergencies
3. Choose the appropriate imaging modality with which to evaluate women who are in 1st trimester of pregnancy and require cross-sectional evaluation

# MORNING TRACKS – SATURDAY, APRIL 28, 2018

## RESIDENT CASE REVIEW

Moderator: Cameron Hague, MD  
10:45 – 12:15  
Salle de bal est

### Chest X-ray Interpretation: Case-Based Session

*Tony Sedlic, MD 10:45 – 11:15*

**PRESENTATION SUMMARY:** This session will review an approach to chest radiographs and how to improve performance in read-out, in rounds, and at the Royal College exam. It will examine common cases and how to narrow the differential diagnosis.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Apply methods to approaching the chest radiograph: Rounds and at the Royal College exam
2. Review common cases and differential diagnoses

### Abdominal X-ray Interpretation: Case-Based Session

*Angus Hartery, MD 11:15 – 11:45*

**PRESENTATION SUMMARY:** Case-based review lecture highlighting high-yield cases for common (and/or important) differential diagnoses on the abdominal x-ray. An emphasis will be placed on what the graduating resident needs to know. Cases will be presented as unknowns on abdominal x-ray.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Recognize abnormal and normal patterns of air on the abdominal x-ray.
2. Recognize abnormal solid visceral pathology on the abdominal x-ray.
3. Recognize abnormal gastrointestinal tract pathology on the abdominal x-ray.
4. Recognize abnormal calcification patterns on the abdominal x-ray.

### MSK X-Ray Interpretation: Case-Based Session

*Stephany Pritchett, MD 11:45 – 12:15*

**PRESENTATION SUMMARY:** This session will review approaches to MSK radiographs and how to improve performance in read-out, in rounds, and at the Royal College exam.

#### LEARNING OBJECTIVES:

1. Apply methods to approaching the MSK radiograph: Rounds and at the Royal College Exam
2. Review common cases and differential diagnoses

# AFTERNOON TRACKS – SATURDAY, APRIL 28, 2018

## QUALITY IMPROVEMENT

Moderator: Santanu Chakraborty, MD  
13:30 – 15:00  
Salle de bal ouest

### QI Primer: Starting a Quality Improvement Project in Your Department

*Santanu Chakraborty, MD 13:30 – 14:00*

**PRESENTATION SUMMARY:** Attendees will be able to discuss the difference between quality improvement, quality assurance and qualitative research. They will understand the basic steps of quality improvement projects and will be ready to start quality improvement projects in their department.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Define quality improvement and apply the steps involved to initiate /implement QI projects in their department
2. Construct a quality improvement process in the department.
3. Realize the importance of peer review/peer learning efforts and how it improves accountability. recognize the difference of processes between peer learning and medicolegal concern.
4. Consider the quality of care information protection and duty to disclose errors from an ethical and legal perspectives.

### Peer Review and Peer Learning

*Willie Miller, MD 14:00 – 14:30*

**PRESENTATION SUMMARY:** Review history of medical and radiological peer review. Discuss issues and problems with peer review. Present current state in Canada. Discuss a shift to peer learning. A brief discussion of Quality culture.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe the history of medical and radiological peer review
2. Identify issues and problems with peer review
3. Describe the current state of peer review in Canada
4. Differentiate peer learning from peer review

### Disclosure of Adverse Events in Radiology – The Right Thing To Do!

*Lorraine LeGrand Westfall, MD 14:30 – 15:00*

**PRESENTATION SUMMARY:** CMPA will provide information on the medical legal risks for radiologists and outline the legal, ethical and professional obligations of disclosure and reporting of adverse events. The participant will develop communication tools to address medical legal risks.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify two medical legal risks of the radiology practice
2. Analyze physicians' obligations related to the disclosure and reporting of adverse events
3. Apply two communication tools to improve safety of care delivery in radiology

# AFTERNOON TRACKS – SATURDAY, APRIL 28, 2018

## ULTRASOUND

Moderator: Tanya Chawla, MD  
13:30 – 15:00  
Salle de bal est

### Practical Approach to Adnexal Masses

*Darcy Wolfman, MD* 13:30 – 14:00

**PRESENTATION SUMMARY:** Lecture will include a practical way to diagnosis adnexal masses encountered at US, including when follow up is necessary.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify benign ovarian lesions on ultrasound
2. Describe the ultrasound imaging findings of benign and malignant adnexal lesions
3. Summarize a practical algorithm to distinguish benign and malignant adnexal lesions

### Ultrasound of the Bowel: How I Do It!

*Tanya Chawla, MD* 14:00 – 14:30

**PRESENTATION SUMMARY:** Sonography remains a first line modality of imaging in the initial evaluation of patients with acute abdominal pain. Its cost effectiveness, negative predictive value and portable nature lend itself to primary assessment of suspected disease within the GI tract. This presentation will aim to provide an approach to the normal anatomy, a range of conditions encountered and potential differential diagnoses when performing US in the adult patient. IBD will not be discussed.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Describe normal sonographic anatomy of the bowel
2. Discuss a range of infectious, inflammatory and neoplastic conditions that are commonly seen when evaluating bowel in an adult patient.
3. Discuss utility of an algorithmic approach to differential diagnosis in this setting

### Outpatient Musculoskeletal Ultrasound

*Rakesh Mohankumar, MD* 14:30 – 15:00

**PRESENTATION SUMMARY:** A case-based review of common elective musculoskeletal ultrasound imaging, including common techniques and indications of such imaging.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Evaluate the common indications in the frequently encountered elective musculoskeletal ultrasound imaging, including shoulder, elbow, hand and wrist, knee and ankle
2. Appraise the common techniques used in such imaging
3. Recognize pitfalls frequently encountered during elective musculoskeletal ultrasound imaging

# AFTERNOON TRACKS – SATURDAY, APRIL 28, 2018

## JUNIOR/SENIOR RESIDENT HOT SEAT SESSIONS

13:30 – 15:00  
Salon 4 & 5, Level 2  
Moderator: Cameron Hague, MD

Small group session for radiology residents who have pre-registered for this opportunity. Restricted attendance.

### JR Hot Seats (PGY 1, 2 and 3)

*Connie Hapgood, MD, and Mario Kontolemos, MD* 13:30 – 15:00

### SR Hot Seats (PGY 3, 4, 5)

*Angus Hartery, MD, and Lisa Smyth, MD* 13:30 – 15:00

**OVERALL PRESENTATION SUMMARY:** This session will provide participating residents with a foundation for approaching cases in a “hot seat” setting in preparation for various examinations. All areas of radiology will be covered. Each resident will receive at least four training-appropriate cases. The cases will be discussed and feedback will be given. Presentation of abdominal imaging cases in Junior Hot Seat session.

#### OVERALL LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Assimilate and apply pertinent differential diagnoses in radiology related to the sample cases
2. Apply a patterned approach to radiographic disease via a case-based approach
3. Analyze feedback received from the moderators and use it to improve skills while interpreting cases orally

# EVENING TRACKS – SATURDAY, APRIL 28, 2018

## IMAGE INTERPRETATION PANEL

Moderator: Bruce Forster, MD  
15:30 – 17:00  
Salle de bal ouest

**PARTICIPANTS:** Simon Bicknell, MD, Nathalie Bureau, MD, Carolyn Flegg, MD, Véronique Freire, MD, Angus Hartery, MD, João Inácio, MD, David Lautner, MD, and Carlos Torres, MD

**PRESENTATION SUMMARY:** Two teams of radiologists will compete to read and interpret unknown cases across a variety of body systems. The panel will be an opportunity to observe colleagues and peers as they analyze images and develop diagnoses, then use those diagnoses to guide patient care.

#### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify imaging findings of unusual but not rare diseases in Neuro, MSK, Chest and Abdominopelvic body systems
2. Establish the advantages of the common modalities in demonstrating such findings
3. Select the optimum approach to unknown case review
4. Consider the role of humour in a late afternoon imaging review session

# MORNING TRACKS – SUNDAY, APRIL 29, 2018

## PLENARY: ARTIFICIAL INTELLIGENCE AND MEDICAL LEGAL ISSUES

Lorraine LeGrand Westfall, MD  
08:00 – 8:40  
Salle de bal ouest

**PRESENTATION SUMMARY:** The capabilities of AI are just at the beginning of the spectrum of potential aid in healthcare delivery. Potential medical-legal risks of the use of AI in radiology will be presented and analyzed with the medical legal lens.

### LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Identify the medical legal risks associated to AI in care delivery
2. Analyze the role of experts in litigation process
3. Apply reasonable practice to implementation of AI in radiology care delivery

## MISTAKES WE ALL MAKE

Moderator: Caitlin McGregor, MD  
08:45 – 12:15  
Salle de bal ouest

### Chest Imaging

*Hamid Bayananti, MD 08:45 – 09:15*

### Neuroradiology

*Maria del Pilar Cortes, MD 09:15 – 09:45*

### Musculoskeletal Imaging

*Nathalie Bureau, MD 09:45 – 10:15*

### Emergency Radiology

*Michael O’Keeffe, MD 10:45 – 11:15*

### Abdominal Imaging

*Paul Hamilton, MD, FRCP(C) 11:15 – 11:45*

### Breast Imaging

*Nancy Wadden, MD, FRCPC 11:45 – 12:15*

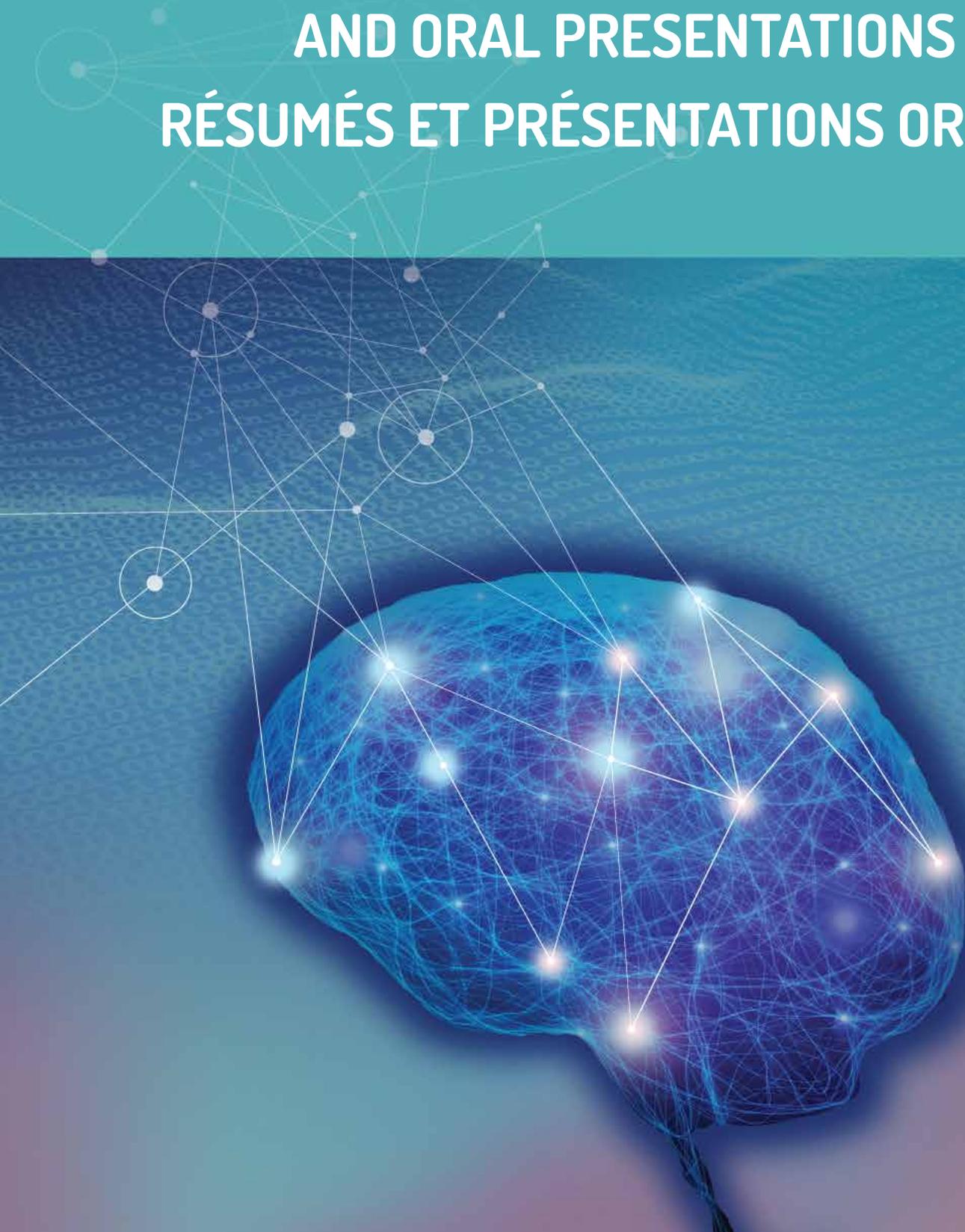
**OVERALL PRESENTATION SUMMARY:** As radiologists, we should always strive to improve our detection methods and interpretation of imaging skills. This series of presentations will review cases with lessons learned, assess poor examinations and discuss lack of clinical information or mistaken interpretation while covering the spectrum of radiological examinations.

### OVERALL LEARNING OBJECTIVES:

At the end of this session, participants should be able to:

1. Recognize the most common causes of imaging errors
2. Apply multiple strategies to reduce imaging errors

**ABSTRACTS (ePOSTERS)  
AND ORAL PRESENTATIONS  
RÉSUMÉS ET PRÉSENTATIONS ORALES**



## Educational Exhibits / Expositions éducatives

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### DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

### AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

**JUDGES / JUGES :** Andreu Costa, Derek Emery, Valerie Keough

## Radiologists-in-Training Research Projects / Projets de recherche pour les radiologistes en formation postdoctorale

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### DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

### ORAL PRESENTATIONS

Friday April 27, 13:15 – 14:45, Salon Jarry / Joyce (Level A)

Saturday April 28, 08:45 – 10:15, Salon Jarry / Joyce (Level A)

### AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

### PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 13 h 15 à 14 h 45, Salon Jarry / Joyce (Niveau A)

Le samedi 28 avril, de 8 h 45 à 10 h 15, Salon Jarry / Joyce (Niveau A)

**JUDGES / JUGES :** Marco Essig, Faisal Khosa, Mark Levental

## Value of Radiology Research Projects / Projets de recherche sur la valeur de la radiologie

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### ORAL PRESENTATIONS

Friday April 28, 13:15 – 14:45, Salon Kafka / Lamartine (Level A)

### PRÉSENTATIONS ORALES

Le vendredi 28 avril, de 13 h 15 à 14 h 45, Salon Kafka / Lamartine (Niveau A)

**JUDGES / JUGES :** Scott Harris, Nick Neuheimer, Charlotte Yong-Hing

## Scientific Research Projects / Projets de recherche scientifiques

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### DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

### ORAL PRESENTATIONS

Friday April 27, 08:45 – 10:15, Salle de bal est (Level 4)

Saturday April 28, 10:45 – 12:15, Salon Jarry / Joyce (Level A)

### AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

### PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 08 h 45 à 10 h 15, Salle de bal est (Niveau 4)

Le samedi 28 avril, de 10 h 45 à 12 h 15, Salon Jarry / Joyce (Niveau A)

**JUDGES / JUGES :** Emily Pang, Francesca Proulx, Vivek Virmani

## Departmental Clinical Audit Projects / Projets de vérification clinique au sein des services

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### ORAL PRESENTATIONS

Friday April 27, 09:00 – 11:40, Salon Jarry / Joyce (Level A)

### PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 9 h à 11 h, Salon Jarry / Joyce (Niveau A)

**JUDGES / JUGES :** Najla Fasih; Sukvinder Dhillon; Matthew McInnes

## DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

Prizes for the winning abstracts are funded by the Canadian Radiological Foundation (CRF) and will be awarded during the Awards Ceremony on Saturday, April 28 at 17:30.

## AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

Les prix pour les résumés gagnants sont financés par la Fondation radiologique canadienne (FRC) et seront présentés lors de la Cérémonie de remise des prix le samedi 28 avril à 17 h 30.

**JUDGES / JUGES :** Andreu Costa, Derek Emery, Valerie Keough

EE001

## Blunt and Penetrating Diaphragmatic Injuries: Why Do We Miss Them?

**Authors:** Michael Patlas, Vincent Mellnick, Sanjeev Bhalla, Christine Menias, Douglas Katz

### LEARNING OBJECTIVES:

1. To describe direct and indirect signs of blunt and penetrating diaphragmatic injury (DI)
2. To highlight factors affecting detection of DI
3. To discuss pitfalls in diagnosis of DI

**BACKGROUND:** According to trauma center audits, diagnostic errors are responsible for approximately 10-15% of preventable deaths. Diaphragmatic injuries (DI) are uncommon traumatic abnormalities, and are frequently missed during prospective interpretation of multidetector CT scans ( MDCT) of trauma patients. Unfortunately, DI do not heal spontaneously, and can potentially cause complications with significant morbidity if left undetected and untreated. The purpose of this educational exhibit is to illustrate the factors leading to suboptimal prospective detection of blunt and penetrating DI on MDCT scans.

**CONCLUSION:** Prospective diagnosis of DI presents a diagnostic challenge for radiologists. Radiologists need to meticulously assess MPRs, follow trajectory of injury, and rely on indirect CT signs of DI.

EE002

## Barriers to Resident Research in Radiology: A Canadian Perspective

**Authors:** Kate Hames, Michael Patlas

### LEARNING OBJECTIVES:

1. To discuss the increasing demands and expectations placed upon Radiology residents to undertake research
2. To highlight the unique obstacles Radiology residents face in conducting research during residency training
3. To propose potential solutions at the individual and program level to assist residents in research development and completion during residency

**BACKGROUND:** Given the rapid technological advances in Diagnostic Imaging, it is increasingly important for radiology residents to participate in research during residency. However, residents face numerous obstacles to research including time commitments, program support, and training in research design and implementation. Daily clinical duties, call demands, and study requirements all limit the time residents may spend on research. In addition, lack of program support including little to no training in research design and inadequate mentorship also inhibits radiology residents' research endeavors.

**CONCLUSION:** This exhibit will outline the most significant obstacles to research as identified by current Radiology residents in Canada. The presentation reviews the common challenges residents face and proposes practical solutions at the individual and program level.

EE003

## Radiographic Findings in Spinal Tuberculosis with Cross-sectional Imaging Correlation

*Authors: Muhammed Hatem, Viesha Ciura, Pieter Janse Van Rensburg*

### LEARNING OBJECTIVES:

1. To discuss radiographic findings of spinal tuberculosis
2. Characterization of early and late findings, emphasizing the importance of recognizing early changes that will help in diagnosis and timely treatment
3. Correlation of radiographic findings with cross-sectional imaging

**BACKGROUND:** Spinal TB accounts for more than half of musculoskeletal cases of TB. Early diagnosis and management are crucial in order to prevent neurological complications and spinal deformity. Radiographs are often the first imaging performed in these patients, who may present with indolent, nonspecific symptoms. We present several cases of spinal tuberculosis, of which the diagnosis was initially suggested based on radiographic assessment, and confirmed with MRI and/or CT.

**CONCLUSION:** Radiographs are often the first imaging modality used for evaluation of patients with spinal tuberculosis, and radiologists should be familiar with the radiographic findings to ensure timely diagnosis and treatment.

EE004

## How to Build a Multi-Faceted Radiology Simulation Curriculum to Meet the Needs of a Competency Based Learning Environment

*Authors: Lindsay Cherpak, Matthew McInnes, Rebecca Hibbert*

### LEARNING OBJECTIVES:

1. Discuss the importance of simulation (SIM) in education
2. Review how to develop a radiology SIM curriculum
3. Identify the components of a needs assessment
4. Discuss relevant CanMEDS competencies and trainee assessment
5. Outline specific SIM examples from our institution

**BACKGROUND:** SIM is an engaging way to deliver medical education that complements traditional clinical teaching. SIM has many advantages including trainee competency assessment beyond technical skills in a safe controlled learning environment. In addition, trainees participating in procedural SIM have been shown to be more proficient and perform patient procedures sooner. Therefore, implementing SIM into existing radiology curricula is encouraged to enhance the performance and assessment of current and future trainees.

**CONCLUSION:** A broad spectrum of core competencies in radiology can be assessed using SIM, extending beyond technical skills. Therefore, SIM should be considered for any and all aspects of education given its potential for high-impact high-fidelity learning. Ingenuity and engagement can overcome any limitation; commercial phantoms and SIM centres are an asset, but are not necessary. SIM will play an important role in education as we continue to incorporate competency based learning models.

EE005

## Nuclear Medicine Bone Scan SPECT/CT Imaging in the Investigation of Occult Wrist Fractures

*Author: Amar Suchak*

**LEARNING OBJECTIVES:** 1. Briefly review the concept of hybrid nuclear medicine bone scan SPECT/CT imaging 2. Understand the potential application for a bone scan study with SPECT/CT imaging in ER patients with acute wrist injuries 3. Review cases illustrating the variety of radiographically fractures that can occur in patients with acute wrist injuries

**BACKGROUND:** In patients with an acute wrist injury, film radiographs can have reduced sensitivity for fracture detection. This is true for distal radial fractures, but especially scaphoid fractures. Nuclear medicine bone scan SPECT/CT imaging combines morphological and functional assessment to markedly improve specificity in a study that already has exquisite sensitivity. This exhibit illustrates radiographically occult fractures that are detected on SPECT/CT imaging to increase the awareness of the applicability of this readily available investigation.

**CONCLUSION:** A greater awareness of the availability and prowess of nuclear medicine SPECT/CT bone scan imaging in patients with radiographically occult wrist injuries can improve both diagnostic accuracy and patient management.

EE006

## What the Spine Surgeons Want to Know about Traumatic Thoracolumbar Spine Injuries

*Author: Anthony Vo*

**LEARNING OBJECTIVES:** 1. Be aware of what spine surgeons want to know about thoracolumbar spine injuries 2. Appreciate the limitations of the Denis and Arbeitsgemeinschaft für Osteosynthesefrage (AO) classification systems 3. Be familiar with the Thoracolumbar Injury Classification and Severity Score (TLICS) classification system and apply its principals to example cases provided 4. Understand how the TLICS categories can impact patient management 5. Integrate key components of TLICS into your practice to communicate effectively

**BACKGROUND:** Use of different descriptors to describe thoracolumbar spine injuries in radiology reports can be confusing to spine surgeons and radiologists. The well-known Denis and AO classification systems don't consider the patient's neurologic status and/or posterior longitudinal complex (PLC). Thus, they don't provide reliable, relevant and prognostic information. TLICS consists of 3 categories including morphology, integrity of PLC and neurological status. These provide information on the immediate mechanical, long-term, and neurologic stability. Furthermore they can help guide management and surgical approach.

**CONCLUSION:** Approximately 64/100,000 Canadians sustain a spine injury per year. 30% and 50% of these involve the thoracic and lumbosacral spine respectively. TLICS incorporates the best available predictor of surgical versus nonsurgical management. By using the key components of TLICS to analyze, evaluate and report thoracolumbar spine injuries, more effective communication with the spine surgeons and radiologists can be achieved.

EE007

## Online TIRADS Calculator

*Authors: Tanche Wang, Tasha Ellchuk, Robert Otani, Gary Groot, Paul Babyn*

**PURPOSE:** Using an online calculator ([www.TIRADSCalculator.com](http://www.TIRADSCalculator.com)) for Thyroid Imaging, Reporting and Data System (TI-RADS) with images and descriptions of each of the ultrasound features as a clinical and educational tool to guide management of incidental thyroid nodules.

**DESCRIPTION:** Thyroid nodules are common, with a prevalence of up to 68% of adults on ultrasound. Fine needle aspiration (FNA) is the most effective test in determining if a thyroid nodule is malignant and occasionally surgery is required to achieve a definitive diagnosis. Most thyroid nodules are benign and not all nodules require FNA or surgery. Over-diagnosis of thyroid cancer results in detected thyroid cancers without affecting mortality between 45-80% of cases. Recent focus on developing a non-invasive system, Thyroid Imaging, Reporting and Data System (TI-RADS), using ultrasound for risk stratification of thyroid nodules allows identification of clinically significant malignancies while reducing the number of biopsies performed on benign nodules. In 2017, the American College of Radiology (ACR) released a white paper on the use of the TI-RADS. TI-RADS is based on ACR recommended standardized terms for ultrasound reporting of thyroid nodules. Selected ultrasound features of thyroid nodules are combined into a score to identify nodules that warrant biopsy or sonographic follow-up. Using TI-RADS to risk stratify incidental nodules may result in fewer unnecessary biopsies. An online calculator was developed to facilitate the use of TI-RADS as an educational and clinical tool with images demonstrating each of the ultrasound.

**SUMMARY:** An online calculator was developed for TI-RADS facilitates the application of TI-RADS.

EE008

## Fleischner Criteria Web App

*Authors: Tanche Wang, Tasha Ellchuk, Geoff Karjala, Derek Fladeland*

### LEARNING OBJECTIVES:

1. Introduce a web based application for the latest 2017 Fleischner Society Guideline for the management of pulmonary nodules
2. Raise awareness of the revision of the Fleischner Society Guideline for the management of pulmonary nodules

**BACKGROUND:** The Fleischner Society Guidelines for management of pulmonary nodules has been revised in 2017 based on new data and accumulated experience. The guidelines represent the consensus of the Fleischner Society which incorporates the opinions on the multidisciplinary international group of thoracic radiologists, pulmonologists, surgeons, pathologists, and other specialists. The guidelines apply to incidental pulmonary nodules with specific management recommendations based on a multiple of factors including the nodule type, multiplicity, size thresholds and clinical risk. A web based application ([www.fleischnerapp.com](http://www.fleischnerapp.com)) was developed to facilitate the dissemination and application of the latest Fleischner Society Guidelines for the management of pulmonary nodules.

**CONCLUSION:** A web based application was developed to facilitate the dissemination and application of the latest 2017 Fleischer Society Guideline for the management of pulmonary nodules.

EE009

## It Will be AO-Kay: A Review of the New AOSpine Trauma Classification

*Authors: Lindsay Cherpak, Marcos Sampaio, Carlos Torres*

### LEARNING OBJECTIVES:

1. Discuss motivation for a new spine trauma classification system
2. Review AOSpine Classification System for Subaxial and thoracolumbar spine trauma
3. Explore AOSpine Classification System using a case-based approach

**BACKGROUND:** Classification systems are devised to facilitate communication. A lack of reliability, accuracy, and clinical relevance can lead to a lack of universal acceptance of proposed classification systems. Spine trauma classification systems date back to 1929. The goal of the AOSpine Classification was to develop a simple, yet comprehensive, classification system that could predict prognosis and aid in treatment strategy decisions.

**CONCLUSION:** Diagnostic imaging plays an important role in spine fracture morphology description. Therefore, radiologists and trainees should remain up to date with the current classification descriptors. Adherence to nomenclature can decrease ambiguity and improve patient care in a multidisciplinary setting. Knowledge and understanding of this classification system will help facilitate communication with spine surgeons as the use of this system becomes more prevalent.

EE010

## Multimodality Pictorial Imaging Review of Focal Renal Lesions

*Authors: Jonathan Lyske, Christopher Hutchinson, Gavin Low, Vima Patel*

### LEARNING OBJECTIVES:

1. To illustrate image characteristics of a variety of malignant tumors, benign tumors and non-neoplastic renal lesions
2. To provide a strategy for characterization of renal cell carcinoma subtypes
3. To review rare causes of focal renal lesions
4. To highlight potential imaging pitfalls that may result in misdiagnosis

**BACKGROUND:** Given the increasing frequency of focal renal lesions discovered on routine cross-sectional imaging it is incumbent upon radiologists to be familiar with the imaging appearances of these lesions and the appropriate differential diagnoses. We believe this article would be of interest to the general radiologist as accurate lesion characterization has important implications for patient prognosis, clinical management and potential treatment options. Emphasis will be placed on characteristic imaging features that facilitate a confident diagnosis as well as potential pitfalls that may lead to diagnostic errors.

**CONCLUSION:** The large number of focal renal lesions identified incidentally requires radiologists to be aware of the differential diagnosis and how to characterize the lesions using the appropriate imaging modalities. Accurate characterization has important implications for patient management and may avoid unnecessary imaging or invasive procedures.

EE011

## Renal Colic Imaging 2018: Myths, Recent Trends, and Controversies

*Authors: Michael Patlas, Abdullah Alabousi, Vincent Mellnick, Victoria Chernyak, Nataly Farshait, Douglas Katz*

### LEARNING OBJECTIVES:

1. To discuss the role of various cross-sectional imaging modalities for the evaluation of patients with suspected renal colic
2. To understand the potential radiation dose from MDCT for suspected renal colic, and to suggest radiation dose reduction strategies
3. To review the recent trends and controversies in imaging of patients with suspected renal colic

**BACKGROUND:** The increase in utilization of imaging for the evaluation of patients with acute flank pain over the past two decades, particularly MDCT has resulted in significant medical expenditures and radiation exposure with its potential sequelae, especially in patients with recurrent disease and in younger patients. The exhibit will focus on recent trends and controversies in imaging of patient with suspected renal colic, including the roles of MDCT, US, and MRI; the potential radiation dose from MDCT and dose reduction strategies; the lower yield of MDCT in female patients with acute flank pain; and imaging of suspected renal colic in pregnant patients. Potential pitfalls in imaging evaluation will be highlighted. Differential diagnosis and management options will be discussed. The current epidemiological, clinical, and practice management literature will be appraised.

**CONCLUSION:** This exhibit offers an opportunity to review the present status of imaging for suspected renal colic and emphasizes the role of the radiologist in the detection and management of this common condition.

EE012

## Evaluation of Renal Cystic Masses: Bosniak Classification System

*Author: Aous Abduljabar*

### LEARNING OBJECTIVES:

1. To identify the radiographic features of renal cystic lesions based on Bosniak Classification
2. To determine its diagnostic performance to diagnose malignant cystic lesions and the prevalence of malignancy in Bosniak categories
3. To highlight the role of radiologists in multidisciplinary meetings in relation to renal cystic lesions whether to suggest surgical intervention or follow up

**BACKGROUND:** Renal cysts are commonly encountered lesions in daily radiological practice. Bosniak classification was described in 1986; this classification helps the radiologists to categorize each renal cystic mass as “nonsurgical” (category 1 and 2) or as “surgical” (category 3 and 4). After the original description, it was found that there were some category 2 cysts were slightly more complicated than most of category 2 cysts, however not complex enough to be put in category 3. For that reason category 2F (F for Follow up) were introduced in 1993. Bosniak classification is based on imaging characteristics on contrast-enhanced CT scans.

**CONCLUSION:** Category 1 and 2 renal cysts do not require further imaging or follow-up. Patients in category 2F do require periodic imaging, because of 5% malignant risk. For category 3 (50% malignant risk) and category 4 (75% to 90% malignant risk) surgical excision is recommended. Although the final differentiation of cystic renal masses is based upon histological diagnosis, there are imaging features that tell you that a cyst is not a simple one such as: calcification, enhancement, septations, hyperdense/ high signal.

EE013

## Cystic Lesions of the Pancreas: A Review for Radiologists

*Author: Aous Abduljabar*

### LEARNING OBJECTIVES:

1. To identify the radiographic features of pancreatic cystic lesions
2. To illustrate the differential diagnosis of cystic lesions of the pancreas and to discuss their malignant potentials
3. To highlight the importance of follow up of Pancreatic Cystic Lesions as an incidental finding in asymptomatic patients

**BACKGROUND:** Cystic lesions of the pancreas are increasingly being identified due to the widespread use of cross sectional imaging; most of these lesions are incidental findings in asymptomatic patients. The initial evaluation of the lesion once detected should be directed to differentiate whether the lesion is most likely a Pseudocyst or a cystic neoplasm. Patients with Pseudocysts generally have a history of Pancreatitis, alcohol abuse, stone disease or abdominal trauma and the lesion is unilocular or contains non-enhancing dependent debris, whereas those with cystic neoplasm most often lack such a history and the lesion has internal septa, a solid component, central scar or wall calcification.

**CONCLUSION:** Cystic lesions of the pancreas are infrequent but can pose a diagnostic challenge. MRI is usually of a more diagnostic than CT; MR with heavy weighted T2WI and MRCP will better describe the cystic nature of the lesion with its internal structures. Cysts smaller than 3 cm and no worrisome or high risk features can be considered for follow up with MRI, CT or Ultrasound. Cysts with high risk features such as main Pancreatic Duct dilatation >10 mm should be considered for resection.

EE014

## Pearls and Pitfalls of Pancreatic Imaging: An Interactive Exhibit

*Authors: Jessie Kang, Andreu Costa*

### LEARNING OBJECTIVES:

1. To outline the common pearls and pitfalls of diagnosing pancreatic lesions on US, CT and MRI, through interactive cases
2. To review anatomic anomalies, pseudo-lesions and inflammatory processes of the pancreas that can mimic malignancy
3. To highlight important signs of diagnosing early pancreatic adenocarcinoma, and to emphasize the importance of good imaging technique

**BACKGROUND:** The typical appearance of pancreatic lesions is well known, however, there are multiple anatomic variants, pseudo-lesions and inflammatory processes of the pancreas that can mimic malignancy. In addition, pancreatic carcinoma can present with subtle imaging findings, which if not detected, can result in delayed diagnosis and mis-management. Familiarity with the common imaging pitfalls of pancreatic imaging can assist the radiologist in making the correct diagnosis for optimal patient management.

**CONCLUSION:** There are several anatomic anomalies, pseudo-lesions and inflammatory processes of the pancreas that can mimic malignancy, and early carcinomas can present with subtle signs on imaging. Awareness of these pitfalls can assist the radiologist in making the correct diagnosis. Early and accurate diagnosis of pancreatic adenocarcinoma is critical for guiding patient management.

EE015

## Benign Uterine Pathologies: How Confident Are We?

*Author: David Miller*

**LEARNING OBJECTIVES:** After viewing this exhibit, participants should:

1. Gain exposure to the wide spectrum of benign uterine pathologies to be considered when evaluating abnormalities of the uterus
2. Recognize examples of each benign uterine pathology as well as identify key imaging features characteristic for each entity
3. Understand the utility of different imaging modalities for further evaluation

**BACKGROUND:** Abnormal imaging findings of the uterus can be discovered either incidentally or during the diagnostic work-up for a patient's symptoms. Benign entities are very frequently encountered, and differentiating them from malignant etiologies can be a diagnostic challenge. With recognition of key imaging features, accurate diagnoses can be made on the initial imaging study, and if not, understanding the best imaging modality to utilize will result in a more efficient work-up.

**CONCLUSION:** Abnormalities of the uterus found on imaging often trigger further diagnostic evaluation, which can quickly lead to increased cost to the patient as well as inefficient use of medical resources. Knowing key imaging features can categorize many uterine pathologies as benign entities, which can prevent further unnecessary work-up. In addition, accurate diagnoses can reduce unnecessary interventions.

EE016

## Retaining and Rewarding Journal Peer Reviewers

*Author: Tyler Coupal, Peter Munk, Jose Lapeña, Wilfred Peh*

### LEARNING OBJECTIVES:

1. To explore the challenge currently facing academic journals and editors to find high quality peer reviewers for submitted manuscripts
2. To review the techniques currently employed by journals and editors to retain and reward peer reviewers and to further explore the important ethical considerations at hand
3. To propose a number of innovative solutions to help combat this issue in the future

**BACKGROUND:** A variety of challenges are faced by journal editors on a daily basis. Of all these challenges, however, many would argue that one of the most difficult tasks at hand is effectively arranging for expeditious and high quality peer review for manuscripts on an ongoing basis. Moreover, with the continued expansion in the number of periodicals appearing throughout the literature, this scarce resource that is vital in maintaining the quality, integrity and validity of scientific research is being stretched more than ever. The question of how journals can reward reviewers and retain their services has been the topic of much discussion throughout recent years, and in response, we have seen a wide variety of techniques employed in this regard.

**CONCLUSION:** Reviewers stand as the backbone of academic literature, and without them, journal content would suffer and the advancement of scientific knowledge would be vastly impeded. As such, it is vital for journals to recognize these individuals who volunteer their time, expertise, and wisdom, but to also remain mindful of the ethical implications surrounding the various techniques to do so.

EE017

## Mind Your P's and Q's: Common Blindspots and Pitfalls of CT Evaluation on the Head

*Authors: Andrea Para, Andrew Leung*

### LEARNING OBJECTIVES:

1. Review CT appearances of normal anatomy and blind spots encountered in routine brain imaging
2. Illustrate commonly missed diagnoses in these blind spots and pitfalls in interpretation
3. Review the differential diagnosis of pathologies occurring in these blindspots
4. Integrate this knowledge into a checklist for everyday practice

**BACKGROUND:** CT evaluation of the head is used extensively in the emergency room and as a screening exam before advanced MRI imaging. With a very high volume of studies and sometimes limited history, common but subtle diagnoses can be missed by residents and staff radiologists alike. A checklist of the P's and Q's – pipes, poles, posterior horns, pressure, pneumocephalus, pituitary gland, parasellar region, pineal gland, pharynx, pons, peduncles, quadrigeminal plate, quality of the study, and more, can help reduce diagnostic errors.

**CONCLUSION:** Many diagnoses can be made on CT evaluations of the head by remembering to mind your P's and Q's. You see what you know, so it is essential to become familiar with the most common blindspots, missed diagnoses, and diagnostic pitfalls to reduce diagnostic errors.

EE018

## Rare Congenital Parapharyngeal Lesions in Neonates: A Series of Three Patients

*Authors: Nicola Lee, Ehab Shaban Mahmoud Hamouda*

### LEARNING OBJECTIVES:

1. To illustrate typical MRI findings of rare congenital parapharyngeal lesions
2. To review the imaging methods used in characterization of paediatric parapharyngeal lesions and assessment of associated intracranial abnormalities and airway compromise
3. To emphasize the need for antenatal diagnosis and postnatal follow up with advanced imaging modalities for effective management

**BACKGROUND:** Primary pathology of the parapharyngeal space is a relatively rare entity in the pediatric population that may be congenital or acquired. Congenital causes include teratomas, branchial arch abnormalities, and vascular malformations whereas acquired lesions may be secondary to inflammation or malignancy. The majority of congenital parapharyngeal abnormalities are diagnosed antenatally. Postnatal imaging is, however, essential for further evaluation of characteristics and extension. As such, we present two cases of congenital naso-opharyngeal teratomas and a case of nasopharyngeal neuroglial heterotopia.

**CONCLUSION:** An understanding of pathologies that may arise from the parapharyngeal space in paediatric patients and recognition of the associated imaging findings is essential to forming an accurate diagnosis and thus effective disease management and patient care.

EE019

## Two heads are better than one: A Combined Approach to the AAST Grading of Renal Trauma from Diagnostic Imaging and Surgical Perspectives

*Author: Maryam Hosein, Alessandro Marro, Dave Paskar, Noah Ditkofsky*

### LEARNING OBJECTIVES:

1. To describe the 5 grades of the American Association for the Surgery of Trauma (AAST) classification for renal injuries and to examine how it was modified in 2011
2. To present the characteristic imaging findings of each grade of renal injury, discussing the key imaging distinctions between the grades of injury
3. To describe the changing landscape of improved management options (operative versus non-operative) and how this impacts on the work up of renal injuries

**BACKGROUND:** Multi-detector CT remains the first line imaging of patients presenting with abdominal trauma and suspected renal injury. The AAST classification of renal injuries is the most widely used grading system for directing management and predicting outcomes in such situations. The AAST renal injury grading system describes 5 grades of injury contains some main key features which provide a good framework for assessing the MDCT images. In cases where the grade is equivocal, use of additional arterial or delayed phase imaging, or recommendation of angiography can be decided based on the initial CT to further clarify the grade of injury. The AAST renal injury classification has undergone one revision in 2011, and further revisions are being postulated, to enhance correlation between grade of injury and current clinical management.

**CONCLUSION:** Radiologists should be aware of and use the AAST classification of renal injury to facilitate patient care. Using a grade of injury and similar terminology as the classification system provides more clinical grounding to radiology reports and facilitates communication between care providers.

EE020

## Multimodality Imaging of Stress-Induced (Takotsubo) Cardiomyopathy

*Authors: James Huynh, Vidhu Anand, Ashish Khandelwal*

### LEARNING OBJECTIVES:

1. To review presentation, pathophysiology, management and prognosis of Takotsubo cardiomyopathy (TTC) pertinent to imaging
2. To review the imaging appearance of classical and variant TTC
3. To present the multimodality imaging manifestations of Takotsubo cardiomyopathy (Left ventriculography, echocardiography, nuclear medicine, cardiac CT/MRI)
4. To discuss advantages and disadvantages of the available imaging modalities and their roles in the diagnosis and prognosis of TTC

**BACKGROUND:** Takotsubo or stress-induced cardiomyopathy has a similar presentation as acute coronary syndrome. Diagnosis is typically suspected after exclusion of acute coronary syndromes via conventional coronary angiography and left ventriculography. However, non-invasive imaging modalities can assist the clinician in the work-up. Knowledge of imaging manifestations of Takotsubo cardiomyopathy on CT, MRI, echocardiography and nuclear medicine is vital for avoiding unnecessary investigations and treatments.

**CONCLUSION:** Takotsubo cardiomyopathy is a distinct clinical entity in the differential of acute coronary syndrome. The unique imaging manifestations of classical and variant TTC in the appropriate clinical setting calls for important differences in management and prognosis. Multiple non-invasive imaging modalities can be helpful to evaluate Takotsubo cardiomyopathy.

EE021

## Gender Disparity: Academic Leadership and Productivity of Emergency Radiologists in North America

*Authors: Frank Battaglia, Sabeena Jalal, Faisal Khosa, Kiran Khurshid, Sravanthi Reddy, Samad Shah, Nupur Verma*

### LEARNING OBJECTIVES:

1. Assess the current state of gender representation in Emergency Radiology in North America
2. Evaluate the academic productivity of Emergency Radiologists and any differences present between genders
3. Analyze the relationship between gender and academic ranking
4. Analyze the relationship between gender and leadership ranking

**BACKGROUND:** Radiology has been defined as a “technical speciality,” with historically a greater proportion of the practicing demographic being male. The hurdles women must overcome to achieve upward career mobility and leadership status are well documented in academic medicine. However, as society progresses with increased focus on equality, gender barriers have been at the forefront of efforts to reduce institutional prejudices. How has a specialty, as demanding as emergency radiology, fared in a generation of physicians more cognizant of gender inequality?

**CONCLUSION:** Our study gives further evidence that gender disparity persists, preventing women from achieving the same upward academic career mobility as men, despite better qualitative academic productivity. The results show no significant difference between leadership ranking and gender. Furthermore, as the differences in academic ranking between gender could be significant ( $p = 0.089$ ), performing further investigations with large sample sizes will help to illuminate more conclusive results regarding the state of women in emergency radiology.

EE022

## Abdominal Applications of Contrast-enhanced Ultrasound: What the Radiologists and Clinicians Need to Know

*Authors: Xiaoyang Liu, Hyun-Jung Jang, Korosh Khalili, Mostafa Atri*

### LEARNING OBJECTIVES:

1. To review the unique advantages of CEUS through illustrative cases
2. To introduce common useful clinical scenarios for abdominal application of CEUS, in hepatic, renal, biliary, pancreatic, splenic and vascular indications
3. To characterize liver and renal masses by CEUS, especially indeterminate lesions on CT or MRI, and differentiate neoplastic from non-neoplastic lesions in various organs
4. To describe the application of CEUS in post renal transplant and post ablation therapy
5. To summarize the efficient setup to guide radiologists to successfully implement CEUS in clinical practice

**BACKGROUND:** Contrast enhanced ultrasound (CEUS) has been increasingly used in a variety of abdominal applications. CEUS utilizes intravenous microbubbles of gas to demonstrate blood flow and tissue perfusion. Wide application of CEUS in hepatic and non-hepatic indications is largely due to its unique advantages of high contrast resolution, real-time imaging, lack of nephrotoxicity, purely intravascular nature of contrast agents, and repeatability during the same examination. It is complementary rather than competitive to other imaging modalities, such as CT and MRI.

**CONCLUSION:** Through this educational exhibition, we aim to guide radiologists to successfully integrate CEUS into clinical practice, by review of essential knowledge and introduction to requirements of clinical implementation. We also aim to familiarize clinicians with the clinical scenarios when CEUS provides great added value to multimodality imaging.

EE023

## Case-Based Diagnosis of Chronic Thromboembolic Pulmonary Hypertension Using CT Pulmonary Angiography

*Authors: David Chenhan Wang, Micheal C McInnis, Marc de Perrot*

### LEARNING OBJECTIVES:

1. Describe an optimal computed tomography pulmonary angiography (CTPA) protocol for diagnosis of chronic thromboembolic pulmonary hypertension (CTEPH)
2. Illustrate specific radiologic signs of CTEPH on CTPA
3. Demonstrate typical cases CTEPH on CTPA pre- and post-pulmonary endarterectomy with radiologic-pathologic correlation

**BACKGROUND:** Acute pulmonary embolism is a common radiologic diagnosis and CTEPH is estimated to occur in up to 4% of these patients. Identification of this subset with CTEPH is important because CTEPH is potentially curable with pulmonary endarterectomy. While ventilation perfusion scintigraphy is commonly used for identification of CTEPH due to its high sensitivity, CTPA plays an increasingly important role due to its increasing use and utility in preoperative planning. Identification of CTEPH requires performance of a high quality CTPA and knowledge of specific radiologic signs. Radiologic-pathologic correlation is provided to emphasize the ability of CTPA to identify chronic thromboemboli.

**CONCLUSION:** CTEPH is an under-recognized disease where the radiologist plays a key role in diagnosis. Awareness of this disease is important because it is potentially curable through pulmonary endarterectomy. High quality CTPA and knowledge of the imaging appearance is important for diagnosis and treatment.

EE024

## Potential Discrepancies between Plain Radiographs and Computed Tomography Scans in the Brooker Classification of Heterotopic Ossifications

*Authors: Mary Jiayi Tao, Linda Probyn, Michael Poon, Hands Kreder, Markku Nousiainen, Richard Jenkinson, Andgela Wan, May Tsao, Elizabeth Barnes, Edward Chow*

### LEARNING OBJECTIVES:

1. To illustrate the potential discrepancies between radiographic and computed tomographic gradings of heterotopic ossifications.
2. To demonstrate the usefulness of multiple radiographic projections in overcoming ambiguities in the overall degree of heterotopic ossifications.
3. To present important considerations when using the Brooker Classification to determine the severity of heterotopic ossifications.

**BACKGROUND:** Heterotopic ossification (HTO) is the dystrophic formation of mature lamellar bone in non-osseous tissues such as muscles, connective tissue, or nerves. The Brooker Classification was one of the earliest proposed schemes employed to stratify the degree of hip HTO formation and it remains widely used in contemporary literature. Despite its widespread use, it is not without its limitations. We aim to provide illustrative cases to describe and highlight challenges and limitations with this system.

**CONCLUSION:** Although the Brooker Classification for HTO is a widely used quantitative and qualitative assessment tool given its simplicity and familiarity, it possesses several limitations. Specific challenges include superimposing structures, variations in radiographic technique, and unaccountability for differences in volumetric measurements and arthroplasty lengths. Utilization of other radiographic modalities, such as computed tomography and orthogonal projections may reduce such ambiguities. The present educational exhibit evaluates the Brooker Classification and identifies areas of improvement in characterizing HTO which is important in determining the course of management and facilitating further research to improve the overall accuracy of HTO classification guidelines.

EE025

## CT Imaging of the Acute Aortic Syndrome and Related Conditions

*Authors: Alexandre Semionov, John Kosiuk, Karl Sayegh*

### LEARNING OBJECTIVES:

To review and illustrate classical CT findings of acute aortic syndrome, several related conditions and common diagnostic pitfalls.

**BACKGROUND:** Acute aortic syndrome (AAS) refers to several conditions that result in acute disruption of the aortic wall. These conditions comprise aortic dissection, aortic intramural hematoma, penetrating atherosclerotic ulcer, and aortic aneurysm rupture. Additionally, aortic wall can be disrupted as a result of acute trauma, commonly manifesting as acute intimal injury, traumatic dissection or contained aortic rupture/pseudoaneurysm. Finally, acute aortitis of inflammatory or infectious etiology may present with symptoms and clinical signs indistinguishable from AAS. Radiological imaging plays a key role in diagnosis of AAS and related conditions.

**CONCLUSION:** CT plays a critical role in assessment of patients with suspected acute aortic abnormalities. Knowledge of typical radiological appearances of these conditions is important as many of them are potentially life threatening and require prompt diagnosis and management.

EE026

## Computed Tomography Appearances of the Aging Lung

*Authors: Susan John, Ageely Ghofran, Zahra Saly, Hamid Bayanati, João Inácio, Carolina Souza*

### LEARNING OBJECTIVES:

1. To discuss challenges and strategies to image the lungs in the elderly with emphasis on CT and high-resolution CT of the chest, including technical considerations and physical limitations such as limited mobility and poor breath-hold
2. To describe expected age-related changes affecting the large and small airways, lung parenchyma and interstitium that may be considered within the limits of normality in this population
3. To present the histological and functional changes associated with aging and to emphasize the importance of radiological-clinical correlation in the interpretations of these findings

**BACKGROUND:** Increase in life expectancy and growing of older populations are rising in the developed world. Awareness of expected changes in lung morphology in the elderly is essential to differentiate age-related findings and clinically relevant abnormalities. The importance of recognizing changes secondary to aging is further emphasized by the widespread use of imaging, particularly CT, in this group of patients and the potential risk of over diagnoses that may ensue.

**CONCLUSION:** As the elderly population of the world steadily increases it is crucial to be aware of the appearances of age-related pulmonary changes as well as of technical challenges and potential solutions for adequate imaging of the lungs in this population. Recognition of the spectrum of changes within the limits of normality is important to avoid over diagnosis and the possible harm that this can ensue.

EE027

## Cardiothoracic Manifestations of Sarcoidosis

*Authors: Susan John, Elena Pena, Hamid Bayanati, Carolina Souza, Carole Dennie*

### LEARNING OBJECTIVES:

1. To describe and illustrate the spectrum of cardiothoracic manifestations of sarcoidosis, with emphasis on pulmonary, mediastinal and cardiac involvement – on radiography, CT, PET and Cardiac MR.
2. To present the typical and atypical imaging findings of thoracic sarcoidosis which if combined with clinical and thoracic imaging manifestations may allow a presumptive diagnosis
3. To demonstrate the role of superior role of HRCT of the chest in diagnosis and staging of sarcoidosis.
4. To emphasize the role of advanced cardiac imaging Cardiac MR and PET in the diagnosis and management of cardiac sarcoid highlighting the new expert consensus statement by the Heart and Rhythm Society

**BACKGROUND:** Sarcoidosis is a multi organ disease of unknown etiology characterized by non-caseating epithelioid cell granulomas. Thoracic involvement is common and accounts for most of the morbidity and mortality associated with the disease. Familiarity with the imaging features and diagnostic challenges in pulmonary and cardiac sarcoid plays an important role in making a diagnosis.

**CONCLUSION:** Cardiothoracic sarcoidosis is common and accounts for most of the morbidity and mortality associated with this disease. Imaging studies demonstrate characteristic findings that suggest the diagnosis, at times allowing a presumptive diagnosis. Sarcoidosis can present with less typical findings and even mimic other diseases. Therefore, familiarity with the spectrum of typical and atypical imaging features of sarcoidosis is crucial as radiologists are often the first to suggest the diagnosis. CT and HRCT have increased diagnostic accuracy over conventional radiography. Cardiac imaging may allow early detection of cardiac sarcoidosis and direct endomyocardial biopsy.

## DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

## ORAL PRESENTATIONS

Friday April 27, 13:15 – 14:45, Salon Jarry / Joyce (Level A)

Saturday April 28, 2018, 08:45-10:15, Salon Jarry / Joyce (Level A)

Prizes for the winning abstracts are funded by the Canadian Radiological Foundation (CRF) and will be awarded during the Awards Ceremony on Saturday, April 28 at 17:30.

## AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

## PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 13 h 15 à 14 h 45, Salon Jarry / Joyce (Niveau A)

Le samedi 28 avril, de 8 h 45 à 10 h 15, Salon Jarry / Joyce (Niveau A)

Les prix pour les résumés gagnants sont financés par la Fondation radiologique canadienne (FRC) et seront présentés lors de la Cérémonie de remise des prix le samedi 28 avril à 17 h 30.

**JUDGES / JUGES :** Marco Essig, Faisal Khosa, Mark Levental

## ORAL PRESENTATIONS

### FRIDAY / VENDREDI – SALON JARRY / JOYCE

13:15 RIT001

#### Diagnostic Yield of CT Urography in the Investigation of Patients with Hematuria

**Authors:** Andrew Fenwick, Eric Sala

**OBJECTIVE:** CT urography (CTU) is often used to evaluate the upper urinary tract (UUT) in patients presenting with hematuria. To determine which patients require investigation with CTU, this study clarifies the diagnostic yield of CTU in patients with hematuria.

**METHODS:** Radiology reports of 1046 CTUs performed for the indication of microscopic (n=457) or gross hematuria (n=589) between January 2015 and May 2017 were retrospectively reviewed and included. Urological findings were categorized as negative, benign, or suspicious for malignancy. All malignancies were pathologically confirmed. Hematuria subgroups were stratified by age, sex, and urological findings and compared with Pearson Chi-Square or Fisher's Exact Test. Cramer's V was used to calculate effect size.

**RESULTS:** Of 1046 CTUs included, 560 (53.5%) were reported as negative, 381 (36.4%) as benign, and 105 (10.0%) as suspicious for malignancy. The most common benign finding was urolithiasis (n=233 [22.3%]). A total of 38 urinary tract malignancies were confirmed by pathology, including 4/457 (0.9%) for microscopic hematuria and 34/589 (5.8%) for gross hematuria.

**CONCLUSION:** CT urography found no upper urinary tract malignancies in 99.4% of patients presenting with hematuria, including all patients with microscopic hematuria and those with gross hematuria

13:25 RIT002

## Sonographic and Clinical Presentation of Benign Versus Malignant Papillary Breast Lesions

*Authors: Harry Marshall, Caitlin Ward, Illanit BenNachum, Anat Kornecki*

**PURPOSE:** To identify sonographic and clinical features that can distinguish benign from malignant papillary breast lesions to avoid biopsy.

**METHODS:** Medical records and imaging of 147 patients with 161 pathology-proven papillary lesions diagnosed between 2010 and 2016 were reviewed. Sonographic features were retrospectively assessed by one of two breast radiologists. Pathology was based on core biopsy. Clinical and imaging features were compared between benign and atypical/malignant lesions using either the t-test or Chi-square test. The most specific features for identifying benign lesions were determined.

**RESULTS:** One-hundred ten lesions were incidental and 51 were symptomatic. All but one lesion were biopsied and 106 were excised. Pathology showed that 114 were benign and 47 were atypical/malignant. Malignant lesions tended to be larger ( $p = 0.048$ ) and occur in older women.

**CONCLUSION:** There is great overlap between clinical and sonographic presentation of benign and malignant papillary lesions. The most specific feature for benignity is being intraductal. However, specificity is insufficient to qualify as a BIRADS 3 lesion and biopsy is therefore recommended, even when the diagnosis of benign papillary lesion is favoured.

13:35 RIT003

## Prevalence and Appropriateness of Lung Cancer Screening with Low-dose Computed Tomography

*Authors: Lesley Latham, Candice Croker, Daria Manos*

**OBJECTIVE:** To assess the prevalence and appropriateness of opportunistic lung cancer screening in a health region where no formal screening program is in place.

**METHODS:** Reports for all chest CTs performed in the Central Zone, Nova Scotia Health Authority (4 hospitals housing 5 CT scanners) between January 1, 2014 and August 31, 2017 were electronically searched for the term "screening". Reports were manually reviewed to ensure the exam purpose was lung cancer screening. Demographic, administrative, referral and reporting data were extracted. Smoking history was obtained from a questionnaire administered to all patients immediately prior to the CT. Analysis was conducted using standard descriptive statistics including means, proportions and 95% confidence intervals.

**RESULTS:** 181 screening studies were identified. Three were excluded as specific smoking history could not be determined. 52.9% ( $N=92$ ;  $CI=45.2\%, 60.4\%$ ) of patients met appropriate inclusion criteria outlined in the Canadian Task Force on Preventive Health Care guidelines (age 55-74 years and smoking history  $\geq 30$  pack years). Follow-up imaging was recommended in 55.6% ( $N=99$ ;  $CI=48.0\%, 63.0\%$ ) of cases. The number of screening studies increased following the release of the Canadian Task Force guidelines in April 2016 (Figure 1).

**CONCLUSION:** Opportunistic lung cancer screening is occurring. Only half of patients meet Canadian Task Force recommendations. The literature shows that patients who do not meet inclusion criteria experience the harms of screening (false positives, invasive follow-up, over-diagnosis and radiation exposure) without the mortality reduction benefit. Education and better controls, including formal organised programs, are recommended.

13:45 RIT004

## Epidemiology of Systematic Reviews in Imaging Journals

**Authors:** *Mostafa Alabousi, Abdullah Alabousi, Trevor McGrath, Kelly D Kobey, Brandon Budhram, Robert A Frank, Frederick Nguyen, Jean-Paul Salameh, Anahita Dehmoobad Sharifabadi, Matthew McInnes*

**PURPOSE:** To evaluate characteristics of published systematic reviews (SR) in imaging journals.

**METHODS:** A search of MEDLINE to identify all SRs published in 72 imaging journals between January 1, 2000 and December 31, 2016 was performed. Articles retrieved were screened against inclusion criteria. Demographic and methodologic characteristics were extracted from eligible studies. Temporal trends were evaluated using linear regression and Pearson correlation coefficients ( $r$ ). The "Sustainability Coefficient" was calculated based on a ratio of all published non-SRs to the primary studies included in all SRs; a value  $>1$  suggested sufficient non-SR publications to sustain the primary studies included in all SRs, while a value  $<1$  suggested insufficient non-SR publications to sustain the primary studies included in all SRs.

**RESULTS:** We identified 921 SRs which reported on 27,435 primary studies, 85,276,484 patients, and were cited 26,961 times. From 2000 to 2016, the SR publication rate increased 23-fold ( $r=0.92$ ,  $pr = 0.94$ ,  $pr=0.20$ ,  $pr=-0.57$ ,  $p=0.017$ ). Most SRs included a meta-analysis (69.6%). Journal impact factor positively correlated with SR publication rates ( $r=0.54$ ,  $p=0.002$ ).

**CONCLUSIONS:** The SR publication rate was sustainable but growing rapidly. Epidemiological SR features changed over time.

14:05 RIT006

## Quantitative MRI in Patients with Gluteus Tendinopathy and Asymptomatic Volunteers: An Exploratory Study on T2\* and T1 mapping

**Authors:** *Joseph Dadour, Guillaume Gilbert, Bernard E Leduc, Roger Vadeboncoeur, Jean Rémillard, Nathalie J Bureau*

**BACKGROUND:** Gluteus tendinopathy (GT) is a debilitating and prevalent disorder in women. Quantitative short-TE MRI might overcome the limitations of conventional MRI in characterizing early stages of GT.

**MATERIALS AND METHOD:** Ten patients and 10 volunteers were evaluated with hip MRI using T1 and T2\* mapping sequences based on short-TE gradient echo acquisitions. Two readers segmented the posterosuperior and lateral gluteus medius (Gmed), and the gluteus minimus (Gmin) tendons on the T2\* map sequence, using ITK-SNAP. These segmentations were transposed to the co-registered quantitative T1 map. Statistical analysis was performed using the Mann-Whitney U test.

**RESULTS:** Results are shown in Table 1.

For both readers, the mean T1 values in all tendons were lower in the patients compared with the volunteers and the difference was statistically significant in the lateral Gmed tendon ( $p=0.013$  for reader 1;  $p=0.041$  for reader 2). For both readers, patients' mean T2\* values were generally higher in all tendons when compared with the volunteers. The difference was statistically significant in all tendons for reader 2 ( $p=0.002$ ;  $p=0.006$ ;  $p=0.028$ ), and for the posterosuperior and lateral Gmed ( $p=0.019$ ;  $p=0.009$ ) tendons for reader 1.

**CONCLUSION:** Compared to asymptomatic volunteers, GT patients showed lower mean T1 values in the lateral Gmed tendons, possibly linked to structural/cellular tendon changes. Higher mean T2\* values were found in the Gmin and Gmed tendons, suggesting a higher water content in pathological tendons. This indicates that quantitative MRI might be used as a noninvasive imaging tool for characterization and staging of GT.

14:15 RIT007

## Epicardial Fat is Increased in the HIV Population and Associated to Coronary Plaque Burden

*Authors: Manel Sadouni, Madelein Durand, Irina Boldeanu, Cécile Tremblay, Carl Chartrand-Lefebvre*

**INTRODUCTION:** HIV-infected patients confront an increased risk of coronary artery disease (CAD). Epicardial fat has emerged as an adipose depot of interest, potentially involved in the pathogenesis of CAD, due to its key localization and its metabolic properties. The objective of this study is to determinate whether epicardial fat is increased in the HIV patients and evaluate its association with coronary plaque volume and low attenuation plaque volume, a marker of plaque vulnerability

**METHODS AND MATERIALS:** This is a cross-sectional study, nested in the Canadian HIV and Aging Cohort Study (CHACS), a large prospective cohort following more than 800 HIV+ and HIV- patients. Consecutive CHACS participants with low to intermediate cardiovascular risk without symptoms or past CAD were invited to undergo cardiac computed tomography (CT) and coronary CT angiography. Volume measurements of epicardial fat, total atherosclerotic plaque and low-attenuation atherosclerotic plaque were performed. Association between epicardial fat volume, coronary plaque volume and low attenuation plaque volume was assessed using multivariate linear regression.

**RESULTS:** A total of 173 HIV+ and 73 HIV- patients underwent cardiac CT. HIV+ patients had greater epicardial fat volume than HIV- patients ( $p=0.03$ ). After adjustment for traditional cardiovascular risk factors, epicardial fat volume was significantly associated with total plaque volume ( $=1.99$ ,  $p=0.04$ ) and low attenuation plaque volume ( $=0.86$ ,  $p=0.01$ ).

**CONCLUSION:** The presence of a greater amount of epicardial fat and its association with coronary artery plaque may suggest a potential mechanism that could explain the increased risk for CAD in the HIV population.

14:25 RIT009

## Quantitative Measurement of Radiology Report Quality: A Machine Learning-based Outcome Metric

*Authors: Andrew Brown, Anish Kirpalani*

**OBJECTIVE:** To explore the feasibility of using machine learning to rank radiology reports according to referring physician preference and to create a new outcome metric of radiology report quality.

**METHODS:** Radiology reports of abdominal and pelvic ultrasounds performed in emergency patients at our institution were data-mined from our RIS/PAC system (January 1, 2006 – December 31, 2015). 1,756 reports from 12 staff radiologist were identified, trainee reports were excluded. 10 reports from each radiologist were selected at random. These 120 reports were used to create an online comparison survey in which participants were shown two reports at random and asked which they preferred. 29 staff emergency physicians at our institution were emailed to participate in the survey, obtaining 18 responses (62%). The survey results were analyzed using a Bayesian ranking algorithm and a quantitative score of quality was generated for each report.

**RESULTS:** The participants performed 5052 pairwise comparisons. A Bayesian ranking algorithm was able to create a rank ordered list of reports and generate a numeric value of quality for each report according to crowdsourced physician preferences. Figure 1 illustrates a sample of text from the highest and lowest ranked radiology reports. Our results suggest that more structured reports were favored over free-form prose.

**CONCLUSION:** Machine learning can be used to generate quantitative scores of radiology report quality using preferences derived from referring physicians. As radiology shifts from volume to value, machine learning-based outcome metrics may help radiologists demonstrate their value in new and interesting ways.

14:35 RIT011

## Decrease in Cerebral Artery Diameter Precedes Parenchymal Atrophy

*Authors: Julie Bilocq-Lacoste, Alexandre Bizeau, Étienne Croteau, Kevin Whittingstall,*

**OBJECTIVE:** Our study's goal was to broaden our knowledge about normal changes occurring in cerebral aging in healthy individuals by comparing vessel diameter (branches emerging from circle of Willis up to cortex) at rest and during visual stimulation in young (20-30 YO) adults and older adults (60 YO and older) with time of flight magnetic resonance angiography.

**METHODS:** Recruitment was done in order to exclude any subject with vascular risk factors nor cognitive impairment. A Time of Flight MRI had been done for each subject. In both datasets, the main and secondary branches of the MCA and PCA were segmented and voxel-wise diameters were calculated. Cortical atrophy in and around the MCA and PCA watershed zones was evaluated using CIVET as implemented in the CBrain platform.

**RESULTS/DISCUSSION:** In the healthy aging cohort, we observed a significantly smaller diameter of distal branches in both anterior (M2) and posterior (P4) circulation despite minimal parenchymal atrophy. On average, M2 and P4 diameters were reduced by ~20% (p0.1). Despite these relatively strong changes in vessel diameter, a significant stimulus-evoked dilation of P4 was still evident in the aging group.

**CONCLUSION:** The significant decrease in cerebral artery diameter in aging is evident despite no parenchymal atrophy.

## SATURDAY / SAMEDI – SALON JARRY / JOYCE

08:45 RIT015

## Electronic Consultation between Primary Care Providers and Radiologists

*Authors: Daniel Walker, Blair Macdonald, Carole Dennie, Amir Afkham, Erin Keely, Clare Liddy*

**OBJECTIVE:** To assess the use of regional electronic consultation (eConsults) initiated by primary care providers (PCPs) to radiologists and to identify common types of clinical questions, usefulness of radiologist responses, and the relevance to targeted radiology report improvement and primary care education.

**METHODS:** A retrospective review of eConsults over a 6.5 year period (April 2011 and September 2017) was performed. eConsults were classified by subspecialty (Neuro, Thoracic/Breast, Body, Musculoskeletal, and Pediatrics) and question type (management, education, diagnostic confidence, specialist referral query, and other). Feedback surveys were completed by primary care providers after each eConsult to evaluate its timeliness and value.

**RESULTS/DISCUSSION:** A total of 347 eConsults were reviewed. Subspecialty break down was as follows: Body (112), Neuro (82), Musculoskeletal (69), Thoracic/Breast (65), and Pediatric (19). The majority of eConsults pertained to the appropriateness of next imaging test, surveillance strategies for identified observations, integration of new clinical information, and requests to confirm the degree of certainty in provisional diagnoses. Consultant reference to published guidelines, incorporation of patient specific imaging solutions, and concise education around common incidentalomas were highly valued by PCPs.

**CONCLUSION:** eConsultation provides PCPs with point of care access to radiologists. These consultations help integrate additional clinical information, patient concerns, and increase the patient and PCP's confidence in the diagnosis, next imaging steps and surveillance rationale. Common consultation themes may identify topics suitable for targeted primary care education and provide a stimulus for radiologists to improve their reporting.

08:55 RIT010

### Primary Thymic Epithelial Neoplasms: What is the Role of Imaging-guided Percutaneous Needle Biopsy?

*Authors: Mohamed Abdelrazek, Carolina Souza, Hamid Bayanati, Ashish Gupta, Carole Dennie, Rebecca Peterson, Eduardo Portela de Oliveira*

#### OBJECTIVES:

1. Evaluate the yield, accuracy of percutaneous needle biopsy for the diagnosis of thymic epithelial neoplasms
2. Compare the usefulness of FNA and CNB in this setting
3. Evaluate the safety of percutaneous needle biopsy

**METHODS:** Retrospective review of prospectively maintained biopsy database (> 400 mediastinal lesions).

**INCLUSION CRITERIA:** Patients with pre-biopsy diagnosis of thymic neoplasm based on clinical-radiological findings and with pathology-proven diagnosis.

**REVIEW OF ELECTRONIC RECORDS:** Patient demographics, procedure characteristics and complications:

- 38 consecutive patients
- 73 needle biopsies: 44 FNA & 39 CNB (For purposes of statistical analysis, FNA and CNB were considered as different procedures).

#### RESULTS:

Final histological diagnosis: Thymoma = 58 Thymic carcinoma=13 Thymic cyst =1 Lung carcinoma =1

Overall diagnostic yield: 75% (55/73 biopsy), FNA yield 75% & CNB yield 76%

Diagnostic yield according to histological subtype: Thymoma = 79%, Thymic carcinoma = 46%

Non-diagnostic needle biopsies: 11 thymomas and 7 thymic carcinomas

**COMPLICATIONS:** Total of 6, 5 had pneumothorax and one vasovagal attack

- None of the pneumothoraces, required chest tube drainage.
- There were no life threatening complications.

#### CONCLUSION:

- Percutaneous imaging-guided needle biopsy is a safe and accurate tool for the diagnosis of thymic epithelial neoplasms and has an excellent diagnostic yield.
- A non-diagnostic result in patients with suspected clinical and imaging findings should prompt further investigation particularly to exclude thymic carcinoma.
- Use of CNB did not positively affected diagnostic success when compared to FNA alone.
- Complication rate was very low (2.7%).

09:05 RIT012

## Degree of Conjugate Gaze Deviation on Computed Tomography Scan Predicts Proximal Vessel Occlusion and Expedite Candidates for Endovascular Therapy

**Authors:** Nancy Jiang, Crystal Fong, Demetrios Sahlas, Ramiro Larrazabal

**PURPOSE:** Recently trials have demonstrated superior outcomes with combination IV-tPA and endovascular therapy (EVT) within 6 hours of symptom onset in patients with proximal vessel occlusion (ICA, M1, proximal M2). The current gold standard of diagnosis is CT angiogram (CTA). Unfortunately, not all hospitals are equipped with CTA capability, and often the decision to transfer patient to tertiary center is based on non-enhanced CT. Conjugate gaze deviation (CGD) is associate with worse outcome in ischemic stroke and we predict that the more proximal the occlusion, the higher degree of CGD. By measuring degree of CGD can help expedite the transfer of patients to CTA/EVT capable facility.

**MATERIALS AND METHODS:** A retrospective analysis was performed on 158-consecutive patients with acute ischemic stroke treated with IV-tPA at a tertiary center over 12-month period. Patients were categorized based on stroke location. Degree of CGD was measured. Demographics, ASPECT, National Institutes of Health Stroke Scale (NIHSS), modified Rankin Scales, length-of-stay, and mortality were collected.

**RESULTS:** Of the 70/158 patients with +CGD, 66 (93%) patients have MCA strokes. Of the 70 MCA patients, 59 (84%) have proximal MCA stroke and 7 (16%) have distal MCA stroke. The median degree of CGD is 16° in proximal and 2° in distal stroke. CGD is positively correlated with proximal stroke ( $p=0.011$ ). Higher degree of CGD is demonstrated in proximal stroke as compared to distal MCA stroke.

**CONCLUSIONS:** The degree CGD may be a practical adjunctive marker to identify acute ischemic stroke patients with proximal occlusion and expedite clot retrieval.

09:10 RIT013

## Feasibility of Magnetic Resonance Navigation in physiological settings on an unmodified MRI scanner

**Authors:** François Michaud, Ning Li, Rosalie Plantefève, Alexandre Bigot, Samuel Kadoury, Sylvain Martel, Gilles Soulez

**OBJECTIVE:** To demonstrate feasibility of Magnetic Resonance Navigation (MRN) as a treatment for unresectable HCC, which consists in steering magnetic drug-eluting microbeads in hepatic arteries towards diseased liver lobes using an unmodified MRI scanner, with regards to physiological, anatomical and technological limitations.

**METHODS:** Eight phase-contrast MRI in vivo flow measurement experiments were performed on pigs to characterize the efficacy of using a balloon catheter positioned in the proper hepatic artery simultaneously with a 0.5 ml/s saline infusion to reduce mean flow velocity and systolic-diastolic variation. Then, a proof-of-concept in vitro experiment was performed with the same flow velocity to demonstrate the feasibility of using a 20 mT/m gradient sequence in an unmodified MRI scanner to selectively steer microbead aggregates in one-bifurcation hepatic arterial phantom.

**RESULTS:** Phase contrast imaging on pig reveal that using a balloon catheter decreases the mean hepatic arterial flow velocity from  $20.5 \pm 15.3$  cm/s to  $8.4 \pm 5.0$  cm/s as well as the systolic-diastolic variation from  $24 \pm 14$  cm/s to  $4.9 \pm 2.3$  cm/s. For the MRN experiment, we obtain a steering efficiency of 77.5% when applying a 20 mT/m gradient towards the left and 67.5% when applying a 20 mT/m gradient towards the right, resulting in an overall steering efficiency of 72.5%.

**CONCLUSIONS:** This study shows that the use of a balloon catheter reduces arterial hepatic flow velocity and variation. In addition, MRN is possible under realistic physiological and anatomical settings, with reduced flow and with an unmodified MRI scanner. An increase of the steering efficiency is expected at a 40 mT/m gradient.

09:30 RIT014

## Evaluating the Effect of Direct Oral Anticoagulants versus Warfarin on Rates of Thrombosis Related Failure of IVC Filter Retrieval

**Authors:** *Hamed Basseri, Fernando Gastaldo, Sabarinath Nair, Sam Schulman, Gordon Yip*

**OBJECTIVE:** Direct Oral Anticoagulants (DOACs) are an increasingly utilized alternative to warfarin in the treatment of venous thromboembolism. However, the efficacy of these newer agents among patients with Inferior Vena Cava Filters (IVCFs) is unclear. Herein we evaluate the effectiveness of DOACs versus warfarin in patients with IVCFs by comparing rates of thrombosis related failure of filter retrieval.

**METHODS:** Following IRB approval, we retrospectively reviewed all attempted IVCF retrievals performed at our institution over 8 years (4/2009-3/2017). Patient demographics, IVCF dwell time, anticoagulant prior to retrieval, and retrieval success or cause of failure were recorded. Thrombosis-related retrieval failure rates in DOAC and warfarin groups were compared using Fisher's exact test.

**RESULTS:** We identified 207 attempted IVCF retrievals in 187 patients (112M:75F, mean age=58.7). Of attempted retrievals, 146 (70.5%) were successful, 48 (23.2%) failed due to thrombus, and 13 (6.3%) failed due to other technical reasons. Among patients on oral agents, anticoagulation prior to retrieval included warfarin in 55.4% (36/65) and DOAC in 44.6% (29/65). Significantly higher rate of thrombus precluding retrieval ( $p=0.02$ ) was seen among patients on DOACs (41.4%, 95% CI: 23.5-59.3%) compared to warfarin (13.9%, 95% CI: 2.6-25.2%) with no significant differences in patient demographics or IVCF dwell time between these two groups.

**CONCLUSION:** A higher rate of thrombosis precluding IVCF retrieval, was seen among patients treated with DOACs compared to warfarin in our cohort. While further investigation is needed, our findings may have future implications in guiding optimal anticoagulation to improve IVCF retrieval success.

09:40 RIT016

## Acute Thrombectomy in the Ageing Population: A Retrospective Analysis of Radiological and Clinical Outcomes in Acute Thrombectomies Performed in Patients $\geq 80$ Years with an Intention to Treat Analysis

**Authors:** *Elena Adela Cora, Vias Demetriou, Fahad Essbaiheen, Hanan AlQahtani, Brian Drake, Howard Lesiuk, Philip White, Dana Iancu*

**OBJECTIVE:** The incidence of ischemic stroke is higher in the older population with higher mortality. Studies have demonstrated clinical benefit when performing thrombectomy. The safety and clinical outcomes in the 80 years or older age group are not yet clear. Our aim is to provide data from clinical practice to assess the safety and efficacy of endovascular thrombectomy in this age group.

**METHODS:** We retrospectively reviewed all consecutive patients of age  $\geq 80$  referred for thrombectomy procedures at two institutions from 01/01/2015 to 01/09/2015. We collected demographic data, risk factors, clinical and radiological findings, treatment details, clinical and radiological outcomes.

### RESULTS/DISCUSSION:

- Data for 75 patients, 50 females and 25 males, with median age of 84 was included. Baseline clinical characteristics are similar to previous trials. There were MCA occlusions in 49% (37/75) and tandem occlusions in 15% (11/75) patients.
- 67% (50/75) patients received IVtPA. Good reperfusion (mTICI 2b/3) was achieved in 60% (45/75) patients within 224 minutes.
- Good clinical outcome (mRS 0-2) at 90 days was achieved in 31% (23/75) patients.
- Safety data is similar to published trials with 5% SICH.
- Overall results are similar to the HERMES interventional data on patients of age  $\geq 80$ . Small differences in results will be fully discussed.

**CONCLUSION:** Our study adds valuable evidence to the limited data on safety and clinical outcomes in patients 80 years of age and older who undergo thrombectomy. Our findings support the data from clinical trials and confirm that mechanical thrombectomy can be performed safely and in a timely fashion outside of trials with similar results.

09:50 RIT005

## Diagnostic Accuracy of MRI for Tumour Staging of Bladder Cancer: Systematic Review and Meta-Analysis

*Authors: Niket Gandhi, Satheesh Krishna, Christopher M. Booth, Rodney H. Breau, Trevor A. Flood, Scott C. Morgan, Nicola Schieda, Jean-Paul Salameh, Trevor Adam McGrath, Matthew McInnes.*

**OBJECTIVE:** To evaluate accuracy of MRI for local staging of bladder cancer for two clinical scenarios (T-stage thresholds) considered against current standards for clinical staging. Secondary objective is to identify sources for variability in accuracy.

**METHODS:** Search of multiple databases was performed on Jan 26, 2017. Screening and inclusion was done independently by 2 authors. Titles-abstracts were screened for relevance, full texts retrieved and inclusion criteria applied. Two authors independently extracted data, with disagreements solved by consensus. Risk of bias was assessed using QUADAS-2. Summary estimates for diagnostic accuracy were generated using bivariate random effects model and subgroup analyses evaluated for sources of heterogeneity.

**RESULTS/DISCUSSION:** Search identified 30 studies (5,156 patients). Pooled accuracy at multiple T-stage thresholds was: T1 vs >T2- sensitivity 87% (95%CI 89-91), specificity 79% (95%CI 72-85); T2 vs >T3- sensitivity 83% (95%CI 75-88), specificity 87%(95%CI 78-93). For T1 vs >T2, accuracy was higher in studies at low risk of bias. No variability in accuracy was identified for: field strength, publication date, index test parameters.

**CONCLUSION:** MRI staging for Q1 (T1 vs >T2) and Q2 (T2 vs >T3) should be considered potentially superior to clinical staging when considering treatment options for bladder cancer.

## ELECTRONIC POSTERS

RIT017

## Reporting Bias in Imaging Research: Association of Diagnostic Accuracy Estimates in Radiology Conference Abstracts with Full-Text Publication

*Authors: Lindsay A Cherpak, Daniel Korevaar, Trevor McGrath, Wilfred Dang, Daniel Walker, Anahita Dehmoobad Sharifabadi, Jean-Paul Salameh, Matthew D McInnes*

**OBJECTIVE:** To assess associations between accuracy estimates and full-text (FT) publication at five years after abstract submission.

**METHODS:** Diagnostic accuracy abstracts presented at the RSNA meeting in 2011-2012 were evaluated. Specificity (Sp) and sensitivity (Sn) from the abstracts were used to calculate Youden's index ( $YI=Sn+Sp-1$ ). Database searches were conducted to identify FT publications within 5 years after abstract submission. T-tests were used to assess for associations between accuracy estimates and FT publication.

**RESULTS/DISCUSSION:** 405 abstracts were included [256 from 2012, 149 from 2011]. Median YI was 0.79 (IQR 0.63-0.90). FT publications were identified for 277/405 (68%) abstracts. Mean YI for abstracts with FT at 5 years (0.76, 95%CI 0.74-0.78) was significantly higher than those without (0.72, 95%CI 0.68-0.76);  $p = 0.03$ .

**CONCLUSION:** Study abstracts that report higher diagnostic accuracy estimates were more likely to be reported in a FT publication 5 years after initial submission. Higher probability of FT publication for higher accuracy estimates could lead to overestimates of diagnostic accuracy by physicians, systematic reviews, and guidelines.

RIT018

## Online Profile of Canadian Diagnostic Radiology Residents: Do Residents Alter Their Profile When Applying for Fellowships

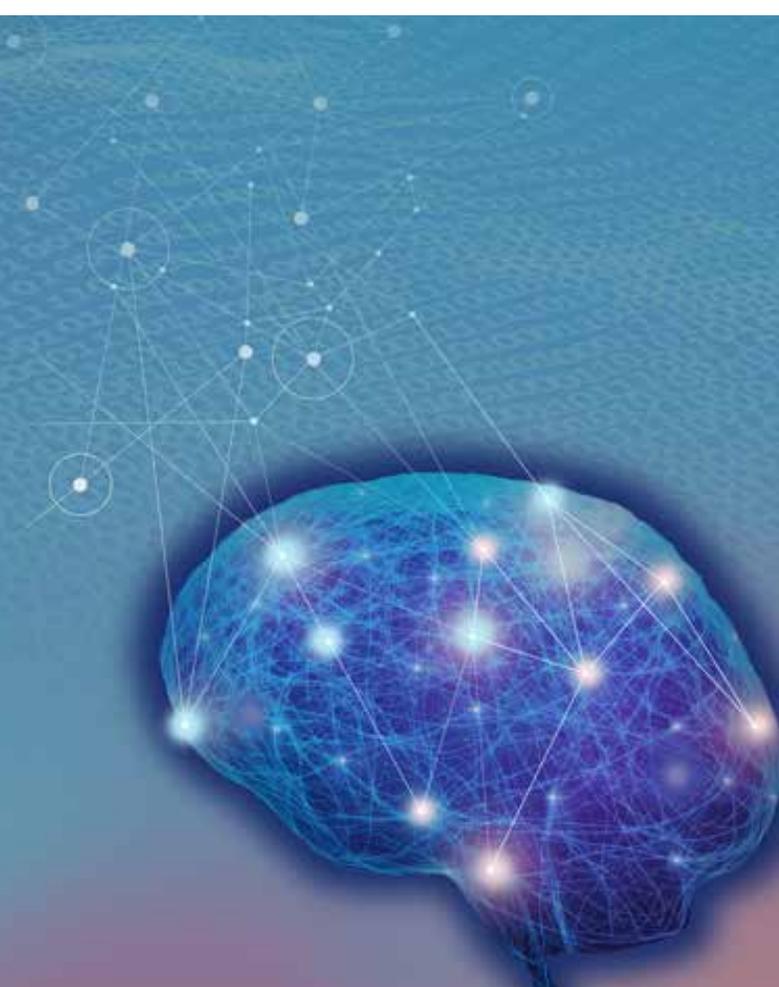
**Authors:** Anthony Vo, Arlene Kanigan

**OBJECTIVE:** Survey the online profile of Canadian Diagnostic Radiology residents and whether residents alter it when applying for fellowships, due to the perceived assessment of their profile by selection committees.

**METHODS:** A cross-sectional study was performed by distributing an anonymous questionnaire to 31 residents at the University of Alberta. Descriptive statistical and ANOVA analyses were performed.

**RESULTS/DISCUSSION:** 26 questionnaires were completed. The average age was 28.9. 91.4% of residents have Facebook, followed by Instagram (30.4%) and ResearchGate (30.4%). 52.5% viewed their profile at least once daily, although 83.3% make changes to it less than once per month. The profiles were primarily for personal use (72.7%) and none were solely for professional use. 53.8% felt that fellowship selection committees assess their profile and 69.2% were neutral or agreed with this. In anticipation, 70.6% would restrict profile viewership, while 29.4% would change their profile name, predominantly due to sensitive and personal information. 92.8% would make the changes at least 2 months prior to the application deadline. There was no statistical difference between age and having a profile ( $p=0.597$ ), agreement with using a resident's profile for selection ( $p=0.91$ ), how often residents view ( $p=0.827$ ) or change ( $p=0.934$ ) their profile.

**CONCLUSION:** Nearly all residents have an online profile and over half view it at least once daily. The majority of residents perceived that their profile is assessed by fellowship selection committees, but are not against it. In anticipation, residents would alter their profile prior to the application deadline.



## ORAL PRESENTATIONS

Friday April 28, 13:15-14:45, Salon Kafka / Lamartine (Level A)

Prizes for the winning abstracts are funded by the Canadian Association of Radiologists and will be awarded during the Awards Ceremony on Saturday, April 28 at 17:30.

## PRÉSENTATIONS ORALES

Le vendredi 28 avril, de 13 h 15 à 14 h 45, Salon Kafka / Lamartine (Niveau A)

Les prix pour les résumés gagnants sont financés par L'Association canadienne des radiologistes et seront présentés lors de la Cérémonie de remise des prix le samedi 28 avril à 17 h 30.

**JUDGES / JUGES :** Scott Harris, Nick Neuheimer, Charlotte Yong-Hing

13:15 VOR001

### Cost Savings as a Result of Implementing TI-RADS Standardized Reporting in a Radiology Department

**Authors:** Ania Kielar, Tetyana Maniuk, Stephanie Kenny, Mohamed El-Khodary, Joseph O'Sullivan, Wael Shabana

**BACKGROUND:** Given mounting health systems fiscal pressures, implementing evidence-based ways of reducing unnecessary use is important. The purpose of our study was to determine if adoption of Thyroid Image Reporting And Data System (TI-RADS) would lead to sustained reductions in thyroid biopsies and subsequently lead to cost savings.

**METHODS:** We instituted a modified TI-RADS reporting in January, 2016, based on a multi-disciplinary consensus at our tertiary care hospital. At the end of 6 months, we had 89% adherence of TI-RADS reporting among radiologists. We compared cost savings of thyroid biopsies before implementing TIRADS in January 2016 (using 2015 data), to costs 3 months after starting the quality initiative. Costs components related to a thyroid biopsy were identified, including hospital costs, physician fees and patient opportunity cost.

**RESULTS:** We identified a net reduction of thyroid biopsies from 74 per month prior to introduction of TI-RADS in January 2016 (using data from 2015), to 60 per month, over 6 months, 3 months after starting the quality initiative project. The number of monthly diagnostic thyroid ultrasounds 271 in 2015 and 287 in 2016. In the first half of 2017, an average of 45 biopsies per month were performed. The total cost for a thyroid biopsy is \$146.15. With a net reduction of 168 thyroid biopsies per year, we were able to save \$24553.20 in 2016 and a projected \$50860.20 based on the data from the first half of 2017.

**CONCLUSION:** A radiology department's implementation of evidence-based, standardized template reporting for thyroid sonography can lead to sustainable health care cost savings.

13:25 VOR002

## Comparative Analysis of Healthcare Economics between Uganda, Canada, and the United States and its Effects on Medical Imaging: Lessons Each Country Can Learn

*Authors: Naiim Ali, Mark Lach, Sergey Leshchinskiy, Ssembatya Renny, Alphons Matoyu, Kristen DeStigter*

**PURPOSE:** Advanced imaging is ubiquitous throughout Canada and the United States resulting in a dramatic rise in medical costs. In Uganda, advanced imaging is essentially nonexistent outside of urban areas. We will contrast the healthcare policy and funding between Canada, the United States, and Uganda to evaluate its effects on medical imaging.

**METHODS:** The healthcare system in Uganda was reviewed by conducting interviews with Ugandan medical workers focusing on the financial aspects of healthcare delivery. Personal views of interviewees were also elicited. Systematic literature review of published imaging utilization data from each country was performed.

**RESULTS:** Healthcare in Uganda is divided into Government and Private sectors. In the Government sector, funding is provided centrally and no fees are charged to patients. Non-profit private facilities are mandated to charge “reasonable fees” and receive government subsidies. Healthcare in Canada and the United States predominantly uses a fee-for-service model, although there is some variation between provinces in Canada and among healthcare organizations in the United States. Reported imaging utilization rates in Canada and the United States are vastly higher than those in Uganda by a multiple of 15-30 times (4404 imaging studies per 1,000 patients vs. 186 imaging studies per 1,000 patients).

**CONCLUSIONS:** While in Uganda, medical imaging is often unavailable in rural areas; some suggest financial incentives for medical imaging have led to overutilization in Canada and the United States. Comparing the healthcare delivery models of Canada, the United States, and Uganda and its effects on medical imaging allows for lessons and areas of improvement for each country.

13:35 VOR003

## Can Artistic Paintings Broaden Medical Students' Understanding of the Radiology Profession?

*Authors: Kari Visscher, Lynn F Bloom, Lisa Faden, Kawan Rakhra*

**OBJECTIVE:** The stereotype held by medical students of the isolated radiologist working in a dark room is a threat to the future of the profession of radiology. Thus, we seek novel ways to challenge it and promote an understanding of radiology as a connected and caring profession. The goal of this study is to explore how art may impact medical students' understanding of radiology and radiologists.

**METHODS:** Using the validated pedagogical tool of Visual Thinking Strategies (VTS), 25 third year medical students participated in a 45 minute-facilitated discussion of three paintings depicting radiology encounters (Figure 1). Participants completed a post-session questionnaire containing Likert scale and open text questions. The data was analyzed using quantitative statistics and the qualitative methodology of thematic analysis.

**RESULTS/DISCUSSION:** Participants included 25 third year medical students. 84% found the experience very enjoyable and 16% somewhat enjoyable. 96% of participants would recommend this session to other medical students/schools. 76% agreed the paintings positively affected their understanding of how radiologists provide care to patients, augmenting their initial perception of minimal patient interaction. All agreed that VTS is a useful teaching tool. The students most valued the group discussions, sharing of opinions, in depth visual analysis, and the space and time to be reflective.

**CONCLUSION:** Paintings can be used to promote radiology as a caring and connected profession, helping challenge stereotypes held by medical students. The use of group discussion and VTS is valued by medical students with 96% recommending this session to other medical students and schools.

13:45 VOR004

## MRI Detects Asymptomatic Brain Anomalies in Survivors of Childhood Acute Lymphoblastic Leukemia (ALL)

*Authors: Huy Nguyen, Ramy El-Jalbout, Caroline Laverdière, Daniel Sinnett, Maja Krajinovic, Laurence Bertout, Philippe Robaey, Serge Sultan, Julie Laniel, Mahsa Shakeri, Simon Drouin, Aubrée Boulet-Craig, Victor Oswald, Samuel Kadoury, Sarah Lippé*

**BACKGROUND:** Quick adequate imaging is essential in the initial evaluation of trauma cases in children for adequate management. At Sainte-Justine hospital, as in most teaching hospitals, on call shifts are done by residents, initial reports are thus given by residents. Therefore, a certain amount of time exists between the initial preliminary report and the final one.

**OBJECTIVES:** We wanted to determine the mean time taken by residents to give a preliminary written report, the mean time between the preliminary and final reports and the discrepancy rate between these reports, and if present to grade it.

**METHODS:** This was a retrospective audit done in Sainte-Justine. All on-call trauma scans between May 1<sup>st</sup> 2016 and December 31<sup>st</sup> 2016 were reviewed. Time of scan visualisation, written report production, dictation and final report availability and signature were noted. Discrepancy was evaluated independently by Dr. Hammachin (resident) and Dr. ElJalbout (Attending physician) and graded from 0 to 3.

**RESULTS:** Mean time of written preliminary report production was 31,81 minutes. Mean time between preliminary and final reports was 8,43 hours. Those numbers were satisfying and correspond to literature standards. We noted a 20.4% discrepancy rate, with 14,2% grade 1 and 7,1% grade 2. This is higher than literature numbers, but is potentially secondary to the severe evaluation of discrepancy by authors, and we had no grade 3 discrepancies.

### **ACTION PLAN:**

- Presented at surgery departmental meeting.
- Discuss expectations with new residents arriving at Sainte-Justine.
- Re-audit in one year.

14:15 VOR006

## Automating Screening Mammographic Image Quality Determination

*Authors: Stephanie Schofield, Elise LeBlanc, Ryan Duggan*

**BACKGROUND:** Radiologists' performance to detect breast cancer is dependent on high quality screening mammographic images. The Canadian Association of Radiology Mammography Accreditation Program (CAR-MAP) requires image quality determinations for all mammography machines every three years. The evaluation of mammographic image quality is a manual, time consuming process that requires a trained reviewer, making frequent review of image quality logistically impossible. An automated approach to image quality determination could make daily image quality review possible.

**PURPOSE:** We compared the time for an expert reviewer to conduct a visual image quality determination to the time required by automated Densitas software to perform the same tasks.

**METHODS:** An experienced reviewer (25 years) assessed a random sample of ten digital screening mammogram studies obtained in January 2017 in Nova Scotia using the image quality standards of the CAR-MAP. The same studies were evaluated using the Densitas software. Average and total time to complete determinations were calculated.

**RESULTS:** The reviewer assessed 10 total 4-view studies in 1h41m44s (average = 10m10s/study, range 8m12s-12m9s). Densitas software processed the same 10 4-view studies in 30s. (average = 3s/study), or 164x faster than manual review.

**CONCLUSION:** An automated tool greatly reduces the time burden of image quality determination, with the possibility of real-time feedback at point of care. An evaluation of agreement between the Densitas software and expert reviewers is currently underway.

14:25 VOR007

## The Age of Medical Imaging Equipment in Canada

*Authors: Kasia Kaluzny, Lisa Pyke, Alison Sinclair, Calvin Young, Andra Morrison, Teo Quay*

**OBJECTIVE:** To track and analyze equipment age in Canada to inform lifecycle planning and support decision-making.

**METHODS:** Information on specialist medical imaging equipment age, locations, and number of units was obtained by a nation-wide survey run by CADTH, a not-for-profit organization. Data was collected in 2017 through a web-based form and supplemented with information from validators and literature searches.

**RESULTS:** Information on 1,615 units was obtained, and age could be estimated in 83.5% of cases. With the exception of SPECT, most imaging equipment in Canada has 10 or fewer years of operation: 74.3% of CT units, 69.9% of MRI units, 84.2% of PET-CT units, and 87.6% SPECT-CT units. In the case of SPECT, 42.5% of units are less than 10 years old. CAR lifecycle guidelines recommend that the age of CT, MRI, PET-CT, and SPECT-CT machines not exceed 8, 10, or 12 years, depending on high, medium, or low use, respectively. In Canada, SPECT is the only modality where equipment installed more than 20 years ago is still in use (4.4%). CAR recommends that the maximum age and clinical relevance of any technology should not exceed 15 years – there are examples of units exceeding this limit across all imaging modalities except for PET-CT.

**CONCLUSION:** An accurate inventory of equipment age that is publicly available promotes transparency and can facilitate conversations and negotiations (e.g., about mass procurement) across jurisdictions to improve health service delivery.

14:35 VOR008

## Evolution of Breast Localization Techniques Improves Management of Non-palpable Breast Lesions

*Authors: Wyanne Law, Belinda Curpen, Frances Wright, Elzbieta Slodkowska*

**PURPOSE:** To review how breast localization methods have helped surgeons to effectively excise non-palpable breast lesions and to improve patient outcomes. Breast radiologists have added value in management of breast cancer by increasing flexibility of procedure scheduling and improving patient satisfaction.

**METHODS:** A review of relevant, peer-reviewed articles on breast localization methods to determine the surgical margins and added value of different techniques.

**RESULTS:** Radioactive seed localization (RSL) has largely replaced the gold standard of wire localization (WL) for non-palpable breast lesions, including the Sunnybrook Health Sciences Centre (SHSC) in Toronto. There is few or no difference in positive margins between RSL and WL in final pathology. RSL provides greater scheduling flexibility than WL translating to more efficient use of the operating room time. RSL has a favorable safety profile with minimal radiation exposure and few procedure-related complications. Newer, innovative techniques take advantage of the ease of loading, delivering and retrieving a seed in the breast lesion, while detecting using magnetic fields and radiofrequency. Through satisfaction surveys, RSL is an excellent localization method for patients.

**CONCLUSION:** Breast localization techniques are continuously evolving. These advances increase efficiency and maintain patient satisfaction. Radiologists working alongside a multidisciplinary team of surgeons and pathologists are instrumental to the implementation and ongoing review of the RSL breast program at SHSC and other institutions.

14:45 VOR009

## Survey on the Interdisciplinary Approach between Radiologists and Clinicians

*Authors: Joyce Zaftis, Tarik Hadbi, Josephine Pressacco, Jean-Marc Chauny*

**PURPOSE:** The present study aims to identify the specific roles and interactions of radiologists that are perceived to add value to the clinical care of patients in the department of oncology at our institution.

**METHODS:** Custom surveys were distributed amongst clinicians in the department of oncology. The main focus of the study was to determine the perceived value of radiology reports, communication and interactions with radiologists, presence of radiologists during multidisciplinary meetings, the importance of location of a radiology interpretation station, and the physical presence of a radiologist during clinics and rounds.

**RESULTS:** A total of twelve oncologists completed the survey. All oncologists saw great value in well-written reports and being able to communicate with a radiologist via telephone. Most oncologists did not see any added value in having a radiologist be physically present during clinics and rounds. However the most important aspect perceived to add value was the physical presence of a radiologist during multidisciplinary meetings.

**CONCLUSION:** Well-written reports, telecommunication and the presence of radiologists during multidisciplinary meetings are all aspects to be considered by radiology departments when trying to optimize their added value in patient care.”



# SCIENTIFIC RESEARCH PROJECTS | PROJETS DE RECHERCHE SCIENTIFIQUES

## DIGITAL DISPLAY

Thursday April 26 to Sunday April 29, Level 4 Annex/Foyer

## ORAL PRESENTATIONS

Friday April 27, 08:45 – 10:15, Salle de bal est (Level 4)

Saturday April 28, 10:45 – 12:15, Salon Jarry / Joyce (Level A)

Prizes for the winning abstracts are funded by the Canadian Radiological Foundation (CRF) and will be awarded during the Awards Ceremony on Saturday, April 28 at 17:30.

## AFFICHAGE NUMÉRIQUE

Du jeudi 26 avril au dimanche 29 Avril, foyer du 4<sup>e</sup> étage

## PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 08 h 45 à 10 h 15, Sal de bal est (Niveau 4)

Le samedi 28 avril, de 10 h 45 à 12 h 15, Salon Jarry / Joyce (Niveau A)

Les prix pour les résumés gagnants sont financés par la Fondation radiologique canadienne (FRC) et seront présentés lors de la Cérémonie de remise des prix le samedi 28 avril à 17 h 30.

**JUDGES / JUGES :** Emily Pang, Francesca Proulx, Vivek Virmani

## FRIDAY / VENDREDI – SAL DE BAL EST

08:45 SRP001

### MRI Feature Tracking Strain is Prognostic for All-Cause Mortality in AL Amyloidosis

**Author:** Jeffrey Illman

**PURPOSE:** To compare myocardial strain measured with feature-tracking cardiac MRI in patients with biopsy-proven cardiac amyloid and age and gender matched normal control subjects. **Materials and Methods:** Cardiac MRI with feature-tracking myocardial strain analysis was performed in 8 patients with biopsy-proven cardiac amyloid as well as in 8 age and gender matched control subjects without cardiac disease. Echocardiography with 2D longitudinal strain measurement was also performed in all patients and controls. Global average peak systolic radial and circumferential strain was obtained from MRI short axis cine balanced steady state free precession (b-SSFP) images using commercial software. Global average longitudinal strain was computed from 2-chamber, 3-chamber, and 4-chamber views and these results were averaged to obtain an average global peak systolic longitudinal strain. MRI strain values in amyloid patients were compared with matched controls and were also compared with echocardiographic longitudinal strain measurements.

**RESULTS:** Radial, circumferential, and longitudinal strain values were significantly different between amyloid patients and matched controls. Agreement between echocardiographic and MRI derived longitudinal strain measurements was modest.

**CONCLUSIONS:** MRI feature-tracking strain analysis showed reduced peak systolic radial, circumferential, and longitudinal strain in amyloid patients in comparison to normal controls.

08:55 SRP002

## Flow Diversion at the Basilar Apex: An International Multicentre Study

*Author: Adam Dmytriw*

**BACKGROUND:** Flow diversion for basilar apex aneurysms has rarely been reported.

**OBJECTIVE:** To assess flow diversion for basilar apex aneurysms in a multicenter cohort.

**METHODS:** Retrospective review of prospectively maintained databases at eight academic institutions was performed from 2009-2016 to identify patients with basilar apex aneurysms treated with flow-diversion. Clinical and radiographic data were analyzed.

**RESULTS:** Sixteen consecutive patients (median age 54.5 years) underwent 18 procedures to treat 16 basilar apex aneurysms with either PED or FRED. Five aneurysms (31.3%) were treated in the setting of subarachnoid hemorrhage. Seven aneurysms (43.8%) were treated with flow diversion alone, while 9 (56.2%) underwent flow diversion and adjunctive coiling. At a median follow-up of 6 months, complete (100%) and near-complete (90-99%) occlusion was noted in 11 (68.8%) aneurysms. Incomplete occlusion occurred more commonly in patients treated with flowdiversion alone compared to those with adjunctive coiling. Patients with partial occlusion were significantly younger. Retreatment with an additional flow diverter and adjunctive coiling occurred in 2 aneurysms with wide necks. There was one mortality in a patient (6.3%) who experienced PCA and cerebellar strokes as well as subarachnoid hemorrhage after placement of a flow diverter. Minor complications occurred in 2 patients (12.5%).

**CONCLUSION:** Flow diversion for the treatment of basilar apex aneurysms results in acceptable occlusion rates in highly selected cases. Both primary flow diversion and rescue after failed clipping or coiling resulted in mRS that was either equal or better than at presentation and the technology represents a viable alternative or adjunctive option.

9:05 SRP003

## Mammographic Density, Age and Family History – A Minimally Sufficient Set of Parameters to Risk-stratify Average Risk Women for Follow-up Screening

*Authors: Mohamed Abdoell, Kaitlyn Tsuruda, Jennifer Payne, Peter Brown, Judy Caines, Penny Barnes, Michael Rivers-Bowerman, Sian Iles*

**OBJECTIVE:** This study evaluated the consistency and discriminatory power of several short-term breast cancer risk models within a general screening population.

**METHODS:** This 3:1 age- and screen-matched case-control study sampled all breast cancer cases diagnosed among digitally screened women aged 40-75 (2009-2015) within a provincial breast screening program. Clinical risk factor data and fully-automated percent mammographic density assessments were obtained for 2,347 cases and 7,041 controls. The data were partitioned such that risk models were developed using a training dataset and validated using a test dataset. Patient-specific risk estimates were derived from models that included density and clinical risk factors alone and in combination. Agreement between models was assessed using Intraclass Correlation Coefficient (ICC) and Kappa; predictive performance was assessed using area under the receiver operating curve (AUROC).

**RESULTS/DISCUSSION:** Agreement between risk estimates was highly variable (ICC=0.016-0.962, Kappa=0.025-0.823). Risk model performance varied highly (AUROC=0.485-0.602). Agreement was almost perfect between a model including density, family history and age versus a model that additionally included menopausal status, HRT use and parity (ICC=0.962, Kappa=0.823); predictive performance was similar (AUROC =0.594,0.598).

**CONCLUSION:** Risk models can generate significantly different risk estimates for the same woman depending on the risk factors included, thus altering follow-up recommendations, especially for higher risk women. A short-term risk model incorporating mammographic density, family history and age provides a practical solution for risk stratification of the average-risk population.

09:15 SRP005

## Risk of Early Onset Breast Cancer Among Women Exposed to Thoracic CT in Pregnancy Or Early Postpartum – A Retrospective Cohort Study

**Authors:** Kirsteen Burton, Alison Park, Michael Fralick, Joel Ray

**OBJECTIVE:** The risk of breast cancer may be higher with direct exposure to ionizing radiation from thoracic computed tomography (CT) during pregnancy or postpartum. We evaluated the short-term risk of maternal breast cancer after exposure to thoracic CT during pregnancy or postpartum.

**METHODS:** We completed a retrospective population-based cohort study of all deliveries between 1995-2014 using universal health care databases in the province of Ontario, Canada. The main exposure was thoracic CT in pregnancy or  $\leq 42$  days postpartum. Each was compared to pregnancies unexposed to thoracic CT or VQ scan. The primary study outcome was newly diagnosed breast cancer starting 366 days after the index delivery date.

**RESULTS:** 5,859 pregnancies were exposed to thoracic CT; 4075 to VQ scan; and 1,292,059 to neither. Starting from one year after the index delivery, the median duration of follow-up was 5.9, 7.3 and 11.1 years, respectively. A total of 10,129 women were diagnosed with breast cancer, of which 9,039 (89.2%) were aged  $\leq 50$  years. There were 27 new cases of breast cancer (7.1 per 10,000 person-years) following thoracic CT vs. 10,080 (7.0 per 10,000 person-years) among the unexposed – an adjusted HR of 1.17 (95% CI 0.80-1.70). Following VQ scan exposure, the incidence rate of breast cancer was also 7.0 per 10,000 person-years – an adjusted HR of 1.23 (95% CI 0.81-1.87) compared to the unexposed cohort.

**CONCLUSION:** Exposure to thoracic CT during pregnancy or postpartum was not associated with an increased short-term risk of maternal breast cancer.

09:45 SRP007

## Utility of Diffusion Weighted Imaging with Background Suppression in Detection of Breast Malignancies; A Non Contrast, Non Radiation and Non Invasive Technique

**Author:** Pratiksha Yadav

**OBJECTIVE:** To evaluate the utility of Diffusion weighted imaging with increased b value and background suppression in detection of breast malignancies.

**MATERIAL AND METHOD:** Study IRB and IEC approved. Study included 68 breast lesions of 57 cases, suspicious for malignancies on mammography and breast ultrasound. All the cases underwent for breast MRI on 1.5 Tesla machine using dedicated breast coil. Multiplaner localizer applied with 3mm slice thickness. Axial T1WI, T2WI and STIR, STIR coronal, & sagittal plane. DWI was done with b value 800 sec/mm<sup>2</sup> and another sequence with 1500 sec/mm<sup>2</sup>. Dynamic study Post gadolinium T1WI Fat sat were obtained in axial plane. Post processing was done and ADC calculations also obtained. All the cases were correlated histopathologically.

**RESULT:** The lesions, which showed diffusion restriction considered positive whereas lesions did not show restriction were considered as benign lesions. DWI with increased b value demonstrates lesions better with background suppression. In 68 breast lesions, 35 (51.4%) were malignant and 33 (48.5%) benign on DWI. Histopathology revealed 37 lesions (54.4%) malignant and 31 (45.5%) benign. Sensitivity of DWI was 91.6% (95% CI = 77.5, 98.25), specificity 90.62% (95% CI = 74.9, 98.02), PPV 91.6% and NPV 90.6%. Mean ADCs of malignant lesions was  $0.609 \pm 0.35 \times 10^{-3}$  mm<sup>2</sup>/s and benign lesions was  $1.732 \pm 0.53 \times 10^{-3}$  mm<sup>2</sup>/s.

**CONCLUSION:** When increase the b value, signal intensity of normal breast decreases which demonstrates improved contrast resolution between malignant lesion and normal breast tissue. It is a useful non-contrast, non-radiation and non-invasive technique in the diagnosis of carcinoma breast.

09:55 SRP010

## CT-guided Placement of Microcoils to Direct Video-assisted Thoracoscopic Surgical Resection of Small Lung Nodules: Safety, Efficacy and Outcome

**Authors:** *João R. Inácio, Ashish Gupta, Hamid Bavanati, Carolina Souza, Sebastian Gilbert, Patrick James Villeneuve, Carole Dennie*

**OBJECTIVE:** To prospectively assess the safety and effectiveness of computed tomography (CT)-guided placement of fiber-coated microcoils used to guide video-assisted thoracoscopic surgical (VATS) excision of small lung nodules. We evaluated successful excision as the primary outcome and successful CT-guided microcoil placement, procedural complications and histological diagnosis as secondary outcomes.

**METHODS:** Study IRB-approved, HIPPA compliant. 59 patients were enrolled, in two patients, two different ipsilateral lung nodules were marked with microcoils for simultaneous excision. Under CT guidance, a fiber-coated microcoil was placed deep to the small lung nodule and coiled in the pleural space. VATS excision of lung tissue, nodules, and the microcoil was performed with fluoroscopic guidance.

**RESULTS:** Mean size of 60 lung nodules was  $15.3\text{mm} \pm 6.6$  and distance from the pleura  $6.9\text{mm} \pm 9$ . The nodule attenuation was solid in 19 (32%), part solid in 24 (41%) and pure ground-glass in 17 (29%). Nodule CT-guided microcoil placement was successful in guiding VATS excision in 59 of 60 procedures (98%). Pneumothorax requiring chest tube placement occurred in 2 (3%) patients. All 59 resected lung nodules were histopathologically diagnosed, revealing 43 (73%) primary lung adenocarcinomas, 9 (15%) metastases, and 6 (10%) benign lesions. 5 (8%) lung specimens had positive margins (lepidic component of adenocarcinoma) but all patients had conservative treatment on follow up.

**CONCLUSION:** Microcoil localization of small peripheral lung nodules enabled fluoroscopically guided VATS resection of 98% of the nodules. Preoperative microcoil CT guided localization of small lung allows definitive histological diagnosis and surgical treatment of small pulmonary nodules.

10:05 SRP011

## Dorsal Thoracic Arachnoid Web and the Scalpel Sign: Inter-rater Agreement

**Authors:** *Nader Zakhari, Santanu Chakraborty, Sara Omaiche, Thanh Nguyen*

**OBJECTIVE:** The “scalpel sign” has been proposed as a reliable indicator for the presence of dorsal thoracic arachnoid web<sup>1</sup>. However, with increased awareness of this entity, more subtle indentations are identified with different individual radiologists’ thresholds to classify the finding as a scalpel sign. Our purpose is to assess the interrater agreement for the identification of this sign and diagnosis of dorsal thoracic arachnoid web.

**METHODS:** Retrospective review of 75 MRI from April 2009 to March 2016 with posterior cord indentation. Two experienced neuroradiologists blinded to the clinical data separately assessed the imaging findings and each indicated whether the sign is present or absent and his diagnosis. Inter-rater agreement was calculated. Association of positive sign and the final diagnosis as thoracic web was calculated for each neuroradiologist.

**RESULTS:** Positive scalpel sign was identified in 53.3% (reader 1) and 34.7 % (reader 2). The diagnosis of arachnoid web was made in 61.3 % (reader 1) and 26.4 % (reader 2). For each reader, there was significant association between positive scalpel sign classification and the diagnosis of thoracic arachnoid web.

**CONCLUSION:** While the presence of the scalpel sign has been proposed as a reliable indicator for the presence of thoracic arachnoid web, the suboptimal interrater agreement in the identification of this sign potentially limits its usefulness in making the correct diagnosis of thoracic arachnoid web. Standardization of this imaging sign may be required to improve its usefulness.

10:15 SRP012

## Can 2D & 3D MRCP Precisely Map the Intrahepatic Biliary Anatomy & Anatomical Variants in Subjects with Normal Liver?

*Authors: Almalki Yassi, Jehan Mazroa*

**OBJECTIVE:** To evaluate the accuracy of 2D&3D magnetic resonance cholangio-pancreato-graphy(MRCP) in precise mapping of the intrahepatic biliary anatomy&anatomical variants in subjects with normal liver(living liver donors)compared to intra-operative cholangiography(IOC).

**METHODS AND MATERIALS:** 35 subjects with normal liver (living liver donors) were imaged with plain 3D MRCP and IOC.

**RESULTS:** (type I) was seen in 23 subjects (65.7%) according to IOC while in MRCP was 22 subjects (62.9%), type II was seen in 4 subjects (11.4%) by IOC and 6 subjects by MRCP (17.1%),type III was seen by both modalities in 4 subject (11.4%),type IV was seen by both modalities in 3 subjects (8.6%), unclassified type was seen in one subject (2.9%) by IOC and missed in 3D MRCP. MRCP (2D & 3D) precisely detected intrahepatic biliary anatomy and anatomical variants in 33 subjects out of 35 with diagnostic accuracy of 97.1 %. In the remaining 2 subjects MRCP gave false positive trifurcation pattern due to very short main right hepatic duct and acute angle at the confluence of right and left hepatic ducts (confirmed in IOC). The sensitivity, specificity, positive predictive, and negative predictive values of MRCP were 100%, 94.6%, 94.3% and 100% respectively.

**CONCLUSION:** 2D&3D MRCP efficiently maps the normal biliary anatomy.The presence of anatomical variations slightly decreases MRCP diagnostic accuracy and makes IOC or duct probing a necessary tool for accurate pre-operative mapping.Contrast study may help in the future for improving the MRCP diagnostic accuracy.

## SATURDAY / SAMEDI – SALON JARRY/JOYCE

10:45 SRP008

## Utility of T2-weighted Magnetic Resonance Imaging, Diffusion-weighted Imaging and MR Spectroscopy to Differentiate Malignant and Benign Thyroid Lesions

*Author: Pratiksha Yadav*

**OBJECTIVE:** To evaluate the diagnostic performance of T2WI mean signal intensity combined with diffusion-weighted imaging and MR spectroscopy to differentiate thyroid carcinomas from benign thyroid nodules.

**MATERIAL AND METHOD:** Study IRB and IEC approved. Inclusion criteria selected 32 patients (12- 67years) who detected 41 thyroid nodules on high resolution ultrasonography. All the cases underwent MRI on 1.5 Tesla machine. Non contrast,axial T2WI, T1WI & STIR sequences acquired and coronal T2WI followed by diffusion weighted imaging and MR spectroscopy. T2WI mean signal intensity and ADC values of each thyroid nodule were calculated. Single voxel MR Spectroscopy done to observe the choline value. Histopathology correlation obtained in all the cases after MRI.

**RESULT:** Thyroid carcinoma detected in 14 (34.1%), metastasis 5 (12.1), lymphoma one (2.4%), thyroiditis 5 (12.1), adenoma 7 (17%) and colloid nodules in 9 (21.9) on histopathology.Carcinoma lesions showed restriction on DWI with corresponding low ADC values and low signal intensity on T2WI.T2W SI was lower in the thyroid carcinoma ranging 205-298 (mean 247.4) as compare to benign thyroid nodules ranging 275-512( mean 391.72). Mean ADC values was  $1.32 \pm 38 \times 10^{-3}$  mm<sup>2</sup>/s in malignant and  $2.58 \pm 53 \times 10^{-3}$  mm<sup>2</sup>/s in benign nodules. ADC value significantly lower in malignant nodules as compare to benign.

**CONCLUSION:** MRI thyroid is an efficient non-radiation and non-invasive imaging modality to differentiate thyroid carcinoma from benign nodules on the basis of MRI T2W SI, ADC values and MR spectroscopy.

10:55 SRP009

## Routine Versus Structured Expert-read Pelvic MRI in the Diagnosis & Staging of Endometriosis: A Retrospective Review

**Authors:** Koenraad Mortele, Adrian Jaramillo, Marcel Cardoso, Kevin Beker, Louise King, Hye-Chun Hur, Patricia Balcacer, Jonathan Glickman

**OBJECTIVE:** To evaluate the sensitivity of routine pelvic MRI (R-MRI) versus expert-read MRI (E-MRI) for the diagnosis & staging of endometriosis at a tertiary care academic center.

**METHODS:** A retrospective review of patients with surgically staged & pathologically confirmed pelvic endometriosis who underwent pelvic MRI was performed. The E-MRI (single radiologist; detailed structured reporting template) was compared to both R-MRI and surgical/pathological staging for sensitivity. Pelvic compartments were categorized as anterior (AC), middle (MC), posterior (PC), adnexal (AX), and other (OC).

**RESULTS:** 24 women (mean age 38.3 years; range: 22-52) met inclusion criteria. Of those, 10 (41.7%) had a suspected diagnosis of endometriosis. Overall sensitivity of R-MRI was 45% (33/68 involved compartments) compared to 78% (53/68) with E-MRI ( $p=0.00001$ ). Based on specific location of disease, R-MRI and E-MRI detected AC involvement in 20% (2/10) vs. 90% (9/10) ( $p=0.01$ ); MC in 40% (2/5) vs. 60% (3/5) ( $p>0.5$ ); PC in 33% (6/18) vs. 83% (15/18) ( $p=0.003$ ); AX in 81% (18/22) vs. 86% (19/22) ( $p>0.5$ ); and OC in 38% (5/13) vs. 53% (6/13) ( $p>0.5$ ). E-MRI missed 2/4 cases of appendicular involvement and 2/2 cases of ureteral involvement. R-MRI sensitivity relied heavily on AX involvement, whereas E-MRI showed additional sites of disease, mainly in the AC or PC, in 50% (12/24) of patients.

**CONCLUSIONS:** Even at a tertiary care academic center, E-MRI is significantly more sensitive than R-MRI to diagnose endometriosis, detecting other lesions than adnexal endometriomas, and can therefore be of assistance in surgical planning and patient counseling.

11:05 SRP013

## Classification of Ventral Hernias (VH) Based on Rectus Anatomy and Function using Dynamic MRI (dMRI)

**Author:** Khashayar Rafatzand, Gabriela Santos-Nunez, Hazel Marecki, Alan Goldstein, James Carroll, Richard Perugini

**PURPOSE:** Current European Hernia Society (EHS) classification of VH is based on location & defect size only. We propose a new classification of VH based on dMRI by adding rectus muscle function to static metrics.

### METHODS:

IRB approved, HIPPA compliant; prospective, Jul 2016 –Mar 2017

Inclusion Elective repair; Single/Multiple hernia(s), midline & lateral

Exclusion Emergent repair, parastomal–lumbar–inguinal hernias, MRI contraindication

### dMRI Technique

- 1.5T, 16–channel coil, supine
- Axial (xiphoid-symphysis) & sagittal T2–HASTE pre–& post Valsalva, Non-contrast
- FOV=36x36cm, Matrix=288x224, TE=91, TR=1130, BW=325, slice=5mm, gap =1mm

### 1) Modified VHWG grade

- Smoking
- Obesity
- Diabetes
- Immunosuppression
- Wound infection

## 2) EHS

- Incisional/Primary
- Midline/Lateral
- Defect location, length & width

## 3) dMRI parameters

- assessed by fellowship-trained abdominal radiologist 5+ years
- Defect length & width pre- & post-Valsalva
- Rectus Atrophy= fatty replacement, partial/complete
- Rectus contraction= inwards displacement & thickening

## RESULTS:

N = 13 patients (17 hernias)

- Mean BMI 34 (range 28–47)
- Hypertension 8
- Diabetes 3
- Hyperlipidemia 8
- CAD 4
- Smoker 3

dMRI (Figure-1)

- 2 hernias only seen on Valsalva (occult on CT)
- Rectus contraction present in 3/13 (2=primary, 1=incisional)
- No rectus atrophy in 9/13

**CONCLUSION:** The proposed functional VH classification allows:

- radiation-free pre-operative planning
- better stratification of EHS W2 hernia
- detection of hernias not seen on resting CT

## CLINICAL RELEVANCE/APPLICATION:

- New knowledge: dMRI suggests step-wise progression of VH:
  - small defects & normal recti
  - larger defects with rectus dysfunction
  - atrophy.
- Functional VH classification may allow individualized repair technique selection and better pre- & post-op prognostication.

11:25 SRP014

## Utility of Platelet Transfusion in Patients With Thrombocytopenia Who Require Central Venous Catheter Placement

*Authors: Niamh Coffey, Andrew Burkett, Sheryl McDiarmid, Adnan Hadziomerovic, Stephen Ryan, Lothar Heubsch, Ashish Gupta*

**OBJECTIVE:** Current guidelines published in the radiology literature recommend platelet transfusions for patients with platelet count of less than 50,000/dL before placement of a central venous catheter. However, some studies have suggested a threshold of less than 20,000/dL which, if implemented, could reduce the number of platelet transfusions administered before CVC placement by 40% with diminished associated risks and costs. The objective of this study was to determine if a periprocedural platelet count of less than 50,000/dL affects the rate of complications in subjects with acute leukemias who had a central venous catheter placed and to determine whether preprocedural transfusion has an effect on the rate of complications in this cohort

**METHODS:** Retrospective cohort study assessing the effect of periprocedural thrombocytopenia. All subjects with acute leukemia who had a central venous catheter placed from Jan 2007 to Dec 2016 were included in analysis. Primary outcomes of interest were correlation of thrombocytopenia with complication rate and effect of platelet transfusions on complication rate. Secondary outcomes of interest were bleeding complication rates and overall complication rates

**RESULTS / DISCUSSION:** Periprocedural thrombocytopenia was not associated with higher risk of complications. Overall rate of bleeding complication was low but there was no increased risk in patients with thrombocytopenia. Correcting with transfusion did not mitigate risk in our cohort. Routinely transfusing without proven benefit could incur unnecessary cost to the healthcare system and risk to the patient. Current evidence remains insufficient to change practice but this highlights that further analysis is warranted.

11:35 SRP015

## Feasibility of Shear Wave Elasticity Imaging to Detect Endoleak and Evaluate Thrombus Organization after Endovascular Repair of Abdominal Aortic Aneurysm

*Authors: Nicolas Voizard, Antony Bertrand-Grenier*

**OBJECTIVE:** Investigate the feasibility of using Shear Wave Imaging (SWI) for detection of endoleaks using a combination of CT-Angiography (CTA), Colour Doppler (DUS) and endotension as a goldstandard. Characterize healing of AAAs by correlating growth and thrombus elasticity after EVAR.

**METHOD:** Endoleaks areas were detected on SWI by 2 readers and compared with DUS and CTA detection rate in 27 patients. Elasticity values of thrombus derived from elastograms were compared between patients with and without endoleak and correlated with aneurysm growth in volume and diameter.

**RESULTS:** All 6 patients with proved endoleaks (positive CTA or DUS or endotension) were categorized positive on SWI elastograms by the two blinded readers. PPV of SWI was averaged to 46% for the two readers with an inter-observer agreement of 0.853. Total thrombus elasticity within aneurysm sac was not statistically different between the endoleak and the sealed aneurysm group ( $P = 0.575$ ). Patients in the endoleak group have a significant aneurysm growth whereas others have an AAA stabilization or shrinkage. No correlation was found between the thrombus elasticity and growth over time.

**CONCLUSION:** This first inpatient study demonstrates the potential of SWI to detect endoleaks in AAAs after EVAR with a comparable and superior sensitivity to the current CTA and DUS examinations. Even though further study has to be made, SWI has shown its potential to characterize aneurysmal sac content based on elasticity maps. Substitution of current surveillance technique by SWI in a near future is conceivable particularly using a multimodal approach to improve its specificity.

11:45 SRP016

## Machine Learning for Automated Analysis of Brain Lesional Patterns for NMO-MS Differential Diagnosis

**Authors:** Lisa YW Tang, Roger Tam, Emmanuelle Lapointe, Jillian Chan, Younglin Yoo, Lisa Lee, Andrew Riddehough, Shannon Kolind, Herena Kim, Ho Jin Kim, David Li, Anthony Traboulsee

**OBJECTIVES:** To evaluate a machine learning framework's ability to differentiate neuromyelitis optica (NMO) from multiple sclerosis (MS) disease using lesion masks of patients' brain scans.

**METHODS:** 3-Tesla T1-weighted images and clinical data were collected from a cohort of 91 NMO and 52 relapsing-remitting (RR) MS patients who received magnetic resonance (MR) imaging scans at the Department of Neurology at the National Cancer Center of Korea for a cross-sectional study. The mean age of the NMO patients and RRMS patients was 34 and 36, respectively. RRMS was diagnosed using the 2010 McDonald criteria while NMO was diagnosed according to the 2006 criteria or based on one of the cardinal symptoms of NMO along with AQP4-IgG seropositivity. Lesion masks were generated semi-automatically by two expert readers. These masks were subsequently registered to a common space where lesion volumes were calculated from 79 white matter and 9 grey matter structures. A 7-fold nested cross-validation (NCV) experiment was used to train and evaluate a random forest (RF) classifier's ability to predict disease classes of previously unseen lesion masks. We also evaluated a multivariable logistic regression as proposed in a recent work for baseline comparison.

**RESULTS:** The baseline approach yielded classification accuracy of  $68 \pm 11\%$ , with sensitivity and specificity for NMO class of  $73 \pm 8\%$  and  $59 \pm 21\%$ , respectively, while the proposed framework achieved a better classification accuracy of  $81 \pm 7\%$ , with sensitivity and specificity for NMO class of  $84 \pm 9\%$  and  $78 \pm 17\%$ , respectively.

**CONCLUSION:** A classification pipeline based on machine learning can differentiate NMO from MS with high accuracy, thereby suggesting a more efficient alternative approach to experts' manual evaluation of criteria for differential diagnoses.

11:55 SRP006

## MR Texture Analysis of Acetabular Subchondral Bone can Discriminate Between Normal and Cam Positive Hips

**Authors:** Taryn Hodgdon, Kawan Rakhra, Rebecca Thornhill

**OBJECTIVE:** To assess whether texture analysis of acetabular subchondral cancellous bone can differentiate between normal and cam positive hips.

**METHODS:** IRB-approved, retrospective case-control study analyzing MR images obtained in subjects with and without cam-type deformities of the proximal femur. Subjects with cam deformity were subdivided into asymptomatic and symptomatic cam-FAI groups. There were a total of 68 patients: 19 controls, 25 asymptomatic cam and 24 symptomatic cam-FAI. All subjects underwent unilateral, routine hip 3T MRI without contrast. The subchondral bone of the entire acetabulum was contoured manually as a volume of interest (VOI) on the sagittal PD images for each patient using ImageJ®. 3D histogram texture features (mean, variance, skewness and kurtosis) were evaluated for each patient using MaZda software. Differences between controls and asymptomatic or symptomatic cam deformities were assessed using Mann-Whitney U tests with post-hoc Bonferroni correction for multiple comparisons.

**RESULTS:** Both asymptomatic and symptomatic cam-FAI hips demonstrated significantly higher mean ( $p=0.009$ ,  $p=0.009$ ), variance ( $p=0.02$ ,  $p=0.009$ ), and skewness ( $p=0.009$ ,  $p=0.009$ ) and significantly lower values of kurtosis ( $p=0.04$ ,  $p=0.03$ ) compared to normal controls. There were no differences in texture profile between asymptomatic cam and symptomatic cam-FAI hips. Conclusion: 3D histogram texture features extracted from MRI can detect subtle differences in subchondral bone architecture between controls and those with cam deformities, regardless of patient symptom status. Changes in texture profile of asymptomatic cam hips is as pronounced as that of symptomatic cam-FAI hips, which may facilitate identification of patients at risk of developing hip dysfunction.

## SCIENTIFIC RESEARCH PROJECT POSTERS – LEVEL 4 ANNEX

SRP004

### The Impact of Image Quality and Mammographic Breast Density on Missed Cancers in Organized Screening

**Authors:** Mohamed Abdolell, Sian Iles, Peter Brown, Judy Caines, Jennifer Payne, Kaitlyn Tsuruda, Penny Barnes, Michael Rivers-Bowerman

**OBJECTIVE:** The aim of this study was to explore the relationship between image quality and breast density with the risk of missing cancers in a breast screening practice.

**METHODS:** The study sample included women diagnosed with missed interval cancers (n=45) and non-cancer controls (n=2475) identified from a 3:1 age- and screen-matched case-control study that included all breast cancer cases diagnosed between 2009-2015 in a provincial breast screening program offering digital mammography to women aged 40-75 (n=9388). Image quality and breast density were determined for each mammogram using fully automated algorithms (Densitas Inc.). Data were partitioned into training (two-thirds) and test (one-third) datasets. Women with inadequate (versus adequate) image quality were compared on their status of true missed cancers vs non-cancers, controlling for breast density. Logistic regression analysis was conducted, modeling cancer status as the dependent variable with image quality and percent mammographic density as independent variables. Odds ratios were estimated for risk of missed cancers using the test dataset.

**RESULTS/DISCUSSION:** Women with mammograms of inadequate quality are 1.56 times more likely (OR=1.56, 95% CI(0.97,2.46), adjusted for breast density) to have a missed cancer; including an interaction term of quality\*density generates an OR=0.92, 95% CI(0.29,2.75).

**CONCLUSION:** Image quality affects risk of missing cancers in mammographic breast exams differentially by breast density. The results of this study indicate that it may be clinically important to evaluate both image quality and breast density routinely during mammographic screening.

SRP017

### Granulomatous Diseases of the Breast and Axilla: Radiologic Findings With Pathologic Correlation

**Author:** Jeffery Illman

**OBJECTIVES:** This article reviews our experience and describes the literature findings of granulomatous diseases of the breast and axilla.

**METHODS:** After approval of the Institutional Review Board was obtained, the surgical pathologic records from January 2000 to January 2017 were searched for the keyword granulomatous. Clinical, imaging and histology findings were reviewed by both a fellowship trained and breast imaging consultant radiologist, reviewing 127 patients (age range, 32-86 years; 126 female and 1 male).

**RESULTS:** Most common causes of granulomatous lesions of the breast and axilla included silicone granulomas 33% (n:42), fat necrosis 29% (n:37) and suture granulomas 11% (n:14). In 16% (n:20) no cause could be found and clinical history was consistent with idiopathic granulomatous mastitis. Other granulomatous etiologies included granulomatous infections, sarcoidosis and Sjögren's syndrome. Causes of axillary granulomatous disease were similar to the breast however a case of cat scratch disease was found that only involved the axillary lymph nodes. They can have a variable appearance on imaging and may mimic malignancy with irregular masses seen on mammography, ultrasound and MRI. Fistulas to the skin and nipple retraction can suggest chronicity and a granulomatous etiology. Combination of clinical history, laboratory and imaging findings can be diagnostic.

**CONCLUSIONS:** Granulomatous processes of the breast are rare. The diagnosis can however be made if there is relevant history (prior trauma, silicone breast implants, lactation), laboratory (systemic or infectious processes) and imaging findings (fistula, nipple retraction). Recognizing these entities are important for establishing pathologic concordance after biopsy and for preventing unnecessary treatment.

SRP018

### Appropriateness in Residency Education: An Initiative in Medical Imaging to Promote System Resource Stewardship

*Authors: Neil Kalra, Juan-Nicolas Pena-Sanchez, Paul Babyn*

**OBJECTIVES:** Recent CanMEDS guidelines for resident education include system resource stewardship. For the medical imaging (MI) specialty, this often translates to ensuring exam appropriateness. The objectives of our study were to 1) gain insight into how quality improvement concepts fit into MI residency education and 2) illustrate ways that MI system resources, specifically magnetic resonance imaging (MRI) given its high cost and resultant healthcare system burden, can be improved in terms of radiologist/resident practices, operational processes, and appropriateness at time of ordering.

**METHODS:** The literature related to both MI educational environments and appropriateness was reviewed. Data was obtained from a novel nationwide study exploring current faculty and facility practice variation among MRI-related operations, with 13 Canadian academic MI departments participating. Information related to MRI ordering at each site was also analyzed.

**RESULTS:** Appropriateness training within Canadian MI residency programs appears scarce, with few strategies or methods currently available to enhance resident involvement. Great variability is evident in MRI-related physician practices and utilization including prioritization/triaging/approval processes, use of referral appropriateness guidelines, scanner operating hours, and requisition forms. From 1087 ordered MRI exams, 87.0% to 87.4% were appropriate while 6.6% to 12.6% were inappropriate, based on the American College of Radiology (ACR) Appropriateness Criteria and Canadian Association of Radiology (CAR) Referral Guidelines respectively.

**CONCLUSION:** This study highlights the need for more MI resident training and involvement in appropriateness initiatives/resource stewardship. Our study also revealed opportunities to create more standardized and consistent processes across Canada to minimize the occurrence of inappropriate MRI exams.

SRP019

### Reporting Bias in Imaging Research: Do Studies with Higher Diagnostic Accuracy Estimates Get Published Sooner?

*Authors: Anahita Dehmoobad Sharifabadi (Medical Student), Daniel A. Korevaar, Trevor McGrath, Nick van Es, Robert Frank, Frederic Nguyen, Cami Stanley, Lindsay Cherpak, Wilfred Dang, Matthew McInnes, Jean-Paul Salameh*

**OBJECTIVE:** The prevalence and impact of reporting bias has been well documented for therapeutic intervention studies; however, there is less evidence of this phenomenon for diagnostic accuracy research in imaging journals. The objective of this study was to evaluate whether higher reported accuracy estimates are associated with shorter time to publication among published imaging diagnostic accuracy studies.

**METHODS:** We included primary diagnostic accuracy studies from meta-analyses in Medline-indexed systematic reviews that were published in 2015. We extracted data on accuracy estimates, participant recruitment period, and publication dates. Using correlation and regression analyses, we assessed for associations between time to publication and Youden's index as our primary outcome.

**RESULTS:** Our sample included 55 meta-analyses and 781 primary studies. Youden's index was negatively correlated with time from completion to publication ( $\rho = -0.106$ ;  $p = 0.009$ ). These publication time lags remained significant in multivariable Cox regression analyses after adjusting for various study characteristics. The hazard ratio of publication was 1.09 (95 % confidence interval [CI] 1.03 to 1.15;  $p = 0.002$ ) per unit increase in logit-transformed estimates of of Youden's index.

**CONCLUSION:** Higher accuracy estimates are weakly associated with a shorter time to publication of diagnostic accuracy studies. Therefore, the impact of reporting bias on systematic review findings may be less important in diagnostic accuracy research than it is in the evaluation of therapeutic interventions.

SRP020

### Computer vs Human: Comparative Analysis of Deep Learning versus Human Perceptual Training in Medically Naïve Individuals for the Detection of Neck of Femur Fractures

*Authors: Matthew Adams, David Holcdof, Mark McCusker, Weijia Chen, Piers Howe, Frank Gaillard*

**OBJECTIVE:** To evaluate the accuracy of deep convolutional neural networks (DCNNs) for detecting neck of femur (NoF) fractures on radiographs, in comparison with perceptual training in medically naïve individuals.

**METHODS:** The study followed on from one prior that conducted perceptual training in naïve (non-medical) undergraduate students for the detection of NoF fractures on a variety of dataset sizes. The same deidentified dataset consisted of 720 anteroposterior hip radiographs to train two DCNNs (AlexNet and GoogLeNet) to detect NoF fractures. For direct comparison with the perceptual training findings, training was completed across a variety of dataset sizes (200, 320 and 640 images) with images split into training (80%) and validation (20%). An additional 80 images were used as the final test set. Multiple preprocessing techniques were undertaken prior to DCNN training.

**RESULTS / Discussion:** AlexNet and GoogLeNet DCNNs NoF fracture detection accuracy increased with larger training dataset sizes, increasing from 81.3% to 91.4% and 82.5% to 90.1%, for the two DCNNs respectively. Similarly, the average test accuracy for the perceptual training in the medically naïve individuals increased from 80.8% to 86.0%.

**CONCLUSION:** Single tasks such as this are commonly used in DCNN research with their results often used to make broader claims about machine learning being able to perform as well as subspecialty radiologists. This study suggests that as impressive as recognising fractures is for a DCNN, it is only representative of a task that can be learned by naïve humans with only 37 minutes training.

SRP021

### The Non-diagnostic Rate of CTPA in Pregnant and Postpartum Patients

*Authors: Sarah Hogan, Jillian Greene, Jeffery Flemming*

**OBJECTIVE:** To evaluate the diagnostic utility of computed tomography pulmonary angiography (CTPA) in pregnant and postpartum patients in order to determine if the radiation exposure to proliferating breast tissue is warranted.

**METHODS:** Study REB approved. All pregnant/post-partum female patients between 18 and 50 years of age who had CTPA within the Eastern Health Authority between November 2012 and November 2016 were included. Each scan was evaluated to assess whether it was non-diagnostic based on two criteria. These were: contrast density in the main pulmonary artery.

**RESULTS:** The non-diagnostic rate was 43%. (n=83). This is higher than current literature values for rates of CTPA non-diagnosis and for rates of ventilation/perfusion non-diagnosis in comparable populations.

**CONCLUSION:** This is the first study that has attempted to identify an objective method of determining non-diagnosis in pregnant and postpartum patients undergoing a CTPA. Our results strengthen the argument that alternative imaging should be considered when investigating for PE in this population in order to protect the proliferating breast tissue. This is an ongoing study, and it would be of value to determine the rate of CTPA non-diagnosis in a comparable non-pregnant population. It would also be valuable to obtain additional data on the non-diagnostic rate of VQ scans in the pregnant and postpartum population for comparison.

SRP022

### The Impact of Standard Clinical Risk Factors on Determination of Optimal Mammographic Density Cutpoints

**Authors:** *Mohamed Abdoell, Sian Iles, Kaitlyn Tsurunda, Stefan Kuhle, Peter Brown, Jennifer Payne, Judy Caines, Daniel Rayson, Penny Barnes, Michael Rivers-Bowerman*

**OBJECTIVE:** This study sought to empirically identify percent mammographic density (PMD) cutpoints both controlling and not controlling for clinical risk factors (RFs).

**METHODS:** PMD was determined using a fully automated algorithm (Densitas DM-Density) on full-field digital screening mammograms from a matched set of 2,347 cases and 7,041 controls. A Generalized Additive Model (GAM) and corresponding AUROC curve were used to model pathologically verified breast cancer status as a function of PMD controlling for age, parity, menopausal status, HRT use, and family history. The same was done without controlling for RFs. Three optimal cutpoints on PMD were determined, defining four risk groups.

**RESULTS/DISCUSSION:** The GAM yielded PMD cutpoints at 18.4, 29.9 and 47.2 when controlling for RFs, and 29.9, 32.8 and 47.2 when not controlling for RFs. Relative to the low risk group, the odds of breast cancer were 1.75, 2.15 and 2.50 when controlling for RFs, and 0.90, 1.45 and 1.69 when not controlling for RFs, respectively for increasingly higher risk groups.

**CONCLUSION:** Controlling for RFs changes the optimal cutpoints on PMD such that the first cutpoint is substantially lowered, thus re-classifying women from the lowest risk group into the next higher risk group. With the highest cutpoint remaining unchanged at 47.2, the highest risk group is composed of the same set of women irrespective of controlling for RFs or not, and clinical care is unaffected for those women.

SRP023

### A Study of Resident Physicians' Attitudes Towards and Interest in Radiology as a Specialty

**Authors:** *Darya Kurowecki, Stephanie Lee, Sandra Monteiro, Karen Finlay*

**OBJECTIVE:** Interest in radiology as a career is declining. The purpose of the study was to survey resident physicians to identify factors that may account for the declining interest.

**METHODS:** An online survey was distributed to resident physicians at a single academic centre between July and August 2017. Participants identified factors affecting career choice and evaluated their level of agreement with statements regarding radiology using 5-point Likert scales. Higher scores indicated stronger agreement. Data were analyzed using descriptive statistics. Comparisons were made between radiology and other specialties, and between training levels. Qualitative data were analyzed using content analysis.

**RESULTS/DISCUSSION:** There were 151 respondents (20 radiology, 120 other specialty, 9 unspecified). There were no notable differences between residents of different training levels. The top attracting factors among radiology residents included diversity of pathology (mean=4.5) and positive interactions with staff/residents (mean=4.4). Non-radiology residents identified positive clinical and mentoring experiences as top factors affecting career choice, and a lack of patient contact (mean=3.9) and dark work environment (mean=3.6) as top deterrents to radiology. Many non-radiology residents reported exposure to radiology only through didactic lectures with 70.5% believing that radiologists have little patient contact outside of interventional radiology. Some trainees changed their mind about pursuing radiology due to lack of a mentor (52%) and becoming interested too late during training (16%).

**CONCLUSION:** The results indicate that exposure to positive experiences in radiology should occur earlier in training. Future additional qualitative exploration of trainees' perceptions may identify key interventions that could be implemented.

SRP024

### Correlation of Acute Findings of CT Abdomen/Pelvis Performed for Abdominal Pain in the Emergency Department with Corresponding Laboratory Values.

*Authors: Amilcar Diaz, Varun Chowdhary, David Sarkany*

**OBJECTIVES:** To correlate acute findings in CT Abdomen/Pelvis performed for abdominal pain in the emergency department with corresponding laboratory values.

**METHODS:** Retrospective chart review of 565 emergency room patients was performed. Inclusion criteria included: CT abdomen/pelvis performed for sole indication of “abdominal pain”, synchronously performed laboratory work and age > 18. CT scans were categorized into acute versus not acute categories based on their report’s impression. Chart review was performed to assess additional symptoms (such as nausea or vomiting) or fever as well as to assess the following laboratory values: WBC, total bilirubin, alkaline phosphatase, AST/ALT, lipase and also temperature. Statistical analysis using chi-square tests for associations, and sensitivity/specificity analysis were performed.

**RESULTS:** See table.

**CONCLUSION:** Laboratory values and additional complaints may predict acute findings on CT abdomen/pelvis in emergency department patients presenting for generalized abdominal pain. Sensitivities of 88% and specificity of 97% can be obtained with statistically significant results.

SRP025

### Clinical Risk Factors and Scales of Mammographic Density in Breast Cancer Risk Prediction

*Authors: Nicole Paquet, Mohamed Abdoell, Jennifer Payne, Kaitlyn Tsurunda, Peter Brown, Judy Caines, Penny Barnes, Michael Rivers-Bowerman, Sian Iles*

**OBJECTIVE:** Examine how various levels of categorization of percent mammographic density affects models predicting breast cancer.

**METHODS:** This case-control study examined digital mammograms of women with breast cancers (n=2222) diagnosed between the years of 2009-2015, in Nova Scotia, Canada, who were age- and screen-matched to non-cancers (n=6819). Clinical risk factors and percent mammographic density (PMD) measurements were obtained for each subject. Continuous PMD was measured at 1% precision using a fully-automated algorithm (Densitas Inc.) and was categorized into various density scales: 6-category, BIRADS 4th edition, 3-category, and high versus low density scales. Area under the receiver operating characteristic (AUROC) curve was used to evaluate the predictive power of density scales in discriminating between cancers and non-cancers, adjusting for clinical risk factors including age, parity, menopausal status, HRT use, family history.

**RESULTS/DISCUSSION:** The adjusted model with continuous PMD had an AUROC of 0.594, with a gradual decrease to 0.592 for the 6-category density, 0.585 for the BIRADS 4th edition categories, 0.584 for 3-category density, and 0.565 for two-category density. Modelling the clinical risk factors without PMD gave an AUROC of 0.533.

**CONCLUSION:** With categorization of PMD, there is a decrease in the predictive performance when modelling in combination with other clinical risk factors. Breast cancer risk models should incorporate PMD as a continuous measure, as opposed to categorical scales. Modelling the two-category, low versus high, density gave an AUROC only slightly better than of the clinical risk factors alone.

SRP026

### Mammographic Density, Clinical and Pathologic Variables Can Distinguish Screen-Detected Versus True Interval Breast Cancers

**Authors:** Mohamed Abdoell, Nicole Paquet, Jennifer Payne, Peter Brown, Penny Barnes, Judy Caines, Kaitlyn Tsurunda, Michael Rivers-Bowerman, Sian Iles

**OBJECTIVE:** To determine the ability of clinical and pathological characteristics to predict the probability of a true interval cancer relative to a screen-detected cancer.

**METHODS:** Clinical and pathology data along with fully-automated percent mammographic density assessments were collected from 775 screen-detected cancers and 53 true interval cancers of women diagnosed by digital mammography in the province of Nova Scotia, Canada, for the period of 2009-2015. Multiple logistic regression was used to evaluate the discriminatory power of the models to classify true interval cancers, measured as area under the ROC curve (AUROC).

**RESULTS/DISCUSSION:** The outcome (true interval versus screen-detected case) was modelled as a function of different combinations of independent variables. The full model containing MD, age, menopausal status, HRT use, family history, size of the tumor, lymphovascular invasion, lymph node positive status, tumor grade, ER status, PR status had an AUROC of 0.821. A four risk factor model that included only MD, age, lymph node positive status, and ER status produced an AUROC value of 0.771.

**CONCLUSION:** These findings suggest that a parsimonious four-factor model including just MD, age, lymph node positive status and ER status is able to discriminate between screen-detected and true interval cancers essentially as effectively as a full eleven-factor model that includes a mix of MD with five clinical factors and five pathological factors. The simplified model is easier and requires less resources to implement for clinical use.

SRP0027

### Non-contrast CT Head Misinterpretations in the Emergency Setting

**Authors:** Ihssan Abdul-Kareem, Santanu Chakraborty

**OBJECTIVES:** Non-enhanced computed tomography of the head (NECT) is a commonly used radiologic examination that constitutes a significant workload of everyday radiology practice. Preliminary reports and subsequent management decisions are often performed by on call radiology residents and emergency physicians after working hours. Prompt and accurate assessment of NECT is crucial to avoid poor health outcome. The first objective was to formulate baseline data about residents' and emergency physicians' NECT misinterpretations including type (perceptual/cognitive, minor/major), time of misinterpretations, most common sites of misinterpretations and common pathologies missed. The second objective was to determine the reasons for these mistakes.

**METHODS:** A retrospective study was performed to review 353 NECT examinations and reports that had discrepancy/disagreement between preliminary radiology report issued by radiology residents or emergency physicians and final report issued by neuroradiologist.

**RESULTS:** The total number of misinterpretations was 123 by radiology residents and 224 by emergency physicians. Overall results show that most errors were perceptual. The most frequent time period for these misinterpretations was (17-21 hr). The three most frequent locations of misinterpretations by radiology residents were cerebral parenchyma (34%), extra-axial (15%) and osseous (15.3%). The three most common pathologies missed by all physicians were ischemia (23%), masses (17%) and fractures (10%).

**CONCLUSION:** Based on the results of this work, we aim to minimize the frequency of misinterpretations among radiology residents and emergency physicians. Strategies and pitfalls to diminish such errors were discussed and NECT head template was proposed.

SRP0028

### Multi-parametric (mp) MRI – Transrectal Ultrasound (TRUS) Guided Cognitive Fusion Biopsy of the Prostate: Clinically Significant Cancer Detection Rates Stratified by PI-RADS Version 2 Assessment Category. Implications for Patient Care In Canada.

*Authors: Susan John, Steven Cooper, Chris Morash, Rodney Breau, Trevor Flood, Wael Shabana, Joseph O'Sullivan, Nicola Schieda*

**OBJECTIVE:** To report the clinically significant (CS=Gleason score  $\geq 3+4=7$ ) prostate cancer (PCa) detection rate in men undergoing mp-MRI-TRUS-cognitive fusion (CF) targeted biopsies by PI-RADS version 2 (v2) scores.

**MATERIALS AND METHODS:** With a quality assurance waiver from the IRB, we identified 131 men (Active surveillance N=33, previously negative template-TRUS biopsy N=98) who underwent mp-MRI-TRUS-CF biopsy of 142 lesions from 2015-2017. mp-MRI (PI-RADS score, lesion size and location (peripheral or transition zone [PZ/TZ]) and CF-TRUS biopsy (operator experience, TRUS visibility, number of biopsies) features were extracted and assessed for associations with cancer detection rate.

**RESULTS:** In total, 41.9% (55/131) men had CS PCa; 17.6% (23/131) on CF biopsy only, 8.4% (11/131) on simultaneous template biopsies only and 16.0% (21/131) on both targeted and template biopsies. CS PCa detection by PI-RADS version 2 scores were: 11.1% (3/27) score 3, 42.9% (24/56) score 4 and 35.6% (21/59) score 5. Score 5 lesions were more common in the TZ ( $p=0.003$ ) with no difference in CS PCa detection rate comparing score 4 and 5 lesions when controlling for location ( $p>0.05$ ). CS PCa detection rates in targeted biopsies were better among PZ (48.9% [46/94]) compared to TZ (31.3% [15/48]) lesions ( $p=0.025$ ) and in TRUS visible lesions ( $p=0.033$ ) with no difference by lesion size, operator experience or number of additional core biopsies ( $p>0.05$ ).

**CONCLUSIONS:** Cognitive fusion mp-MRI-TRUS guided targeted biopsy yielded unacceptably low rates of clinically significant cancer in PI-RADS v2 score 4 and 5 lesions which was worst in the TZ.

SRP0029

### Magnetic Resonance Imaging (MRI) Findings of Central Nervous System (CNS) Infections in Pediatric Patients.

*Authors: Ruba Kiwan, Andrew Leung, Yasmine Sallam*

**PURPOSE:** To investigate the magnetic resonance imaging (MRI) findings in pediatric patient who presented with clinical symptoms and signs of CNS infection.

**MATERIALS:** We searched our PACS database for pediatric patients (age 0-17 years) with clinical concern for CNS infection who were investigated with MRI brain between January 2015-November 2017. We used these search terms: meningitis, ventriculitis, abscess, cerebritis and encephalitis. The MRI examinations were performed on 1.5 T units. The MRI scans were reviewed by a Neuroradiology fellow and consultant, then the findings were tabulated. We reviewed the electronic medical record for clinical presentation, laboratory results and outcome.

**RESULTS:** Our retrospective search resulted in a cohort of 129 patients. 65 patients (50%) had positive MRI findings including parenchymal changes, leptomeningeal enhancement, and altered cerebrospinal fluid (CSF) signal. 16 of these patients had 2 or more findings. 37 of the 65 patients (55%) had positive CSF culture including 15 patients (40%) with common infections (e.g. E.coli, H. influenza and Streptococcus pneumoniae) and 22 patients (60%) with uncommon infections (e.g. Bacillus cereus, Cronobacter sakazakii, HSV, eosinophilic Baylisascaris and Pseudomonas aeruginosa). Most patients had a full recovery. Two patients died (from Cronobacter sakazakii and Pseudomonas aeruginosa), one patient required bilateral cochlear implants (from Streptococcus) and one patient developed epilepsy (from HSV).

**CONCLUSIONS:** In the pediatric population, CNS infection is a common cause of mortality and long term morbidity. In this retrospective study, 50% of patients who presented clinically with CNS infection had relevant MRI findings. Occasionally, the MRI appearance can be pathognomonic, as with Bacillus cereus infection in preterm infants. Also, MRI can be helpful to detect complications, as labyrinthitis ossificans from Streptococcus or hippocampal injury from HSV.

SRP0030

## Evaluation of Low-dose CT Denoising on Patient Data Using Sharpness-aware Conditional Generative Adversarial Network

*Authors: Xin Yi, Paul Babyn*

**OBJECTIVE:** To evaluate the potential of a trained sharpness-aware conditional generative adversarial network (SAGAN) on low-dose computed tomography (CT) of real patient data.

**METHODS:** A SAGAN model was trained on a series of low-dose CTs of a deceased piglet with an effective dose level of 0.71, 1.41, 3.54, 7.07 mSv. The reference full-dose conventional CT has an effective dose of 14.14 mSv. The trained model was applied to 25 filtered back-projection (FBP) reconstructed low-dose CTs of real patients selected from the Kaggle data science bowl 2017. The selected criteria was based on the noise level so that the selected low-dose CTs are within the denoising capability of the trained model. Mean standard deviation (SD) of attenuation were calculated on some hand-chosen homogeneous rectangular region of interest (ROI) (size of  $21 \times 21$  pixels on sites including: liver, kidney, mediastinum, and lung) as a direct measure of noise level.

**RESULTS:** Mean SD of attenuation for selected ROIs as a whole was 39.0 for FBP and 11.60 for SAGAN, corresponding to a noise-reduction factor of 3.36. Noise-reduction factor was 4.24 for liver, 4.01 for kidney, 3.34 for mediastinum and 2.40 for lung.

**CONCLUSION:** SAGAN trained on low-dose CTs with a wide range of dosage level is applicable to denoise standard low-dose CT of unknown dosage and the resultant images shows substantial noise reduction on soft tissue. The denoising process for SAGAN only requires one forward pass over the generator which introduces almost no computation overhead.

SRP031

## Magnetic Resonance Imaging (MRI) Findings in Pediatric Patients with Seizure or Epilepsy

*Authors: Yasmine Sallam, Andrew Leung, Ruba Kiwan*

### LEARNING OBJECTIVES:

1. MRI features of patients presenting with seizures/epilepsy during childhood.
2. Incidence and Etiology of childhood epilepsy.
3. Importance of MR spectroscopy (MRS) in patients with metabolic diseases.

**BACKGROUND/AIM:** Our aim was to characterize the MRI findings in pediatric patients investigated for seizure or epilepsy at our teaching center.

**METHODS:** We searched our PACS database for patients under 18 years with history of seizure or epilepsy and were investigated with MRI brain between October 1, 2015 and November 30, 2017. Examinations were performed on 1.5T units. MRS was acquired if requested by the referring physician. The images were reviewed by a Neuroradiology fellow and consultant.

**RESULTS:** Our overall cohort of 417 pediatric patients consisted of 216 males and 201 females. Of these, 51 were placed into group A (relevant MRI findings), 77 into group B (non specific MRI) and 289 in group C (normal MRI). Sorting group A patients by etiology, 18 patients had an infarct/germinal matrix hemorrhage, 11 patients had a congenital malformation, 8 patients had temporal lobe lesion, 5 patients had tumor/space occupying lesion, 4 patients had metabolic disorder, 2 patients had a CNS infection, 2 had traumatic injuries, and 1 patient had hemorrhage due to a cardioembolic event. One patient with metabolic disorder had Creatinine Transporter Deficiency. The conventional anatomic sequences were unremarkable but the MRS was pathognomonic.

**CONCLUSION:** Patients with relevant MRI findings represented 15% of our study and were categorized according to etiology with majority having infarct/germinal matrix hemorrhage or congenital malformation. Neurologist and radiologist should consider adding MRS to the imaging protocol in the appropriate clinical scenario.

SRP032

### Atypical Lesions at MRI-Guided Biopsies: Risk of Upgrade

*Authors: Yasmin Kerouch, Julie David, Lucie Lalonde, Mona El Khoury, Maude Labelle, Isabelle Trop*

**OBJECTIVE:** MRI-guided biopsies are essential to the evaluation of suspicious enhancing lesions without mammographic or ultrasound correlation. Besides, the rate of surgical upgrade of high-risk lesions is high. The aim of this study was to determine the upgrade rate of atypical lesions diagnosed by MRI-guided biopsy and to determine if there are predictive factors of upgrade.

**METHODS:** This retrospective study totalized 524 consecutive MR biopsies performed between 2009 and 2016, including 108 (20.6%) confirmed malignant lesions and 58 (11.1%) atypical lesions (atypical ductal hyperplasia (ADH), lobular neoplasia or other atypia). Surgical pathology or a 12-month MRI follow-up post-biopsy were available for 36 of the 58 atypical lesions. The demographic data, MRI characteristics and biopsy features were collected and analyzed using the Chi-x2 and Anova tests.

**RESULTS:** The upgrade rate of atypia to malignancy was 25% (9/36), comparable to the literature. No correlate was noted between the risk of upgrade and the indication of the MRI exam or the technical features of the biopsy. Factors associated with upgrade were larger lesion size (cutoff 3.2cm;  $p=0.03$ ) and specific histology of the biopsy ( $p=0.04$ ): ADH lesions had the highest upgrade rate measured at 50% (6/12), while lobular neoplasia lesions had an upgrade rate of 14% (3/22).

**CONCLUSION:** The upgrade rate of atypical lesions diagnosed at MRI-guided biopsies is high. Factors associated with upgrade were lesion size and histology of the biopsy. ADH has the highest upgrade rate and requires excision. Lobular neoplasia has a 14% upgrade rate and needs a thorough radio-pathologic correlation with surgical consultation.

SRP033

### Ultra-low-dose CT and Abdominal Plain Films: Comparing the Diagnostic Performance

*Authors: Jonghun John Lee, Silvio Bruni, Bernice Hoppel, Ravi Menezes, Vimarsha Swami, Sean Kennedy, Patrik Rogalla*

**OBJECTIVE:** To determine relative diagnostic performance of ultra-low-dose CT (ULD-CT) and abdominal plain films (APF) with regard to sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) in the emergency setting.

**METHODS:** As per new institutional protocol, all patients with acute abdominal pain who would be referred to APF were automatically converted to ULD-CT. Target exposure values were set to achieve 1 mSv equivalent exposure to a standard 75 kg individual. Our study examined 196 consecutive ULD-CT ordered since initiation of the new protocol and 196 consecutive APF from the emergency department prior to inception of new protocol over a period of 9 weeks. Final diagnosis was compared to the gold standard diagnosis comprising of lab values, clinical notes, additional imaging tests, endoscopy, and surgery. Each patient was followed up for a minimum of one month.

**RESULTS/DISCUSSION:** There were no statistical difference between age (63.3 vs 60.8,  $p=0.5$ ) and gender (49% vs 51% male,  $p=0.7$ ) between ULD-CT and APF groups. When comparing ULD-CT to APF, sensitivity (0.86 vs 0.40,  $p$

**CONCLUSION:** ULD-CT has statistically higher sensitivity, specificity, PPV and NPV compared to APF. ULD-CT has the potential to replace APF by delivering significantly better diagnostic information despite a radiation dose profile comparable with conventional APF. This is the largest study to date comparing the diagnostic performance of ULD-CT compared to APF.

SRP034

### Publication Productivity in Academic Radiology in the Province of Quebec: A Cross-sectional Study

**Authors:** *Eugen Lungu, An Tang, Isabelle Trop, Gilles Soulez, Nathalie J. Bureau*

**OBJECTIVES:** To tally the number of publications and citations of academic radiologists in Quebec (QC), to compare their productivity to that of other academic radiologists, and to determine whether academic rank is associated with productivity in research.

**METHODS:** The sex, affiliation, and rank of each academic radiologist in QC were recorded. The number of peer-reviewed publications, citations, and the h-index of each radiologist were obtained from Scopus between May and August 2017. A literature review on publication productivity in radiology was conducted. A multivariate logistic regression analysis was performed to determine the association between academic rank and publication productivity.

**RESULTS:** A total of 283 radiologists from four academic centers in QC were included. Per radiologist, the median number of publications was 5 (range 0 – 244); citations was 48 (0 – 9880); and the h-index was 3 (0-50). Radiologists in QC had a lower median h-index (3) compared to 185 radiologists at the University of Toronto (9). Mean h-index by academic rank of radiologists in QC was similar to that of 683 American academic radiologists. When controlling for sex, academic center, number of publications and citations, the h-index was significantly associated with academic rank ( $p = 0.003$ ).

**CONCLUSION:** Publication productivity of academic radiologists in QC is similar to that of American radiologists, and inferior to that of U-of-T radiologists. These results may serve as a baseline and underscore the need to promote research development strategies. The h-index might be used as an objective variable for academic promotion.

SRP035

### Macroscopic Fat in Adrenocortical Carcinoma (ACC): Fact or Fiction? A Systematic Review

**Authors:** *Damitri Ranathunga, Matthew McInnes, Nicola Schieda, Cherpak Lindsay, Trevor Flood*

**OBJECTIVE:** This study uses systematic review to critically evaluate reports of ACC containing macroscopic fat.

**METHODS:** Comprehensive search was performed. Two reviewers independently selected studies, case series or reports of ACC with macroscopic fat on imaging and extracted data. Risk of bias (ROB) assessed using QUADAS-2.

**RESULTS:** Three case reports were included; detailed characteristics provided in fig-1. All had symptoms; lesions size: 6.5-22cm; No reported local invasive features or metastasis.

**CONCLUSIONS:** Our analysis raises concern regarding whether imaging reports of macroscopic fat in ACC are reliable. We question whether macroscopic fat was truly present in one case and whether two other case reports accurately reported ACC based upon provided information. These findings may spur critical re-evaluation of these cases, and of recommendations for management of adrenal lesions with macroscopic fat.

This study suggests that reports of macroscopic fat in ACC may be unreliable and could lead to unnecessary radical therapy when low amounts of macroscopic fat are detected within adrenal masses on CT or MRI.

SRP036

## A Deep Learning Framework for Classification of Severity in Chronic Obstructive Pulmonary Disease (COPD)

*Authors: Lisa Y.W. Tang, Roger Tam, Harvey Coxon, Jonathon Leipsic, Don Sin*

**OBJECTIVE:** To evaluate the accuracy of a machine learning using a deep neural network (DNN) for the automated classification of COPD severity using thoracic CT scans as a proof-of-concept in developing a diagnostic and prognostic framework.

**METHODS:** A subset of 337 baseline scans acquired with GE CT Lightspeed scanner were randomly selected from the larger ECLIPSE study. Inclusion criteria included COPD subjects of age 40-75 at baseline, with 10 or more pack-years of smoking history. All subjects underwent a low-dose volumetric CT scan (120kV peak, 40mA and 1.00 or 1.25-mm slice thickness) at full inspiration. After spatial normalization to a random scan, 100 axial slices from each scan were sampled from the thoracic region to produce a dataset of 33,700 slice samples. This dataset was then split into non-overlapping training, validation and test sets (approximate sizes of 27300, 3033, 3370, respectively). The training set with Global Initiative of Obstructive Lung Disease (GOLD) grades was used to train a DNN to predict GOLD grades of unseen slices from the test set, while the validation set was used to tune the hyper-parameters of the DNN. We validated the overall framework via a 10-fold cross-validation experiment (CVE).

**RESULTS:** Mean classification accuracy of the trained DNN models from the described CVE was 87% (SD=7.39), with comparable prediction accuracy across classes (F1-score of 0.72, 0.66, 0.69 for classifications of grade 2, 3, and 4, respectively).

**CONCLUSION:** A DNN framework was able to predict GOLD grade with high accuracy. Future work includes using three-year follow-up functional data to evaluate the prognostic accuracy of the proposed DNN-based framework.

SRP037

## Radiology Adds Value to Medical Undergraduate Anatomy Education Through Virtual Dissection

*Authors: Kathryn Darras, Rebecca Spouge, Abigail Arnold, Anique de Bruin, Claudia Krebs, Rose Hatala, Savvas Nicolaou, Bruce Forster*

**OBJECTIVE:** Virtual dissection is performed using patient CT scans on near life-size anatomy visualization tables. Using near life-size PACS touchscreen, students work together to manipulate the data and perform their dissection. The purpose of this study was to develop virtual dissection laboratories for first year medical students and to qualitatively assess its educational value.

**METHODS:** All students in the first-year medical undergraduate program were included in this study (n = 292). A Basic Virtual Dissection Curriculum focused on normal anatomy was offered to all students and an Advanced Virtual Dissection Curriculum focused on pathology was offered as extra-curricular sessions. 36.6% of students participated in the Advanced Curriculum. Following the sessions, students were surveyed and results were statistically analyzed using the Schulze method.

**RESULTS/DISCUSSION:** The response rate was 69.2% for the Basic Curriculum and 82.9% for the Advanced Curriculum. 93% indicated that virtual dissection was “definitely” a valuable addition to the anatomy lab. 89% of respondents “agreed” or “strongly agreed” that AVT virtual dissection improved their understanding of disease and pathology. They reported that the most memorable case was the aortic aneurysm case because the imaging made it easier to understand the disease. Furthermore, 95% of students “agreed” or “strongly agreed” that virtual dissection improved their understanding of the role of the radiologist in patient care.

**CONCLUSIONS:** Virtual dissection adds educational value to undergraduate anatomy teaching, primarily because it provides students with a clinical context for the anatomy they are learning.

SRP038

### Rethinking the PGY-1 Basic Clinical Year: A Canadian National Survey of its Educational Value for Diagnostic Radiology Residents

*Authors: Kathryn Darras, Silvia Chang, Abigail Arnold, Colin Mar, Bruce Forster, Linda Probyn, Silvia Chang*

**OBJECTIVE:** Recently, the relevance of the PGY-1 Basic Clinical Year for radiology residents has been questioned. The purpose of this study was to determine the attitude of radiologists towards this year and which clinical rotations they perceived as most valuable to clinical practice.

**METHODS:** An online survey was administered to Canadian radiologists and radiology trainees. In addition to reporting demographic information, respondents were asked to rank the usefulness of individual rotations on a 5-point Likert scale. The Schulze method was used to rank the usefulness of the 31 rotations considered.

**RESULTS/DISCUSSION:** Of the 275 respondents, 73.1% were male and 47.3% were trainees. 71% of respondents were in favour of the basic clinical year while 16% were opposed. 46% of respondents ranked general surgery rotations as most relevant to their clinical practice and 26% ranked surgical subspecialty rotations. Interventional radiologists found general and subspecialty surgical rotations to be equally relevant. The rotations deemed to be “essential” were emergency medicine (48.7%) and general surgery (46.6%) and the rotations deemed to be “very useful” were orthopedics (45.8%), trauma (44.4%), neurosurgery (43.3%), neurology (42.2%), and hepatobiliary surgery (38.9%). There was no statistical difference between respondents’ choices based on their level of or scope of practice.

**CONCLUSION:** Most radiologists and radiology trainees were in favour of the Basic Clinical Year. However, programs should maximize the education value of this year by including more of the top ranked rotations. As the practice of radiology evolves, it is important to ensure that training paradigms continue to prepare residents for independent practice.

SRP039

### Assessing the Gender Authorship Gap in the American Journal of Neuroradiology: Trends over a 36-year period

*Authors: Kathryn Zhao, Michael Patlas, Thomas Hu, Milita Ramonas*

**OBJECTIVE:** To examine trends in female first and senior (listed last) authors in the American Journal of Neuroradiology (AJNR), from January 1980 to December 2016.

**METHODS:** Articles in AJNR were reviewed from 1980-2016. Original articles, case reports, review articles, pictorial essays, and technical reports were included. The first and last author’s gender was categorized as male or female using the knowledge of basic names that are commonly associated with gender. If an article only had one author, this author was considered to be the first author. For less common names, a Google search was performed with the author’s names and state or country of practice. If the gender was remained uncertain, the author was excluded. Statistical tests were performed using commercially available statistical software.

**RESULTS:** 1318 articles fulfilled the inclusion criteria. We confidently determined the gender of 94% of first authors (1240) and 91% of last authors (1201). Overall, women constituted 22% of first authors and 13% of last authors. From 1980 to 2016, the proportion of female first authors grew from 11% to 28% and 8% to 18% for last authors (p value 0.002 and 0.01, respectively). In addition, if the last author was female, it was more likely that the first author would also female. However, the increase in the percentage of publications where both first and last authors were female was not significant (p=0.07) over time (0% in 1980 to 43% in 2016).

**CONCLUSION:** Over last 27 years, there has been statistically significant upward linear trend of female first and senior authorship in the ANJR.

SRP040

### A Survey of Magnetic Resonance Imaging Protocols for the Investigation of Epilepsy in Canadian Academic Referral Centers

**Authors:** *Usman Khan, Matthias Schmidt*

**OBJECTIVES:** Published recommendations for optimized epilepsy imaging emphasize multiplanar, multicontrast imaging with slice orientation relative to the hippocampal axis and maximal spatial resolution. This study aims to determine the types of MRI protocols used for the investigation of epilepsy in Canadian tertiary care centers.

**METHODS:** We surveyed neuroradiologists at Canadian tertiary-care centers affiliated with medical schools to determine the range of MRI protocols that are currently used by experts in the investigation of patients with a first seizure and chronic epilepsy. We included pediatric and adult centres.

**RESULTS:** We received 19 responses (90% response rate) from centers spanning eight provinces across Canada. A standardized, dedicated epilepsy protocol is used in 79% of centers for the investigation of a first seizure and in 95% of centers for the investigation of epilepsy. T1-weighted 3D volume acquisitions, T2, FLAIR and DWI sequences are used most commonly. Coronal T2 and FLAIR sequences are oriented orthogonal to the hippocampi in most centers, while axial images are rarely oriented parallel to the hippocampi. The most commonly used slice thickness and inter-slice gap for T2 and FLAIR sequences are 3 mm and 0, respectively. Specialized MRI techniques, such as gadolinium-enhanced imaging, susceptibility weighted imaging, magnetization transfer imaging, diffusion tensor imaging, magnetic resonance spectroscopy, T2 relaxometry and functional MRI are used relatively sparingly.

**CONCLUSIONS:** Overall, our results highlight similarities and differences among MRI imaging protocols for the investigation of epilepsy in Canadian tertiary-care centers and offer a benchmark for the development or modification of future epilepsy imaging protocols.

SRP041

### Predictors of Bleeding Complications Following Percutaneous Image-Guided Liver Biopsy: A Scoping Review

**Authors:** *Mehran Midia, Devand Odedra, Ramin Midia, Jeffrey Muir, Anatoly Shuster*

**OBJECTIVE:** The purpose of this review was to collect and summarize the best available evidence regarding the risk factors associated with bleeding complications in image-guided liver biopsy.

**METHODS:** A literature review was performed, searching Medline, EMBASE, CINAHL, Cochrane Library, NICE and CADTH databases for any studies evaluating bleeding complications in image-guided liver biopsy. A total of 68 articles, published between January 1994 and April 2015, were reviewed in full, with 34 ultimately eligible for inclusion in the review.

**RESULTS:** Bleeding of any kind occurred in up to 10.9% of image-guided liver biopsies, with major bleeding episodes ranging from 0.1% to 4.6% and minor bleeding events in up to 10.9%. Several risk factors, in terms of patient, operator and procedure related, were identified as potentially indicative of increased risk of post-biopsy bleeding. Patient-related factors included patient age (>50 or 1.5: 7.1%, p200 biopsies/year vs.

**CONCLUSION:** Reported rate of post-biopsy bleeding ranges between 0 and 10.9%, with majority of studies reporting rates below 2%. Several patient, operator and procedure-related risk factors are associated with higher risk of bleeding.

SRP042

### Automated Identification of Vertebral Compression Fractures Reported by Radiologists on Routine Chest Radiography

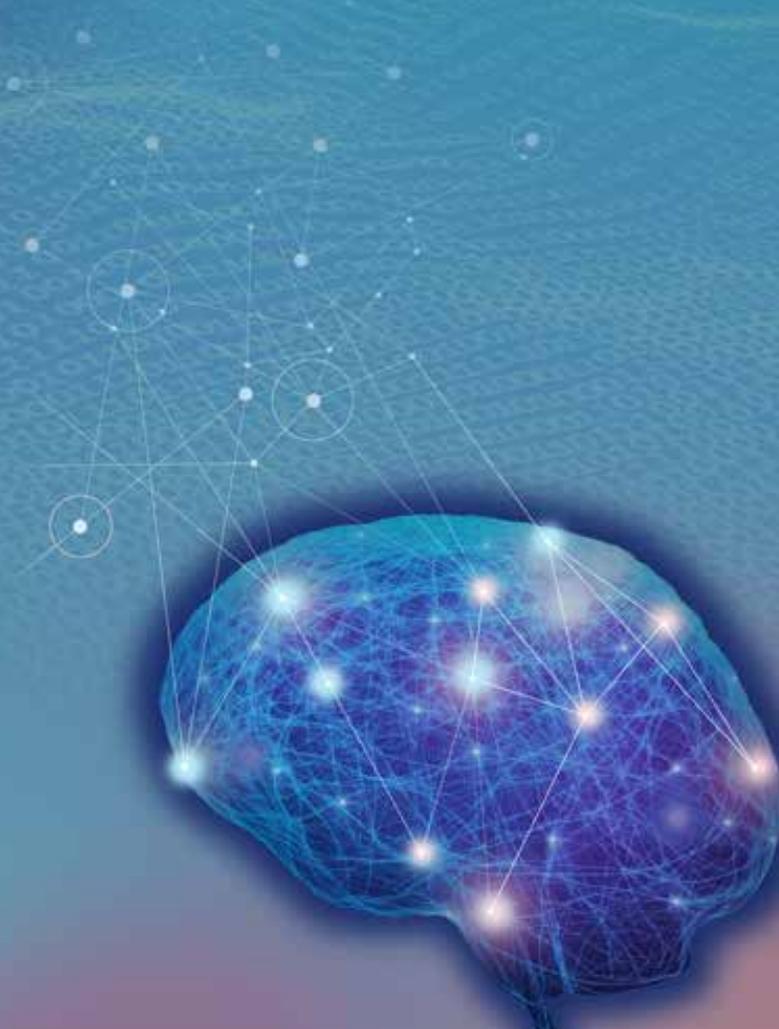
**Authors:** Henry Weibe, Jacob Jaremko, Hector Aguilar, Sumit Majumdar

**INTRODUCTION:** Despite vertebral compression fractures (VCF) being a hallmark sign of osteoporosis, their often-incident presence on chest x-ray rarely initiates treatment. Large scale manual search for vertebral fractures is time-consuming and impractical. We tested the feasibility of an automated search for VCFs found in radiologist reports.

**METHODS:** The last 30,000 emergency room and outpatient films between 3 hospitals were searched. Patients aged 60+ with reports including postero-anterior and lateral films were included. Reports were automatically flagged if they contained keywords suggesting VCF. A radiologist then performed manual review of 100 randomly selected flagged radiographs and 100 randomly selected non-flagged radiographs.

**RESULTS:** 2213 unique cases (7.4%) were flagged for VCF, with the search term “compression fracture” being the most commonly used identifier. The 200 randomly selected cases yielded a mean age of 76.7 years, with 84 males (43%) and 114 females (57%). Manual review of these cases yielded an 90.0% auto-capture accuracy rate ( $k=0.80$ , 95% confidence interval 0.72-0.88). Of the 20 manually reviewed discrepant cases, the auto-capture program provided 8 false-negative and 12 false-positive results. The search had 92% sensitivity and 89% specificity.

**CONCLUSIONS:** Approximately 7.4% of elderly patients with outpatient or emergency room chest radiography were flagged for VCF by our program. 92% of patients flagged by the automated search did indeed have VCFs and treatment could be considered in these patients.



## ORAL PRESENTATIONS

Friday April 27, 09:00 – 11:40, Salon Jarry / Joyce (Level A)

Prizes for the winning abstracts are funded by the Canadian Radiological Foundation (CRF) and will be awarded during the Awards Ceremony on Saturday, April 28 at 17:30.

## PRÉSENTATIONS ORALES

Le vendredi 27 avril, de 9 h à 11 h, Salon Jarry / Joyce (Niveau A)

Les prix pour les résumés gagnants sont financés par la Fondation radiologique canadienne (FRC) et seront présentés lors de la Cérémonie de remise des prix le samedi 28 avril à 17 h 30.

**JUDGES / JUGES :** Najla Fasih; Sukvinder Dhillon; Matthew McInnes

09:00 AP001

### Appropriateness of Lumbar Spine CT Imaging Requisitions: A Retrospective Study

**Authors:** Mark Hayward, Ravindra Gullipalli, David McComiskey, Angela Pickles

**PRINCIPAL LOCATION OF AUDIT:** Regional Healthcare Authority in NL, Canada.

**BACKGROUND AND AIM OF THE AUDIT:** To determine the proportion of lumbar spine (LS) CT imaging requisitions compliant with the Canadian Association of Radiologists' (CAR) appropriateness guidelines. Audit Target: 200 samples at 70% appropriateness.

**METHODS:** A single-year (2015) retrospective study was completed. A random sample of 200 LS-CT requisitions were analyzed regarding history provided and reason for imaging based on the CAR guidelines. Requisitions were categorized as appropriate, inappropriate, or incomplete. Other variables investigated: previous LS imaging and if patients were consulted or had surgery performed.

**RESULTS:** Of the 200 samples, 57% of the requisitions were for suspected uncomplicated disc herniation, 13.5% for suspected spinal stenosis, 17% did not fall into any of the CAR guideline categories. Overall proportion of appropriate requisitions was 13% with 23-35% inappropriate, and 65-73% incomplete. Many patients had prior LS imaging (x-ray 87%, CT 45%, and MR 12%). Of the 200 samples, 29.5% were consulted to an orthopedic or neurosurgeon and 7% had surgery after CT.

**ACTION PLAN:** This project was completed in conjunction with the Choosing Wisely NL initiative. Final results will be part of information disseminated to family physicians to help increase appropriateness of referrals.

**CONCLUSIONS:** There was a markedly low proportion of appropriate with a relatively high proportion of inappropriate and incomplete LS-CT imaging referrals.

09:10 AP002

## Adequacy of Ankle Radiographs...Where Are We?

**Authors:** *Amna Al-Arnawoot, Hema Choudur*

**LOCATION OF AUDIT:** Radiology department, University teaching hospital

**BACKGROUND:** There are ~5 million ankle radiographs performed annually in Canada and the USA for ankle trauma. An ankle radiograph series is the second most requested musculoskeletal examination in the emergency department. Accurate interpretation depends largely on adequate positioning of the ankle to best visualize the common areas of injury. In this project, we audited the quality of a 100 ankle radiographs at our institution.

**TARGET:** 90% of ankle radiographs obtained at our institute in patients with ankle trauma should meet the adequacy criteria.

**METHODS:** A 100 trauma cases are selected (both during and after regular working hours) by convenience sampling. The sample size is based on a similar audit performed in the UK. The images were reviewed by radiology resident and the following data was collected:

- Mortise view criteria for adequacy
- Lateral view criteria for adequacy

**RESULTS:** The target is not achieved. For the lateral view, 84% of cases met the standard. On the mortise view, 88% of cases met the standard. Loss of the expected clear ankle joint space on both the mortise and lateral radiographs is the most common cause for inadequacy of the images based on our data.

**ACTION PLAN:** The project was presented to the resident group and will further be presented to technologists during rounds.

**CONCLUSION:** After implementation of the action plan, a re-audit in 12 months is required to assess the quality of ankle radiographs.

09:20 AP003

## Use of Oral Contrast in the Setting of Undifferentiated Abdominal Pain in the Emergency Room: A Quality Assurance project

**Authors:** *Gage Watson, Yang Du, Paul Babyn*

**BACKGROUND:** Recent studies show that the use of oral contrast is generally of little benefit in making the diagnosis in undifferentiated abdominal pain in the emergency room. The average reduction of wait times for patients receiving an abdominal CT ranges from 60-120 minutes when oral contrast is not administered with no overall effect on patient outcome.

**AIM:** To assess the use of oral contrast with abdominal CT in undifferentiated abdominal pain in Saskatoon Health Region.

**METHODOLOGY:** Montage was used to retrospectively identify patients who underwent abdominal CT imaging for undifferentiated abdominal pain in SHR from January 2016-March 2016. After the initial audit, a PQI presentation and information package was distributed to Radiologists in the SHR. A re-audit was performed in April 2017 to assess the overall effectiveness of the original action plan.

**RESULTS:** The original audit revealed that 32% (87/274) of patients undergoing abdominal CT received oral contrast with only 3/87 patients having a clear indication for oral contrast use. After a presentation and information package was distributed to the Radiologists in SHR, a second audit was performed over April 2017 which revealed that only 3.9% (123/128) of studies received oral contrast. The overall average scan time from the original audit was 65 minutes in March – May 2017 and reduced to 49 minutes in April 2017.

**CONCLUSION:** The information package and presentation was successful and resulted in less use of oral contrast. Overall, the average scan time reduced by 16 minutes.

09:30 AP004

## Renal Biopsy Adequacy and Complication Rates at a Large University Institution

*Authors: Craig Ferguson, Gavin Low, Marina McToal, Stuart Jackson, Sean Winters*

**PRINCIPAL LOCATION:** University-based practice.

**BACKGROUND:** Until early 2014, renal biopsies were performed by nephrologists without direct ultrasound-guidance. Change in institutional policy transferred renal biopsies to radiology for ultrasound-guidance. Referring physicians have subsequently raised concerns regarding the number of inadequate biopsies and the complication rates.

**TARGET:** Adequacy rate >95% and complication rate

**METHODS:** All biopsies performed by radiologists or nephrologists between Jan 1, 2012 – Dec 31, 2015 were reviewed in collaboration with an ultrasound technician.

**RESULTS:** 602 renal biopsies performed by radiologists. The total complication rate was 11.9%, with minor complication rate of 6.7%, major complication rate of 4.2% and life-threatening complication rate of 1.0%. Adequacy rate was 96.3%. These rates were similar to those biopsies performed by nephrology (N=465).

**INTERVENTION:** Target for adequacy was met, but target for complication rate was not met by both radiology and nephrology-performed biopsies. Further analysis found reduced adequacy rates when only 1 biopsy pass was performed and with trainee-performed procedures. Higher complications were observed with radiology trainee performed procedures. This information was discussed with all radiologists involved, with recommendations for increased supervision and more than 1 biopsy pass.

**RE-AUDIT RESULTS:** Radiologist (N=115) adequacy rate was 97.4% and total complication rate was 6.1% (2.6% minor, 2.6% major and 0.9% life-threatening complication rate).

**CONCLUSION:** Increased supervision of trainees and more than one biopsy pass resulted in an improvement in both adequacy and complication rates.

09:40 AP005

## Radiation Reduction in Fluoroscopy: Use of a 5-minute Illustrated Educational Document to Reduce Dose

*Authors: Kevin Shek, Iain Kirkpatrick*

**LOCATION:** St. Boniface Hospital

**BACKGROUND/AIM:** At our institution, radiation dose exposure during fluoroscopy varies based on the radiologist. We aim to determine if an educational manual distributed to all radiologists (and designed to be read in 5 minutes) can result in decreased radiation exposure to patients.

**TARGET:** Decrease average radiation exposure by 50%.

**METHODS:** Average patient radiation exposure during esophograms (the most commonly performed exam), measured in dose area product (DAP), was determined pre and post intervention. For the intervention, all radiologists read a 5 page instruction manual for lowering fluoroscopy radiation entitled "Radiation Reduction in Fluoroscopy – a 5 minute guide to reducing patient exposure". The teaching points were: 1) Keep pulses per second at the minimum setting, 2) Pulse the fluoroscopy on and off with the foot pedal as well, 3) Use the image capture and cine capture functions liberally whenever a full exposure is unnecessary, and 4) Remember to collimate.

**RESULTS:** A 53% decrease in mean DAP from 147.32 $\mu$ Gy\*m<sup>2</sup> (n=133) in the pre-intervention period compared to 69.55 $\mu$ Gy\*m<sup>2</sup> (n=107) in the post-intervention time period reached statistical significance.

**INTERVENTIONS/ACTION PLAN:** Continued collection of post intervention data will be used to assess sustainability.

**DISCUSSION:** The results demonstrate that distributing a simple manual on radiation dose reduction can effectively decrease average patient exposure. The manual could easily be repurposed for other departments, potentially resulting in similar dose reductions.

09:50 AP006

## What Clinical Information Is Provided to Radiologists Interpreting Pelvic Radiographs from the ER at an Adult Trauma Center

*Authors: Anthony Vo, Chris Fung, Richard Coulden*

**LOCATION:** Adult Trauma Hospital

**BACKGROUND/AIM:** History improves report accuracy for subtle abnormalities. We have 3 sources of history for ER radiographs: radiology information system (RIS), ER triage nurse assessment and standardized requisition. The latter was revised 2 years ago together with ER physicians to maximize history provided. This audit evaluated use of the revised form and the other sources of history for pelvic radiographs.

**TARGET:** 100% in at least one source of history.

**METHODS:** Information associated with ER pelvic radiographs was assessed in three one-week intervals over 9 months. Assessment included presence of: i) sources of information, ii) relevant history, iii) site of pain/injury, and iv) clinical question.

**RESULTS:** 131 radiographs were assessed. 108 (82.4%) had all 3 sources of information provided. 111 requisitions were available but only 89 (80.2%) were complete, 6 (4.5%) had site of injury highlighted, a relevant history and a clinical question. Of the 119 nurse assessments, 84 (70.6%) provided relevant specific location and 113 (95.0%) provided relevant history. Although RIS information was present in 130 exams (99.2%), only 8 (6.1%) provided relevant history, specific location and clinical question.

**INTERVENTIONS/ACTION/DISCUSSION:** Despite modifying the standardized requisition form to meet the needs of ER physicians, the form was still not used appropriately. Triage nurse assessment remained the most reliable source of history and future drive will be to improve this source.

**CONCLUSIONS:** Clinical information provided to Radiologists is incomplete. Nurse assessment is likely to be the best next target for improvement.

10:00 AP007

## Reducing Unnecessary Knee MRI in Patients with Known Osteoarthritis

*Authors: Dorian Nobbee, Bevan Frizzell*

**BACKGROUND/AIM:** Knee MRI is the second most common MRI test in our province. In the setting of chronic pain and documented osteoarthritis, there is no role for the routine use of MRI. A quality improvement project was conducted intending to reduce the number of knee MRI requests in this population.

**TARGET:** Reduce the total number of knee MRI requests in the subject population by at least 20% (288) and increase use of appropriate radiographs.

**METHODS:** Retrospective review of locally performed knee MRIs in patients aged 55 or older with histories that included keywords suggesting osteoarthritis was performed. Every 6th MRI was sampled. Clinical history, prior studies, MRI and final report were reviewed by a senior radiology resident (DN) supported by a musculoskeletal radiologist (BF).

**RESULTS:** 1342 MRIs were performed in the study population and 237 (18%) were assessed. 183/237 (77%) had osteoarthritis on MRI. 106/237 (45%,  $p < 0.5$ ) were not indicated; of those 69 had osteoarthritis radiographically and 28 did not have weight-bearing radiographs. Of those not indicated 8/106 had a final diagnosis other than osteoarthritis. Of radiographs obtained without radiologist described osteoarthritis 33/61 (54%) had osteoarthritis on MRI. 22/237 (9%) studies that had radiographic findings of osteoarthritis had an MRI diagnosis unrelated to osteoarthritis.

**INTERVENTION/ACTION Plan:** A multi-disciplinary team, including Radiology and Family Medicine, developed a clinical decision support tool and educational platform to help family physicians and their patients understand that MRI would not assist with management and to improve x-ray ordering practices.

**DISCUSSION:** Re-evaluation of MRI requests 4 months after program implementation to determine efficacy of the program.

10:10 AP014

## Fluoroscopically Guided Lumbar Puncture: Evaluation of the Cytological Diagnosis

*Authors: Florence Thibault, Rachid Hadjeres, Antonio Maietta, Jennifer Sirois, David Landry, Céline Bard*

**LOCATION:** University of Montreal Hospital Centre

**BACKGROUND/AIM:** The purpose of our study was to assess the success rate of fluoroscopically guided lumbar puncture (FGLP) in our hospital – assessing the percentage of specimens which were representative for cytological diagnosis.

**TARGET:** We compared our success rate to that of neurologists who perform bedside lumbar punctures (BLP).

**METHODS:** In collaboration with the pathology department, the cytology analysis of 100 patients who had had a FGLP and of 100 patients who had had a BLP between January 2014 and December 2015 were reviewed. In the FGLP group, the indication for the procedure, the needle type, and the delay between sampling and handling in pathology were noted.

**RESULTS:** In the FGLP group, 31% of the specimens were considered unrepresentative because of cellular degeneration, compared to 32% in the BLP group ( $p > 0,05$ ). In the FGLP group, the needle type and the delay between sampling and handling in pathology did not show a statistically significant difference in performance ( $p > 0,05$ ).

**INTERVENTIONS/ACTION Plan:** Changes were made in the preparation of the specimens: filling the entire tube with fixative after sampling, adding Cytospin Collection Fluid (Shandon, Inc.) once in pathology, and putting a cap on the tube to minimize evaporation during centrifugation. The cytology analysis were then reviewed for all patients (110) who had had a FGLP or a BLP between March 24 and October 11, 2017. After changes were made, 11% of the specimens were considered unrepresentative.

**DISCUSSION:** Optimization of the preparation of the specimens was decisive in obtaining representative cytological diagnosis, improving patient care.

10:30 AP008

## Stereotactic Breast Core Biopsies [SBCB] and Rate of Surgical Diagnostic Upgrades – A Single Centre Quality Assurance Audit

*Authors: Prasaanthan Gopee-Ramanan, Faten Al-Douri, Abdullah Alabousi*

**LOCATION:** University hospital

**AIM:** To compare non-vacuum-assisted stereotactic breast core biopsy [SBCB] results with final surgical diagnoses to determine upgrade rate post-operatively.

**TARGET:** Post-surgical total upgrade rate to ADH, DCIS and/or invasive carcinoma of 7.7% or less (based on vacuum-assisted SBCB published rate). Upgrade rate for atypical lesions 10.5% and for DCIS 6.1%.

**METHODS:** SBCBs from January 2015-August 2017 were reviewed. Data collected included core biopsy and surgical diagnoses, presence of microcalcifications/masses/both, size of invasive tumour if diagnosis was upgraded and whether repeat surgery was required. The study was REB exempt.

**RESULTS:** 321 biopsies reviewed, 95 complete cases included. Total post-operative upgrades in 26 cases (27.4%). 16 DCIS/LCIS cases (16.8%) and 6 atypical lesions (6.3%) were upgraded. 58 cases (61%) had no change in diagnosis and 7 cases (7.4%) were downgraded.

**DISCUSSION:** Total upgrade rate of 27.4% exceeds the target of 7.7%. DCIS upgrade rate also exceeds target. We aim to reduce these by improving method of sampling, including increasing the number of samples obtained. This data will support upgrading current equipment to allow for vacuum-assisted SBCB. We plan to follow-up benign biopsies for at least 1 year to ensure there are no false negative cases.

**CONCLUSIONS:** Our findings confirm a high upgrade rate for non-vacuum-assisted SBCB and provides evidence for the need to implement vacuum-assisted SBCB.

10:40 AP009

## Reducing Radiation Dose and Contrast Volume in Pediatric CT Angiography (CTA) with Low kV from Dual Source CT (DSCT)

*Authors: Lu Qiqi, Marielle Fortier*

**LOCATION:** Tertiary hospital

**BACKGROUND AND AIM:** Scanning at 70 kV is suitable for CTA as iodinated contrast demonstrates higher attenuation due to proximity to the K-edge of iodine. However, protocols with optimized radiation exposure and contrast volume in different age groups have not been well established. In this audit, we aim to achieve lower radiation dose and contrast volume in children from neonates to 17 years old.

**AUDIT target:** Radiation dose

**METHODS:** We retrospectively reviewed CTA cases (n=51) performed in our department during the past 2 years and summarized radiation dose, total contrast volume and contrast injection rate. Data were classified based on age groups: G1(10 years old).

**RESULTS:** Radiation doses in different age groups were as follows:  $1.31 \pm 0.64$  mSv (G1),  $1.02 \pm 0.43$  mSv (G2),  $1.29 \pm 0.33$  mSv (G3) and  $1.82 \pm 0.46$  mSv (G4). Total contrast volume was recorded as  $10.54 \pm 1.66$  ml (G1),  $20.35 \pm 2.58$  ml (G2),  $32.67 \pm 5.21$  ml (G3) and  $56.8 \pm 10$  ml (G4) with injection rates of  $1.28 \pm 0.25$  ml/s (G1),  $1.89 \pm 0.11$  ml/s (G2),  $2.24 \pm 0.28$  ml/s (G3) and  $3.17 \pm 0.36$  ml/s (G4).

**INTERVENTIONS:** Procedural protocols will be updated

**CONCLUSION:** Diagnostic CTA can be performed with low radiation dose and contrast volume in various pediatric age groups. Further optimization will be done following re-audit.

10:50 AP010

## Utilization of CT Imaging and Pulmonary Scintigraphy for Investigation of Pulmonary Embolism in Pregnancy

*Authors: Andrew Walsh, Terra Hayward, Karen Allred, Christopher Winter*

**LOCATION OF AUDIT:** University Hospital Site

**BACKGROUND/AIM:** SOCG and ACOG guidelines recommend pulmonary scintigraphy preceded by normal CXR as the first imaging test for evaluation of PE in pregnancy. With a newer trinary reporting structure, SPECT V/Q scintigraphy (the institutional standard) is appropriate with a minimally abnormal CXR. CTPA is appropriate based on availability (after hours) and with a preceding abnormal CXR. The aim is to assess the appropriateness of CTPA and pulmonary scintigraphy for assessment of PE in pregnant patients.

**TARGET:**

1. 90% appropriate utilization of CTPA.
2. 100% appropriate utilization of pulmonary scintigraphy.

**METHODS:** All primary pulmonary scintigraphy and CTPA studies in pregnant patients were reviewed over a 19 month period. Perfusion only pulmonary scintigraphy studies were excluded. Data items included: reports of preceding CXR, two nuclear medicine physician consensus for abnormal CXR prior to V/Q SPECT, and the study time of day (08:00 and 17:00 is "on hours").

**RESULTS:** The first target was met. 15/15 of CTPA investigations were appropriate with either preceding abnormal CXR (5/12), imaging performed after hours (5/12), or with an abnormal CXR and after hours (2/12). The second target was met. 54/54 V/Q SPECT studies were appropriate with normal (47/54) or minimally abnormal (7/54) preceding CXR.

**INTERVENTIONS/DISCUSSION:** Results were communicated to relevant departments. Positive feedback was provided including the importance of maintaining appropriate utilization. Factors contributing towards appropriate use will be further investigated.

**CONCLUSIONS:** Current methods of PE imaging in pregnancy are being utilized appropriately.

11:00 AP011

## Reducing Radiation and Cost Associated with Follow-up Imaging for Pneumothorax

*Authors: Malik Usama, Peter Dickhoff, Simon Chi, Sandra Hovey, Geoff Schneider, Mark Macmillan, Richard Walker*

**PRINCIPAL LOCATION OF AUDIT:** University-based practice

**BACKGROUND** Aim of Audit: Management of pneumothorax (PTX) typically includes serial follow-up chest x-ray (CXR) exams. Multiple guidelines recommend an erect posteroanterior CXR for follow-up of simple PTX, with a lateral view recommended only when additional diagnostic information is required. This study aims to determine whether these guidelines are being followed at two tertiary academic centres in our region.

**AUDIT TARGET:**  $\geq 80\%$  compliance with published guidelines.

**METHODS:** Department analysts retrospectively identified 260 patients diagnosed with PTX and at least one follow-up CXR between January 1 and March 31, 2017 (Fig. 1). Inclusion criteria included age  $\geq 18$ -years and spontaneous pneumothorax or pneumothorax associated with minor trauma. Consensus review of images was performed by a staff radiologist and medical student. Data collected included patient age, gender, CXR order (2-view, 1-view, 1-view portable), ordering physician, patient location (inpatient or emergency room), and PTX etiology.

**RESULTS:** 35 patients meeting the inclusion criteria underwent 226 follow-up CXRs. 2-views were performed 71.7% (162/226) and a 1-view or 1-view portable 28.3% (64/226). There was no difference whether the ordering physician was a resident or attending ( $p=0.161$ ). Inpatients were more likely to receive a 2-view follow-up exam ( $p=0.00012$ ). The incremental cost associated with ordering a 2-view follow-up was \$1,989.36 and resulted in 2.0mSv of additional radiation exposure to the average PTX patient.

**INTERVENTIONS/ACTION PLAN:** An education action plan directed towards departments managing patients with pneumothorax is planned with compliance re-evaluated between January 1 and March 31, 2018.

**CONCLUSION:** Our study demonstrates an opportunity to decrease cost and radiation exposure for inpatient and emergency department patients being followed for PTX.

11:10 AP012

## Breast MRI: Are We Over Recalling? A Local Audit

*Authors: Melissa Walsh, Connie Hapgood*

**PRINCIPAL LOCATION OF AUDIT:** University-based tertiary care center.

**BACKGROUND AIM OF AUDIT:** There are well established potential complications associated with Inferior Vena Cava Filters (IVCFs) which become more significant with longer dwell times. We aim to assess if interventional radiologists are meeting best practices in advocating for appropriate and timely IVCF retrieval at the time of filter insertion at our institution.

**AUDIT TARGET:**  $> 90\%$  of reports containing strong recommendation for IVCF retrieval.

**METHODS:** We retrospectively reviewed all IVCF insertions performed over 6 years (3/2011-3/2017) and recorded from the procedural report, presence and strength of recommendation for IVCF retrieval. Recommendation was graded as absent, weak (did not state timely retrieval), or strong (explicitly suggested timely and appropriate retrieval). We further recorded whether retrieval was attempted and IVCF dwell time if applicable.

**RESULTS:** Within our cohort, 260 IVCF insertions were performed of which only 33 (12.7%) included a strong recommendation, and 200 (76.9%) included a weak recommendation for IVCF retrieval. No recommendation was made in 27 (10.4%). Our audit target was not achieved. In this cohort, attempted retrieval rate was 37.7% with wide variability in IVCF dwell time (median 16d, range: 1-472d).

**INTERVENTIONS/ACTION PLAN:** All interventional radiologists will be advised to modify current reporting templates to include a strong recommendation for timely IVCF retrieval.

**CONCLUSION:** Our audit results will be utilized to raise awareness of the importance of timely IVCF retrieval to improve patient safety. A re-audit will assess compliance and evaluate for any differences in IVCF retrieval rates.

11:20 AP013

## Management of Acute Iliofemoral Deep Vein Thrombosis in the Calgary Zone: A Clinical Audit

**Authors:** David Cornell, Aman Wadhvani, Ani Mirakhur

**OBJECTIVE:** MRI-guided biopsies are essential to the evaluation of suspicious enhancing lesions without mammographic or ultrasound correlation. Besides, the rate of surgical upgrade of high-risk lesions is high. The aim of this study was to determine the upgrade rate of atypical lesions diagnosed by MRI-guided biopsy and to determine if there are predictive factors of upgrade.

**METHODS:** This retrospective study totalized 524 consecutive MR biopsies performed between 2009 and 2016, including 108 (20.6%) confirmed malignant lesions and 58 (11.1%) atypical lesions (atypical ductal hyperplasia (ADH), lobular neoplasia or other atypia). Surgical pathology or a 12-month MRI follow-up post-biopsy were available for 36 of the 58 atypical lesions. The demographic data, MRI characteristics and biopsy features were collected and analyzed using the Chi-x2 and Anova tests.

**RESULTS:** The upgrade rate of atypia to malignancy was 25% (9/36), comparable to the literature. No correlate was noted between the risk of upgrade and the indication of the MRI exam or the technical features of the biopsy. Factors associated with upgrade were larger lesion size (cutoff 3.2cm;  $p=0.03$ ) and specific histology of the biopsy ( $p=0.04$ ): ADH lesions had the highest upgrade rate measured at 50% (6/12), while lobular neoplasia lesions had an upgrade rate of 14% (3/22).

**CONCLUSION:** The upgrade rate of atypical lesions diagnosed at MRI-guided biopsies is high. Factors associated with upgrade were lesion size and histology of the biopsy. ADH has the highest upgrade rate and requires excision. Lobular neoplasia has a 14% upgrade rate and needs a thorough radio-pathologic correlation with surgical consultation.

11:30 AP015

## Assessing the Interventional Radiologist's Recommendation on IVC Filter Retrieval – A 6-year Clinical Audit

**Authors:** Haonan Mi, Hamed Basseri, Fernando Gastaldo, Gordon Yip, Sabarinath Nair

**PRINCIPAL LOCATION OF AUDIT:** University-based tertiary care center.

**BACKGROUND AIM OF AUDIT:** There are well established potential complications associated with Inferior Vena Cava Filters (IVCFs) which become more significant with longer dwell times. We aim to assess if interventional radiologists are meeting best practices in advocating for appropriate and timely IVCF retrieval at the time of filter insertion at our institution.

**AUDIT TARGET:** > 90% of reports containing strong recommendation for IVCF retrieval.

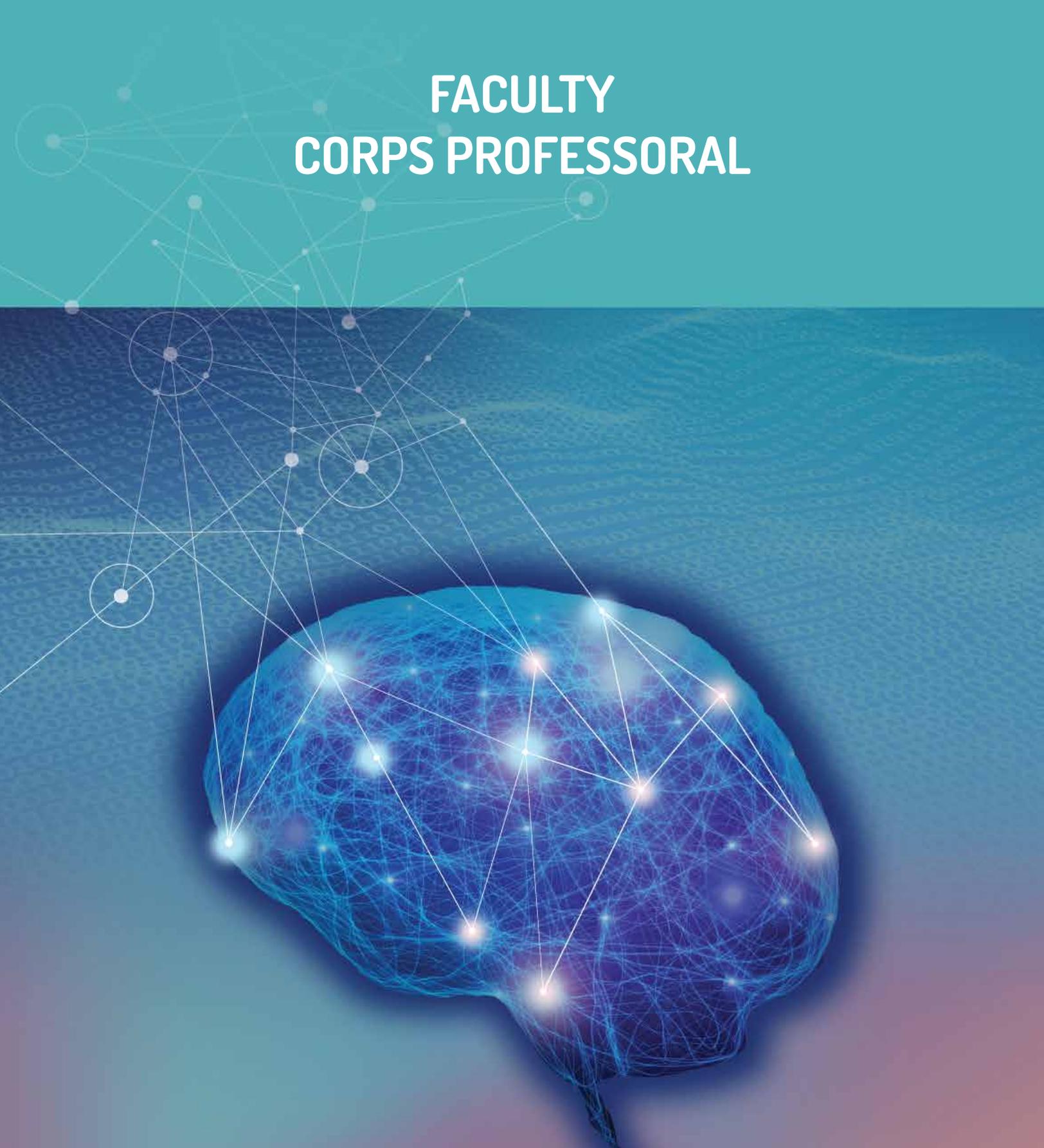
**METHODS:** We retrospectively reviewed all IVCF insertions performed over 6 years (3/2011-3/2017) and recorded from the procedural report, presence and strength of recommendation for IVCF retrieval. Recommendation was graded as absent, weak (did not state timely retrieval), or strong (explicitly suggested timely and appropriate retrieval). We further recorded whether retrieval was attempted and IVCF dwell time if applicable.

**RESULTS:** Within our cohort, 260 IVCF insertions were performed of which only 33 (12.7%) included a strong recommendation, and 200 (76.9%) included a weak recommendation for IVCF retrieval. No recommendation was made in 27 (10.4%). Our audit target was not achieved. In this cohort, attempted retrieval rate was 37.7% with wide variability in IVCF dwell time (median 16d, range: 1-472d).

**INTERVENTIONS/ACTION PLAN:** All interventional radiologists will be advised to modify current reporting templates to include a strong recommendation for timely IVCF retrieval.

**CONCLUSION:** Our audit results will be utilized to raise awareness of the importance of timely IVCF retrieval to improve patient safety. A re-audit will assess compliance and evaluate for any differences in IVCF retrieval rates.

# FACULTY CORPS PROFESSORAL



# FACULTY I CORPS PROFESSORAL

**Manisha Bahl, MD, MPH**  
Harvard Medical School, Boston,  
Massachusetts, USA



Dr. Manisha Bahl is a breast imaging radiologist at Massachusetts General Hospital (MGH) and the Director of the MGH Breast Imaging Fellowship Program. She received her medical degree from University of California at San Francisco and completed residency and fellowship at Duke University Medical Centre. She is a current recipient of the RSNA Research Scholar Grant and the ESSCO-MGH Breast Cancer Research Grant to investigate the application of machine learning algorithms to risk-stratify patients with ductal carcinoma in situ.

#### PRESENTATION:

- Artificial Intelligence in Breast Imaging

**David Barnes, MD, FRCPC**  
Dalhousie University, Halifax,  
Nova Scotia, Canada



Dr. David Barnes is Professor and Head of the Department of Radiology, Dalhousie University and Clinical Chief of Diagnostic Imaging of the Central Zone of the Nova Scotia Health Authority. He is a graduate of Memorial University Medical School, Dalhousie's radiology residency and the nuclear medicine program of Western University. He has been a member of the academic department at Dalhousie since 1989.

#### MODERATOR

- Innovations and Controversies in Residency Education

**Hamid Bayananti, MD**  
University of Ottawa, Ottawa,  
Ontario, Canada



Dr. Hamid Bayananti is currently a radiologist at The Ottawa Hospital and Assistant Professor at the University of Ottawa. He graduated from the Ahvaz University of Medical Sciences and completed a radiology residency and thoracic imaging fellowship at the University of Ottawa.

#### PRESENTATION

- Mistakes We All Make: Chest Imaging

**Eric Bartlett, MD, MPH**  
University of Toronto, Toronto,  
Ontario, Canada



Dr. Eric Bartlett is a head and neck radiologist within the Joint Department of Medical Imaging (JDMI) and is based at Princess Margaret Hospital. He is also the Program Director for the Diagnostic Radiology Residency Program at the University of Toronto. Dr. Bartlett maintains an active online educational presence in this realm via the [www.Headandneckrad.com](http://www.Headandneckrad.com) site. He has been involved in online simulation for more than three years.

#### PRESENTATION

- Online Emergency Radiology Simulation

**Alex Bilbily, MD, BHSc**  
16 Bit Inc., Toronto, Ontario, Canada



Dr. Alexander Bilbily is a University of Toronto trained medical doctor with a five year specialization in diagnostic radiology. Dr. Bilbily wrote his first computer program at the age of five and has since pursued the study of computer science. With over seven years of AI experience, Dr. Bilbily co-founded 16 Bit Inc, an AI-first medical imaging company with the vision of augmenting physician diagnostic ability using artificially intelligent tools. Dr. Bilbily currently serves as the Chief Executive Officer of 16 Bit and is a member of the Canadian Association of Radiology AI Working Group. Dr. Bilbily believes that AI will be the foundation of next-generation tools that will improve the efficiency, quality, and reliability of care that physicians can offer to their patients.

#### PRESENTATION

- MSK: What I have learned from the RSNA "Bone Age Challenge"

# FACULTY | CORPS PROFESSORAL

## Simon Bicknell, MD

University of British Columbia, Vancouver, British Columbia, Canada

Dr Simon Bicknell currently practices at Lions Gate Hospital in North Vancouver, a larger community-based hospital that serves as a tertiary referral site for neurosurgery and orthopedics. He is Clinical Professor at the University of British Columbia – the same institution where he completed his residency in radiology as well as additional subspecialty training in echocardiography, interventional radiology and neuroradiology. He was the managing partner of his group for eight years and served 10 years on the examining board of the Royal College. Teaching radiology concepts to medical students and family practice residents as well as interventional skills to senior radiology residents remains a strong focus in his academic career. Although family and his four kids dominate most of his current time outside of medical imaging, his current research interests are centred around the translational application of academic studies to the community hospital setting.



### PANELIST

- Saturday Image Interpretation Panel

## Nathalie Bureau, MD, MSc, FRCPC, FABR

Université de Montréal, Montreal, Quebec, Canada

Dr. Nathalie Bureau is an MSK radiologist at the Centre Hospitalier de l'Université de Montréal. She was born in Montreal. She earned her medical degree at the Université de Montréal before completing her residency at the same institution. She then pursued a fellowship in MSK radiology at the University of Virginia in Charlottesville, Virginia. In 2012-2014 she obtained a Master's degree in Biomedical Sciences – Evaluation and treatment of mobility and posture disorders.



### PRESENTATION

- Mistakes We All Make: Musculoskeletal Imaging

### PANELIST

- Saturday Image Interpretation Panel

## Alexandre Cadrin-Chênevert, MD, B.Eng., FRCPC

CISSS Lanaudière, Saint-Charles-Borromée, Québec, Canada

Dr. Alexandre Cadrin-Chênevert is a radiologist at the Centre Intégré de santé et de services sociaux (CISSS) de Lanaudière, which is affiliated with Université Laval. After completing a computer engineering degree at École Polytechnique de Montréal, he completed his medical degree and radiology residency at Université de Montréal. His long-term academic research goals are to improve accessibility and quality of medical imaging services using machine/deep learning algorithms. He is a member of the CAR AI working group. Dr. Cadrin-Chênevert is planning on pursuing a research MSc degree in computer science and artificial intelligence.



### PRESENTATION

- MSK: What I have learned from the RSNA “Bone Age Challenge”

## Robyn Cairns, MD, MSc, FRCPC

University of British Columbia, Vancouver, British Columbia, Canada

Dr. Robyn Cairns is a Clinical Professor of Radiology at the University of British Columbia. She is a practicing pediatric radiologist at British Columbia's Children's Hospital. In addition to her MD, Robyn also has Masters degree in Health Information Sciences and works as a health informatics consultant in private and public sector.



### MODERATOR

- AI: Challenges and Controversies in Clinical Applications

### PANELIST

- CAR Hot Topics – AI in Canada: Investment, Implementation, and Regulation

# FACULTY I CORPS PROFESSORAL

## Santanu Chakraborty, MD, FRCR, FRCPC

University of Ottawa, Ottawa,  
Ontario, Canada



Dr. Santanu Chakraborty is an Associate Professor in the Department of Radiology at the University of Ottawa. Dr. Chakraborty is a diagnostic neuroradiologist with special interest in quantitative MR imaging, acute stroke imaging and spine intervention. He is also involved in projects on radiology informatics, quality control and safety as well as appropriate utilization. Dr. Chakraborty has been the Chair of the committee to develop the Canadian Association of Radiologists (CAR) Standard on Magnetic Resonance Imaging 2011 and the co-chair of the Canadian Heart Rhythm Society (CHRS) and the Canadian Association of Radiologists (CAR) Joint Consensus Statement on Magnetic Resonance Imaging with Cardiac Implantable Electronic Devices. He is Chair of the Quality Improvement working group of the CAR.

### MODERATOR

- Moderator, Quality Improvement

### PRESENTATION

- QI Primer: Starting a Quality Improvement Project in Your Department

## Florent Chandelier, PhD, MSc, MEng

Imagia Cybernetics, Montreal,  
Quebec, Canada



Dr. Florent Chandelier is the Chief Technology Officer of Imagia Cybernetics. He is also the Founder and Vice-President Research and Development of Cadens Medical Imaging. Cadens Medical Imaging has a leading position in computer-assisted medical imaging and provides software solutions facilitating image diagnosis. Dr. Chandelier received his PhD in Bio-Mechanics at the University of Sherbrooke (2007), after completing a Master of Advanced Studies in Medical Physics and Physiology at Université Paris Sud (2004), and a Masters of Engineering at ESME Sudria (2004). He is also a member of the Canadian International Council, where he is a speaker on intellectual property.

### PRESENTATION

- Vendor Usage Scenarios and Demos

## Silvia Chang, MD, FRCPC, FSAR

University of British Columbia, Vancouver,  
British Columbia, Canada



Dr. Silvia Chang is an Associate Professor at the University of British Columbia and an abdominal radiologist at Vancouver General Hospital. Her area of interests include medical education and abdominal MRI, particularly prostate and liver. She is the past Residency Program Director and a Royal College Examiner for Diagnostic Radiology. She is a Fellow of the Society of Abdominal Radiology (SAR) and is co-chair of the Educational Subcommittee of the SAR Prostate Disease Focus Panel.

### MODERATOR

- Prostate MRI and PIRADSv2 Practical Workshop

### PRESENTATION

- Canadian Radiologists' Perception of the PGY-1 Basic Clinical Year: Results of a National Survey

## Tanya Chawla, MD, MBBS,

FRCPC, FRCR

Joint Department of Medical Imaging,  
University of Toronto, Toronto,  
Ontario, Canada



Dr. Tanya Chawla graduated from the University of London, Charing Cross and Westminster Medical School (UK) and completed her radiology residency at the University of Southampton. Dr. Chawla completed a fellowship in abdominal imaging at the University Health Network / Mount Sinai Hospital. She is currently a staff abdominal radiologist and assistant professor at the Joint Department of Medical Imaging, University Health Network/Mount Sinai Hospital in the Division of Abdominal Imaging, where she is Head of GI imaging at the JDMI. She also heads the Advanced Imaging and Education Centre at the JDMI. Her research interests are in GI and gynecological imaging.

### MODERATOR

- Ultrasound

### PRESENTATION

- Ultrasound of the Bowel: How I Do It!

# FACULTY I CORPS PROFESSORAL

**Leonid Chepelev, MD, PhD**  
University of Ottawa, Ottawa, Ontario,  
Canada



Dr. Leonid Chepelev is currently a radiology resident physician at the University of Ottawa. He hails from a background in computational chemistry and bioinformatics. As part of his doctoral studies at Carleton University and the European Bioinformatics Institute, he has been responsible for automated computational resource integration, ontology development, and human-accessible machine learning. His current interests include the extension of clinical applications of radiology, including through 3D printing and artificial intelligence applications.

#### MODERATOR

- AI: Challenges and Controversies in Clinical Applications

**Mark Cicero, MD, BSc, FRCPC**  
16 Bit Inc., Toronto, Ontario, Canada



Dr. Mark Cicero is a radiologist with subspecialty training in cross-sectional body imaging. He completed his residency in diagnostic radiology at the University of Toronto. Prior to residency, Dr. Cicero obtained his medical degree from McMaster University and engineering degree from Western University in a combined six years. Dr. Cicero strives to bridge the gap between these domains to improve healthcare from the inside out. He currently serves as 16 Bit's Chief Operating Officer, is a member of the Canadian Association of Radiology's AI working group and is a firm believer that AI will revolutionize how we practice medicine today.

#### PRESENTATION

- MSK: What I have learned from the RSNA "Bone Age Challenge"

**James Clarke, MD, FRCPC**  
Dalhousie University, Halifax, Nova Scotia,  
Canada



Dr. James Clarke is dual certified in radiology and nuclear medicine and is the Program Director for the Nuclear Medicine Residency Program at Dalhousie University. He is a member of the Nuclear Medicine Specialty Committee group that is currently developing the Competence by Design documents for Nuclear Medicine and is the Chair of the Postgraduate Medical Education Policy Committee at Dalhousie University.

#### PRESENTATION

- The Transition to Competency-Based Medical Education: Opportunities and Challenges

**Maria del Pilar Cortes, MD**  
McGill University, Montreal, Quebec,  
Canada



Dr. Maria del Pilar Cortes is a neuroradiologist, neurointerventional radiologist and Associate Professor at the departments of Oncology, Neurology, Neurosurgery and Radiology at McGill University in Montreal. Dr. Cortes did her diagnostic neuroradiology fellowship at the University of British Columbia and neurointerventional fellowship at the Montreal Neurological Hospital (MNH) of McGill University. She combines a busy practice in both diagnostic and neurointerventional radiology and has special interest in CT perfusion applications and interpretation for acute stroke. She is developing alternative vascular approach techniques for neuroangiography in stroke patients. She is also the Chair of the Medical Evaluation Committee of the MNH at McGill University Health Centre and has published her projects in quality and assessment of radiology practice.

#### PRESENTATION

- Mistakes We All Make: Neuroradiology

**Andreu Costa, MD, MSc, FRCPC**  
Queen Elizabeth II Health Sciences Centre,  
Dalhousie University, Halifax, Nova Scotia,  
Canada



Dr. Andreu Costa is an academic abdominal radiologist at the QEII Health Sciences Centre, and an Assistant Professor at Dalhousie University. He has a keen interest in abdominal imaging research, particularly in the imaging of hepatobiliary disease and in improving image quality. He is a committed teacher to radiology residents, fellows, and medical students, and has been recognized with departmental teaching awards. As Head of the Abdominal Imaging Section at the QEII Health Sciences Centre, he is actively engaged in several administrative endeavours and committees at the local, provincial, and national levels.

#### JUDGE

- Educational Exhibits

# FACULTY I CORPS PROFESSORAL

## Sukvinder Dhillon, MD University of Alberta, Edmonton, Alberta, Canada

Born and raised in the U.K., Dr. Sukvinder Dhillon completed a musculoskeletal fellowship at the University of Alberta and moved to Edmonton in 2003. His research interests include MRI of ankylosing spondylitis and aspects of spinal anatomy. Over the past three years he has developed a major interest in medical education. His primary focus in this field is making the process of learning radiology more efficient by using targeted methods. He is currently developing online educational material and a radiology learning lab. He also has a keen interest in departmental clinical audit, and has helped to author the CAR clinical audit website.

### JUDGE

- Departmental Clinical Audit Projects



## Jonathan Draper Arterys

Jonathan Draper is the Director of Product Management at Arterys, a company that is leading the way in Artificial Intelligence applied to clinical radiology workflows. Jonathan has spent the past 14+ years in the medical imaging industry, driven by a passion for bringing leading-edge technologies to market, and with the goal of improving patient outcomes always at the forefront. He is a computer and biomedical engineer by training and loves working in the intersection of technology and medicine.

### PANELIST

- CAR Hot Topics – AI in Canada: Investment, Implementation, and Regulation



## Gina Di Primio, MD FRCP(C) Halton Health Care, Oakville, Ontario, Canada

Dr. Gina Di Primio is currently in community practice at the Oakville Trafalgar Memorial Hospital and professor at McMaster University. She completed her undergraduate education, medical school and diagnostic radiology residency at the University of Ottawa. Her musculoskeletal fellowship was subsequently completed at the Mayo Clinic (Jacksonville and Rochester) under the supervision of Dr. Thomas Berquist and Laura Bancroft. She then went on to complete a mini-fellowship with Dr. Caroline Reinhold in Montreal, Quebec in body MRI, specializing in pelvic MRI imaging. Upon completion of her fellowship, she returned to Ottawa to lead the musculoskeletal section at the Ottawa Hospital. Recently, new family commitments have led to a move to the Toronto area and she is currently in community practice at the New Oakville Hospital. Her special interests include bone and soft tissue tumor imaging, arthritis, ultrasound and musculoskeletal MRI imaging, peripheral nerve imaging as well as the female pelvis.

### PRESENTATION

- MSK Ultrasound in Emergency Patients



## Derek J. Emery, MD University of Alberta, Edmonton, Alberta, Canada

Dr. Derek Emery is Professor and Chair of the Department of Radiology and Diagnostic Imaging at the University of Alberta. His clinical practice involves both neuroimaging and interventional neuroradiology. Current research focuses on the study of appropriateness of diagnostic imaging and the use of magnetic resonance imaging to study neurologic disease. Dr. Emery is the Medical Director of the Peter S. Allen MR Research Centre at the University of Alberta.

### JUDGE

- Educational Exhibits



# FACULTY I CORPS PROFESSORAL

## Marco Essig, MD, PhD, FRCPC University of Manitoba, Winnipeg, Manitoba, Canada



Dr. Marco Essig is Professor and Chair of the University of Manitoba Radiology Department, and Medical Director of the Winnipeg Regional Health Authority Diagnostic Imaging Program. He received his medical degree and doctorate in neurological sciences from the University of Heidelberg, Germany. After completing a residency in radiology at the German Cancer Research Centre, Dr. Essig completed a fellowship in neuroradiology at the University of Iowa Hospitals and Clinics, and a second in interventional radiology at Brigham and Women's Hospital at the Harvard Medical School. Dr. Essig earned a board certification in diagnostic radiology and neuroradiology and was appointed professor at the University of Heidelberg in 2006. Dr. Essig's research focuses on the integration of functional imaging techniques into neuroimaging protocols in order to enable individualized and improved patient management with a special focus on brain cancer.

### JUDGE

- Radiologists-in-Training Research Projects

## Najla Fasih, MD, FRCR, FRCPC University of Ottawa, Ottawa, Ontario, Canada



Dr. Najla Fasih is a staff radiologist and Associate Professor in the division of Abdominal Imaging at the University of Ottawa. She obtained her radiology certification from London, UK after acquiring her residency training from Lahore, Pakistan in 2004. She completed her subspecialty fellowship training in abdominal imaging at the University of Ottawa. Dr. Fasih's subspecialty interests include oncological and gynecological imaging as well as radiofrequency ablation of abdominal neoplasms. She has been involved in several teaching and research initiatives at the University of Ottawa and is the humble recipient of teaching awards both at undergraduate and postgraduate levels. She has been a course director for several CPD courses in diagnostic imaging, offered by the University of Ottawa.

### JUDGE

- Departmental Clinical Audit Projects

## Carolyn Flegg, MD, FRCPC University of Saskatchewan, Saskatoon, Saskatchewan, Canada



Dr. Carolyn Flegg received her medical degree from the University of Saskatchewan. Following her radiology residency training at Queen's University in Kingston, Ontario, she completed a fellowship in oncology imaging through McMaster University at the Henderson Hospital site in Hamilton, Ontario. In 2007, after working at the Henderson Hospital for a year following her fellowship, Dr. Flegg returned home to Saskatchewan, where she joined Associated Radiologists in Saskatoon. While her practice encompasses all areas of general diagnostic radiology, her primary field of interest is oncology imaging, particularly breast, thyroid and gynecological imaging.

In 2009 and 2010, Dr. Flegg served as the Clinical Head for the Department of Medical Imaging of the Saskatoon Health Region. She is currently the Medical Director of the Breast Health Centre at Saskatoon City Hospital and also serves as a member of the Residency Education Committee for the radiology residency program at the University of Saskatchewan.

### PANELIST

- Saturday Image Interpretation Panel

# FACULTY I CORPS PROFESSORAL

## **Bruce B. Forster, MSc, MD, FRCPC** University of British Columbia, Vancouver, British Columbia, Canada



Dr. Forster is Professor and Head of the University of British Columbia Radiology Department, and Regional Department Head and Medical Director of Diagnostic Imaging at Vancouver Coastal Health and Providence Health Care. He was recently Director of Diagnostic Imaging for the Vancouver 2010 Winter Olympics/Paralympics Games. As an associate member of the Allan McGavin Sports Medicine Centre, he has been involved in the clinical, educational, and research aspects of sports imaging for 25 years; he is also consultant to the editor for *Radiology*, and associate editor of *British Journal of Sports Medicine*. Dr. Forster has delivered over 300 invited lectures, many internationally, and has served as a visiting professor in Canada, the United States, Indonesia, Singapore, Japan, and the Middle East. He is the author of over 110 peer-reviewed scientific publications, and 100 educational exhibits, and has served as president of the Pacific Northwest Radiology Society, and on the Board of Directors of the Canadian Association of Radiologists and is currently on the Board of Directors of the Canadian Radiological Foundation. Dr. Forster is Lead Physician for *Choosing Wisely: Medical Imaging*, one of the most comprehensive appropriateness initiatives in British Columbia, and is chair of the CAR/CRF/UBC Radiology Leadership and Business course, in collaboration with the Sauder School of Business.

### MODERATOR

- Saturday Image Interpretation Panel

## **Laure Fournier, MD** Hôpital Européen Georges Pompidou, Paris, France



Dr. Laure Fournier works as a professor at the Hôpital Européen Georges Pompidou, in Paris, France. Her time is divided between clinical work on urogenital cancers, and imaging research in the Laboratoire de Recherche en Imagerie (INSERM U970). She is working on functional imaging, radiomics and big data, to extract quantitative parameters from images reflecting tumour physiology and biology, more specifically to define response to therapy, particularly for targeted therapies requiring new response criteria.

### PRESENTATION

- Radiomics and Oncology: an Overview – Access to Big Data and Open Data for Research: A French Perspective

## **Véronique Freire, MD** Missing info



Dr. Freire is a musculoskeletal radiologist at the CHUM and an assistant clinical professor at the Department of Radiology, Radiation Oncology and Nuclear Medicine at the Université de Montréal.

### PANELIST

- Saturday Image Interpretation Panel

## **Raym Geis, MD** American College of Radiology, Fort Collins, Colorado, USA



Dr. Raym Geis is Senior Scientist, ACR Data Science Institute, Adjunct Associate Professor of Radiology, National Jewish Health, and Clinical Assistant Professor of Radiology, University of Colorado. He is Vice Chair, ACR Informatics Commission; member, Canadian Association of Radiologists' Artificial Intelligence Working Group; co-organizer RSNA/SIIM National Imaging Informatics Curriculum and Course (NIIC); and a past Chair of SIIM. He completed his medical degree, residencies and fellowship at the University of Colorado, and engineering degrees from Carnegie-Mellon University and Stanford.

### PRESENTATION

- Highly Augmented Radiology and the Centaur Radiologist: Integrating Machine Learning Into Radiology Practice

## **Dr. Sangeet Ghai, MD** Joint Department of Medical Imaging, University Health Network, Toronto, Ontario, Canada



Dr. Sangeet Ghai is an Associate Professor in the Joint Department of Medical Imaging (JDMI) at University Health Network (Toronto General Hospital- Princess Margaret Hospital) – Mount Sinai Hospital – Women's College Hospital, University of Toronto, Canada. His main areas of interest and research include prostate imaging and intervention. He is actively involved in prostate MRI techniques, high resolution ultrasound imaging of prostate, and in-bore focal treatment for intermediate risk prostate cancer.

### PRESENTATION

- Prostate MRI and PIRADSv2 Practical Workshop

# FACULTY I CORPS PROFESSORAL

## Will Guest, MD, PhD

University of British Columbia, Vancouver, British Columbia, Canada



Dr. Will Guest grew up in Winnipeg and obtained his undergraduate degree in physics and biochemistry from the University of Manitoba. He then moved to Vancouver to enroll in a combined MD/PhD program at the University of British Columbia (UBC), completing his doctoral research on the biophysics of protein misfolding in neurodegeneration. He is now a fifth-year radiology resident at UBC and will be starting fellowship in diagnostic and interventional neuroradiology at the University of Toronto in July.

### PRESENTATIONS

- State of the Art of AI in Radiology: An Overview
- Introduction: Issues of Interest and Concern for Radiologists

## Alok Gupta, PhD, MBA

IBM Watson Health Imaging, Cambridge, Massachusetts, USA



Dr. Alok Gupta is the Global Vice President, Product Development at IBM Watson Health Imaging, where he is responsible for the development of Enterprise Imaging and cognitive offerings for Watson Health Imaging around the world. He is also an Adjunct Assistant Professor of Health Services, Policy, and Practice at Brown University in Providence, RI. He completed his MSE (1988) and PhD (1991) in Computer and Information Science in the University of Pennsylvania, and then completed MBA from the Wharton School in 2002.

### PRESENTATION

- Vendor Usage Scenarios and Demos

## Cameron Hague, MD

University of British Columbia, Vancouver, British Columbia, Canada



Dr. Cameron Hague is a cardiothoracic radiologist at St. Paul's Hospital in Vancouver, British Columbia. He is the current University of British Columbia Diagnostic Radiology Residency Program Director. Dr. Hague has a special interest in radiology education as well as cardiothoracic research.

### PRESENTATION

- How Low Can You Go? Thoracoabdominal CT in 2018

### MODERATOR

- Panel Discussion for Residents
- Resident Case Review
- Junior/Senior Resident Hot Seat Sessions

## Masoom Haider, MD, FRCPC(C)

University of Toronto, Toronto, Ontario, Canada



Dr. Masoom Haider is an internationally recognized leader in the field of body MRI and prostate MRI. He is Professor of Radiology in the Faculty of Medicine at the University of Toronto, Senior Scientist at the Lunenfeld-Tanenbaum Research Institute and a Clinician Scientist in the Ontario Institute of Cancer Research. He has published more than 170 peer reviewed papers, holds multiple grants and is a member of the ACR Pi-Rads Steering Committee. His ongoing work is focused on the assessment of multiparametric prostate MRI in the active surveillance and screening settings and detailed radiologic pathologic correlation of prostate cancer with MRI biomarkers. He has extensive experience with focal therapy research involving prostate MRI and MRI/US fusion.

### MODERATOR

- Prostate MRI and PIRADSv2 Practical Workshop

# FACULTY I CORPS PROFESSORAL

**Paul Hamilton, MD, FRCP(C)**  
Sunnybrook Health Sciences Centre,  
University of Toronto, Toronto,  
Ontario, Canada



Dr. Paul Hamilton is an abdominal radiologist with 30 years of experience working at Sunnybrook Health Sciences Centre, University of Toronto.

#### PRESENTATION

- Mistakes We All Make: Abdominal Imaging

**Connie Hapgood, BSc (Hons), MD, FRCPC**  
St. Clare's Hospital, Paradise, Newfoundland and Labrador, Canada

Dr. Connie Hapgood graduated in 1999 from Memorial University (MUN) with a BSc (Hons), and in 2003 from MUN Medical School. She completed her radiology residency training program at Memorial in 2008 and a breast imaging/body imaging fellowship in 2008/2009 at McMaster University. Currently working full time at St. Clare's Mercy Hospital in St. John's NL. Dr. Hapgood has a keen interest in medical education particularly in radiology simulation. She is actively involved in teaching at the medical school level and within the radiology residency program. She is on the radiology CARMS committee for Memorial's radiology program and on Memorial's medical school admissions committee.

#### MODERATOR

- JR Hot Seats

**Scott Harris, MD, FRCPC, ABR**  
Memorial University, St. John's,  
Newfoundland and Labrador, Canada



Dr. Harris has been a board member of the CAR for the last seven years. He is an Associate Professor in diagnostic radiology, with subspecialty training in cardiothoracic imaging, with Eastern Health and Memorial University of Newfoundland.

#### JUDGE

- Value of Radiology Research Projects

**Angus Hartery, MD, FRCPC**  
Memorial University, Paradise,  
Newfoundland and Labrador, Canada



Dr. Hartery is a practising radiologist and clinical assistant professor in the Discipline of Radiology at Memorial University. Dr. Hartery completed a fellowship in abdominal imaging at the University of Toronto University Health Network in 2011. He is currently Director of the Postgraduate Radiology Residency Program. His interests are postgraduate and undergraduate medical education, online education with interactivity to promote engagement, and online assessment with immediate feedback and statistical analysis. Dr. Hartery has previously received the Region 5 Mentor of the Year Award from the Royal College of Physicians and Surgeons of Canada. Dr. Hartery is very pleased to be participating at the CAR Annual Scientific Meeting.

#### MODERATOR

- SR Hot Seats

#### PRESENTATION

- Resident Case Review – Abdo X-ray Interpretation: Case-Based Session

#### PANELIST

- Saturday Image Interpretation Panel

# FACULTY I CORPS PROFESSORAL

## João Inácio, MD, FRCPC

University of Ottawa, Ottawa,  
Ontario, Canada



Dr. João Inácio is a radiologist at The Ottawa Hospital, Department of Medical Imaging, Chest, Cardiac and Emergency sections. He has also been an Assistant Professor of Radiology at The University of Ottawa since 2011. Born and raised in Lisbon, Portugal, Dr. Inácio graduated from medical school at the University of Lisbon (1993-1999). He completed his radiology residency at the Hospital de Santa Maria/University of Lisbon (2003-2008). He sub-specialized in chest radiology working with Dr. Paula Campos. He was an assistant professor of radiology at the University of Lisbon (2008-2009) and also completed a mini-fellowship with Dr. Paul Finn, Diagnostic Cardiovascular Section, Radiology Department, University of California at Los Angeles (2008). He also completed an emergency/trauma radiology clinical fellowship with Dr. Savvas Nicolaou and a cardiothoracic clinical fellowship with Dr. Nestor Muller and Dr. John Mayo, University of British Columbia, Vancouver General Hospital (2009-2011). Dr. Inácio received the American College of Radiology Cardiac CT Certificate of Advanced Proficiency (CoAP) in 2011 and is a Diplomate of the Certification Board of Cardiovascular Computed Tomography (CBCCT) (2011). His areas of interest include interstitial lung disease, chest intervention and CT myocardial perfusion.

### PANELIST

- Saturday Image Interpretation Panel

## Arlene Kanigan, MD, FRCPC

University of Alberta, Edmonton,  
Alberta, Canada



Dr. Arlene Kanigan is a pediatric radiologist at the Stollery Children's Hospital in Edmonton, Alberta. She is a partner with Medical Imaging Consultants. Dr. Kanigan is also the Program Director for the Diagnostic Radiology program at the University of Alberta.

### PANELIST

- How to Get a Job: Tips from Radiologists Who Have Done It!

## Valerie J. Keough, MD, FRCPC

Queen Elizabeth II Health Sciences Centre,  
Dalhousie University, Halifax,  
Nova Scotia, Canada



Dr. Valerie Keough is an Assistant Professor of Radiology at Dalhousie University and an abdominal radiologist at the QEII Health Sciences Centre in Halifax. Following a residency at Dalhousie University, Dr. Keough completed a fellowship in abdominal radiology at the University of Toronto. Dr. Keough has a special interest in hepatopancreaticobiliary and multiorgan transplantation imaging. In addition to clinical and teaching commitments, Dr. Keough is a past president of the Nova Scotia Association of Radiologists, an invited speaker and judge at CAR Annual Scientific Meetings, and prior CAR working group member.

### JUDGE

- Educational Exhibits

## Faisal Khosa, MD, MBA,

FFRRCSI, FRCPC

Vancouver General Hospital, Vancouver,  
British Columbia, Canada



Dr. Faisal Khosa is a radiologist at the Vancouver General Hospital, University of British Columbia. He is the recipient of the CAR/CRF Leadership scholarship in 2017. Dr. Khosa and his ER team received the Outstanding Support Award from the Vancouver General Hospital Trauma Program in 2016. Dr. Khosa has also received numerous educational, clinical service and research awards, including the American Roentgen Ray Scholarship (2013-16), the Outstanding Young Investigator Award (2015), and the One in One Hundred Mentor Award (2014). He received the Medal of Excellence ("Tamgha-i-Imtiaz") from the Government of Pakistan and The College of Physicians and Surgeons Award for 15 years of Outstanding Service to Medicine in Pakistan. Dr. Khosa is board-certified in radiology in the U.S., Canada and Europe. He completed an MBA with a major in leadership. His academic interests include mentoring, leadership and imaging in the acute care setting.

### JUDGE

- Radiologists-in-Training Research Projects

# FACULTY I CORPS PROFESSORAL

## Ania Kielar, MD, FRCPC

University of Ottawa/University of Toronto,  
Oro-Medonte, Ontario, Canada



Dr. Ania Z. Kielar completed her radiology training at the University of Ottawa, and abdominal radiology fellowship at the University of Michigan. She is associate professor at the University of Ottawa and adjunct professor at the University of Toronto. She is chair of Scientific and Educational Exhibits for CAR Annual Meeting and co-chairs LI-RADS Outreach and Education Group for the American College of Radiology. Her research interests include standardization and quality initiatives for decreasing medical errors.

### PRESENTATION

- First Trimester Obstetrical Emergencies Iceberg ahead!  
Looking below the surface

## Iain Kirkpatrick, B.Sc., B.Sc. (Med), M.D., FRCP(C), DABR, FSAR

University of Manitoba, Winnipeg,  
Manitoba, Canada



Dr. Iain Kirkpatrick is an Associate Professor of Diagnostic Imaging and Section Head of Abdominal Imaging at the University of Manitoba. He completed his residency at the University of Manitoba followed by a fellowship in abdominal imaging at Stanford University where he was an Adjunct Clinical Instructor until 2012. Dr. Kirkpatrick currently practices as the Director of CT, Radiography and Interventional Radiology at St. Boniface General Hospital in Winnipeg, specializing in both abdominal and non-invasive cardiovascular imaging. His research interests are diverse and include CT technology/protocols, CT of the bowel, and multimodality cardiac imaging.

### MODERATOR

- Thoracoabdominal CT in 2018

### PRESENTATION

- Dual Energy Thoracoabdominal CT in 2018

## Mario Kontolemos, MD CM, MSc, FRCPC

The Ottawa Hospital, University of Ottawa,  
Ottawa, Ontario, Canada



Originally from Montreal, Dr. Mario Kontolemos completed medical school training and a residency in radiology at McGill University in 2011, followed by a fellowship in diagnostic neuroradiology at the University of Ottawa, where he is practicing in a tertiary-care setting. His main clinical interests are stroke and CNS tumour imaging as well as head and neck imaging. In parallel, he maintains a strong passion for medical education with ongoing active involvement in the radiology resident training program in Ottawa.

### MODERATOR

- JR Hot Seats

## David Lautner, MD, FRCPC

University of Calgary, Calgary,  
Alberta, Canada



Dr. David Lautner is an Assistant Professor and Deputy Department Head of Diagnostic Imaging at the University of Calgary. He completed his residencies at the University of Calgary followed by a period of Echocardiography Training at the Mayo Clinic. Dr. Lautner currently practices as the Medical Site Director of Diagnostic Imaging at Foothills Hospital in Calgary, specializing in Diagnostic and Interventional Ultrasound. His special interests are diverse and include Neonatal Radiographic Imaging and Fetal Echocardiography.

### PANELIST

- Saturday Image Interpretation Panel

# FACULTY I CORPS PROFESSORAL

## Alexandre Le Bouthillier, PhD Imagia, Montreal, Quebec, Canada

Dr. Alexandre Le Bouthillier holds a PhD in Operations Research from the Université de Montréal and completed a post doctorate program at the University of Geneva. He is the co-founder of Planora (previously Omega Optimization). Dr. Le Bouthillier was VP Science & Technology at RedPrairie (now JDA Software) following the acquisition of Planora. He is cofounder of Imagia, an artificial intelligence driven company in the fight against cancer. He invests talent and capital in technological ventures. He has received scholarships and other academic awards from government research funding agencies, corporations and professional associations. His research and work interests include operations research, artificial intelligence (machine learning, deep learning), brain, finance, big data, cloud infrastructure & domotic.



### PANELIST

- CAR Hot Topics – AI in Canada: Investment, Implementation, and Regulation

## Lorraine LeGrand Westfall, MD, FRCSC, CSPQ, IAPP/C CMPA, Ottawa, Ontario, Canada

Originally from Montreal, Dr. Lorraine LeGrand Westfall received her medical degree from the Université de Montréal in 1981. From 1981 to 1982, she completed her internship in surgery at the University of Toronto and from 1982 to 1986 completed her residency in general surgery at the University of Ottawa. She practised general surgery from 1986 to 2006 at the Centre hospitalier des Vallées de l'Outaouais – Pavillon Gatineau, serving on many hospital committees, on council for the hospital from 1996 to 1999, and as chief of surgery from 1999 to 2003. She was a member of the Quebec Regional Advisory Committee of the Royal College of Physicians and Surgeons of Canada from 1995 to 2001. From 2003 to 2006, Dr. LeGrand Westfall was a member of council of the CMPA. Since joining the CMPA in 2006, she has given hundreds of educational and risk management presentations to Canadian physicians. In 2011, Dr. LeGrand Westfall was appointed Director of Regional Affairs and is responsible for managing relationships with governments, medical organizations, and other key stakeholders, with a primary focus in Quebec. Since January 2017, Dr. LeGrand Westfall is also Chief Privacy Officer at the Association and in this role, she is leading the CMPA on privacy matters.



### PRESENTATIONS

- Disclosure of Adverse Events in Radiology – The Right Thing To Do!
- Plenary Lecture: Artificial Intelligence and Medical Legal Issues

## Mark Levental, MD, CM, FRCPC Jewish General Hospital, McGill University, Montreal, Québec, Canada

Dr. Mark Levental completed his medical school training at McGill University, Montreal in 1988. He first did a residency in family medicine and thereafter a residency in diagnostic radiology at McGill University. In 1996, Dr. Levental completed an Abdominal Imaging fellowship at University of California at San Diego. He has been an examiner with the Royal College of Physicians of Canada since 2005. Dr. Levental has special interests in abdominal imaging as well as neuro/ENT imaging.



### MODERATOR

- Updates and Controversies in Emergency Radiology

### JUDGE

- Radiologists-in-Training Research Projects

## Caitlin McGregor, MD, FRCPC Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada

Dr. Caitlin McGregor was born in Fredericton, raised in Calgary, and completed her post secondary education in Ontario. Dr. McGregor is a practising radiologist in abdominal imaging, Head of the Ultrasound Department, and a member of the Quality Improvement Committee at Sunnybrook Health Sciences Centre. She earned an Honours Co-op Bachelor of Science in Biochemistry from the University of Waterloo and a medical degree from the University of Toronto. Dr. McGregor completed a residency in radiology at the University of Toronto, followed by a fellowship in abdominal imaging at Sunnybrook Health Sciences Centre.



### MODERATOR

- Mistakes We All Make

# FACULTY | CORPS PROFESSORAL

## Matthew McInnes, MD, FRCPC

University of Ottawa, Ottawa,  
Ontario, Canada



Dr. Matthew McInnes is an Associate Professor at the University of Ottawa and Director of the Diagnostic Radiology Residency Program. He is a radiologist at The Ottawa Hospital Department of Medical Imaging, Abdominal and Chest Radiology divisions, and a clinical investigator in The Ottawa Hospital Research Institute (OHRI) Clinical Epidemiology program. He is deputy editor for the Journal of Magnetic Resonance Imaging and associate editor for Radiology, both in the area of evidence-based practice. He completed radiology training at the University of Toronto in 2006, followed by a one-year clinical fellowship in abdominal imaging at the University of Toronto University Health Network. He holds a cross appointment in the School of Epidemiology, Public Health and Preventive Medicine at the University of Ottawa. Dr. McInnes' current areas of research interest are systematic reviews and diagnostic test accuracy in imaging.

### JUDGE

- Departmental Clinical Audit Projects

## Daniel Margolis, MD

Weill Cornell Medical College, New York,  
New York, USA



Dr. Daniel Margolis is a board-certified radiologist specializing in body imaging. He is Assistant Professor of Radiology at Weill Cornell Medical College and Assistant Attending Radiologist at New York Presbyterian Hospital-Weill Cornell Campus. Dr. Margolis is a graduate of University of California, Berkeley earning his A.B. in Biochemistry with honours in 1992. Dr. Margolis earned his medical degree from University of Southern California in 1998. Following a transitional internship year at Los Angeles VA Healthcare System, Dr. Margolis served as a resident in diagnostic radiology from 1999-2003 at David Geffen School of Medicine at UCLA. Dr. Margolis then completed a fellowship in Advanced Imaging at Stanford University Medical Center. While at UCLA, Dr. Margolis completed the K30 Graduate Training Program in translational investigation, and was principal investigator or co-principal investigator on numerous research projects. His primary focus was the use of MRI for the detection and characterization of prostate cancer, with over 50 publications in this field. He also serves as a member of the American College of Radiology Prostate Imaging Reporting and Data Systems committee, setting the standard for prostate MRI world-wide. He has given invited talks on prostate imaging on three continents and looks to continue his success collaborating with urologists, radiation oncologists, and medical oncologists to continue the fight against prostate cancer. In addition to prostate imaging, Dr. Margolis participated in research or clinical programs on pancreas cancer, liver disease, and inflammatory bowel disease, and was director for virtual colonography, a screening test for early colon cancer. Dr. Margolis was recruited to the full-time faculty of Weill Cornell Medical College and was appointed Assistant Professor of Radiology and Assistant Attending Radiology at the New York Presbyterian Hospital Weill-Cornell Campus in September 2016. Dr. Margolis is a member of several radiological societies listed below: American College of Radiology, Radiological Society of North America, International Society of Magnetic Resonance in Medicine, Society of Abdominal Radiology.

### PRESENTATION

- Prostate MRI and PIRADSV2 Practical Workshop

# FACULTY | CORPS PROFESSORAL

## William Miller, MD, FRCPC

The Ottawa Hospital, University of Ottawa,  
Ottawa, Ontario, Canada



Dr. William Miller is currently a practicing neuroradiologist at The Ottawa Hospital. He is an Assistant Professor at the University of Ottawa. He served as the acting Chief/Chair of Diagnostic Imaging at The Ottawa Hospital from September 2006 until October 2008. He is the Past-President of the Canadian Association of Radiologists. He serves as a member of the American College of Radiology Board of Chancellors. Dr. Miller graduated from the faculty of Medicine at the University of Manitoba. He completed a rotating Internship at McGill University in Montreal then went on to practice as a family physician for 13 years before returning to complete a four-year radiology residency at the University of Missouri. He completed his training with a two-year neuroradiology fellowship at the University of Toronto. He has practiced neuroradiology in Ottawa since 1999. Dr. Miller is a proud father, an avid photographer, golfer, and cottager.

### PRESENTATION

- Peer Review and Peer Learning

## James K. Min, MD, FSCCT

Dalio Institute of Cardiovascular Imaging,  
New York, New York, USA



James K. Min is Professor of Radiology and Medicine at Weill Cornell Medical College and the Director of the Dalio Institute of Cardiovascular Imaging (ICI) at New York-Presbyterian/Weill Cornell Medical Center. He is a board-certified cardiologist with a clinical focus on cardiovascular imaging and cardiovascular disease prevention. Min received his BA from the University of Chicago, and his medical degree from Temple University Medical School. He completed his internship, residency and cardiovascular medicine fellowship at the University of Chicago Hospitals.

### PRESENTATIONS

- Plenary Lecture: What Defines Better? Machine Learning in Medical Imaging
- Cardiac: Recommender Systems for Cardiovascular Disease Research

## Rakesh Mohankumar, MD, MRCS, FRCR, FRCPC

Toronto Joint Department of Medical Imaging, Toronto,  
Ontario, Canada

Dr. Rakesh Mohankumar is an Assistant Professor of Medical Imaging at University of Toronto and Musculoskeletal Radiologist at Joint Department of Medical Imaging (Mount Sinai Hospital, University Health Network and Women's College Hospital). Dr. Mohankumar completed his residency in radiology from University of Manchester, UK and undertook a fellowship in musculoskeletal radiology at University of Toronto. His main areas of research are bone and soft tissue sarcoma imaging, bone imaging of Gaucher disease, and development of WIPS MRI sequences in musculoskeletal imaging. He is the division lead for quality control initiatives within the musculoskeletal division including audit projects and peer review process.

### PRESENTATION

- Outpatient Musculoskeletal Ultrasound

## Nick Neuheimer, MEd

Canadian Association of Radiologists,  
Ottawa, Ontario, Canada



Nick Neuheimer is the CEO of the Canadian Association of Radiologists. He was instrumental in the development of the Value of Radiology in Canada report, published by the Conference Board of Canada, which examined how radiologists and medical imaging have added value to the healthcare system, improved patient care, and driven cost savings.

### JUDGE

- Value of Radiology Research Projects

# FACULTY I CORPS PROFESSORAL

## **Elsie T. Nguyen, MD, FRCPC** University of Toronto, Toronto, Ontario, Canada

Dr. Elsie Nguyen is an Assistant Professor of cardiothoracic imaging at the Peter Munk Cardiac Centre, Toronto General Hospital, University of Toronto. She is passionate about undergraduate, post-graduate and inter-professional education and has won several teaching awards. Dr. Nguyen is Director of Undergraduate Medical Education for Medical Imaging at the University of Toronto and has collaborated with undergraduate education leads across Canada to establish a medical student radiology curriculum. Her research interests include optimization techniques for cardiac CT, myocardial iron overload MR imaging and pre-surgical lung nodule localization techniques.

### PRESENTATION

- Contrast Considerations in Thoracoabdominal CT in 2018



## **Savvas Nicolaou, MD, FRCPC** Vancouver General Hospital / University of British Columbia, Vancouver, British Columbia, Canada

Dr. Savvas Nicolaou is the Director of Emergency and Trauma Imaging at Vancouver General Hospital, as well as a Professor of Radiology at the University of British Columbia. He is also the Vice Chair of Undergraduate Education and Continuous Professional Development. He completed his medical degree at the University of Toronto, and residency in diagnostic radiology at University of British Columbia. Dr. Nicolaou has been actively involved in teaching medical students, residents, and fellows and has served as a mentor for many of them. At the Faculty of Medicine, he has been involved as the Director of the Undergraduate Radiology Education, where he has helped to integrate radiology into the medical curriculum. He has been the recipient of many teaching awards and was recently presented with the UBC Killam Teaching Prize in 2013, which recognizes all aspects of outstanding teaching at both the undergraduate and graduate levels. Dr. Nicolaou continues to contribute to the field of emergency radiology, publishing over 150 articles and over 400 abstracts in peer-reviewed journals. Using state-of-the-art imaging technology, he is investigating ways to develop faster, safer, and more sensitive methods for diagnosing patients in the acute care setting. Major focus of research is on ultra low-dose techniques in the acute setting, dual energy CT in the acute setting, polytrauma imaging, brain perfusion in trauma and role of MRI in the acute setting.

### PRESENTATION

- Pearls and Pitfalls of Cervical Spine Imaging



## **Michael O'Keeffe, MD** University of Toronto, Toronto, Ontario, Canada

Dr. Michael O'Keeffe is an Assistant Professor of ER/Trauma Imaging at the University of Toronto. He is a radiologist at Sunnybrook Health Sciences Centre.

### PRESENTATION

- Mistake We All Make: Emergency Radiology

## **Michael N. Patlas, MD, FRCPC, FSAR** McMaster University, Hamilton, Ontario, Canada

Dr. Michael N. Patlas is Professor of Radiology and Emergency/Trauma Division Chief at the McMaster University, Hamilton. His main research interests include imaging of traumatic and non-traumatic abdominal emergencies. He has authored over 165 peer-reviewed papers, chapters and abstracts. His first book, MDCT and MR imaging of acute abdomen: new technologies and emerging issues, will be published by Springer in early 2018.

### MODERATOR

- Updates and Controversies in Emergency Radiology

### PRESENTATION

- Controversies in Abdominal Trauma



## **Christopher Pal, PhD** Polytechnique Montréal, Montreal, Quebec, Canada

Dr. Christopher Pal is an Associate Professor in the Department of Computer Engineering at the Polytechnique Montréal. He obtained his doctorate from the University of Waterloo. His areas of expertise are in artificial intelligence, computer vision, intelligent systems applications, pattern analysis and machine intelligence. Dr. Pal is a founding member of Montreal Institute of Learning Algorithms.

### PRESENTATIONS

- AI for Radiologists: A Primer
- Neural Networks and Deep Learning for Radiologists: How Does It Work?



# FACULTY I CORPS PROFESSORAL

## Emily Pang, MD

Vancouver General Hospital, Vancouver, British Columbia, Canada



Dr. Emily Pang is an abdominal radiologist at the Vancouver General Hospital. She completed a residency in radiology at the University of Toronto and a fellowship in abdominal imaging at the Vancouver General Hospital.

### JUDGE

- Scientific Research Projects

## Stephany Pritchett, MD, FRCPC

London Health Sciences Centre, London, Ontario, Canada



Dr. Stephany Pritchett is an Assistant Professor of Radiology at the London Health Sciences Centre – University Hospital, where she specializes in musculoskeletal imaging.

### PRESENTATION

- Resident Case Review – MSK X-Ray Interpretation: Case-Based Session

## Linda Probyn, MD, FRCPC

University of Toronto, Toronto, Ontario, Canada



Dr. Linda Probyn is an Associate Professor and Musculoskeletal Radiologist at the University of Toronto. She is the past Program Director and now the Vice-Chair of Education for the Department of Medical Imaging. She has interests in ultrasound, sports injuries, trauma, osteoporosis and arthritis as well as teaching and education including the use of ultrasound simulation. She has published several scholarly projects and presents her work and teaches at many national and international conferences.

### PRESENTATION

- Online Emergency Radiology Simulation

## Francesca Proulx, MD CM, FRCPC, DABR

McGill University, Montreal, Quebec, Canada



Dr. Francesca Proulx is an Assistant Professor with the Radiology Residency Program at McGill University, and Chief of the Breast Centre at the Jewish General Hospital. She completed medical school training and a residency at McGill University. She completed a fellowship in women's imaging at the Beth Israel Deaconess Medical Center, Harvard Medical School in Boston, and in thoracic imaging at the Centre hospitalier de l'Université de Montréal (CHUM). Dr. Proulx's clinical and research interests include women's and thoracic imaging, 3D tomosynthesis, breast MRI and breast imaging education.

### JUDGE

- Scientific Research Projects

## Vijay M. Rao, MD

Thomas Jefferson University, Philadelphia, Pennsylvania, USA



Vijay M. Rao, M.D., is president of the Radiological Society of North America (RSNA). A global authority on head and neck imaging, and also recognized for her health services research in radiology, Dr. Rao is the David C. Levin Professor and Chair of Radiology at Sidney Kimmel Medical College of Thomas Jefferson University and senior vice president and chair of Enterprise Radiology and Imaging at Jefferson Health in Philadelphia. As president, Dr. Rao works to emphasize the significant role radiology has in transforming health care delivery in the digital age. The RSNA is well positioned to support innovative initiatives that embrace the power of emerging technologies to drive excellence in patient care in the value-driven era of healthcare. Dr. Rao has held many leadership roles in national organizations, including president of the American Society of Head and Neck Radiology, the Association of Program Directors in Radiology (APDR) and the American Association for Women Radiologists (AAWR). She has served the RSNA Research & Education (R&E) Foundation in a number of roles, including member of the Board of Trustees from 2008 to 2011, and in 2016. In 2011, she was named to the RSNA Board of Directors. In 2017, she served as president-elect of RSNA. She is also a member of the board of the Academy for Radiology & Biomedical Imaging Research and the Pennsylvania Radiologic Society. She has served on the editorial boards of multiple prestigious radiology journals.

### PANELIST

- CAR Hot Topics – AI in Canada: Investment, Implementation, and Regulation

# FACULTY I CORPS PROFESSORAL

## Demetrios Raptis, MD

Mallinckrodt Institute of Radiology, St. Louis, Missouri, USA



Dr. Demetrios (Jim) Raptis is an Assistant Professor in the abdominal imaging and cardiothoracic imaging sections at the Mallinckrodt Institute of Radiology at Washington University School of Medicine in St. Louis. He received his medical degree from the Case Western Reserve School of Medicine and completed residency at Mallinckrodt. He is fellowship trained in cardiothoracic imaging, having completed fellowship at Mallinckrodt. Specific interests include cardiac imaging and cardiovascular imaging in the emergency setting.

### PRESENTATION

- Computed Tomographic Imaging of Acute Pulmonary Embolism

## Tony Sedlic, MD, FRCPC

University of British Columbia, Vancouver, British Columbia, Canada

Dr. Tony Sedlic is a Clinical Instructor in the Department of Radiology at the University of British Columbia. He is a diagnostic radiologist at Vancouver General Hospital, where he specializes in chest radiology.

### PRESENTATION

- Resident Case Review – Chest X-ray Interpretation: Case-Based Session

### PANELIST

- How to Get a Job: Tips from Radiologists Who Have Done It!

## Lisa Smyth, BSc, MD, FRCPC, ABR

St. Clare's Mercy Hospital, St. John's, Newfoundland and Labrador, Canada



Dr. Lisa Smyth is a diagnostic radiologist at St. Clare's Mercy Hospital and practices general radiology, with subspecialties in thoracic and breast imaging, being the Chief of service of Thoracic Imaging. She completed a fellowship at The Ottawa Hospital, University of Ottawa. With a keen interest in imaging-guided procedures, Dr. Smyth teaches at the Memorial University Medical School, as well as in the Diagnostic Radiology residency program.

### MODERATOR

- SR Hot Seats

### PANELIST

- How to Get a Job: Tips from Radiologists Who Have Done It!

## Ronald M. Summers, MD, PhD

NIH Clinical Center, Bethesda, Maryland, USA



Dr. Ronald M. Summers is a tenured Senior Investigator and Staff Radiologist at the National Institutes of Health (NIH) Clinical Center in Bethesda, Maryland. His clinical areas of specialty are thoracic and abdominal radiology. His research interests include deep learning, virtual colonoscopy, computer-aided diagnosis and development of large radiologic image databases. He has co-authored over 400 journal, review and conference proceedings articles and is a co-inventor on 14 patents.

### PRESENTATION

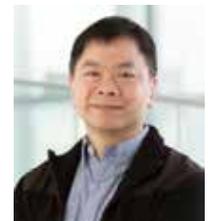
- Opening Lecture: The Impact of Deep Learning and Artificial Intelligence on Radiology

### PRESENTATION

- Artificial Intelligence in Abdominal Radiology

## Roger Tam, PhD

University of British Columbia, Vancouver, British Columbia, Canada



Dr. Roger Tam obtained his PhD in 2004 from the University of British Columbia (UBC), with a thesis in the area of computational shape modelling and visualization. From 2004 to 2007, he was a Research Associate in the Division of Neurology at UBC. Since 2007, he has been a faculty member in the Department of Radiology, UBC. His research interests revolve around image analysis, machine learning, and precision medicine.

### PRESENTATION

- Neuro: Deep Learning of Brain MRIs and Its Application to Neurodegenerative Diseases

**An Tang, MD, MSc, FRCPC**  
Université de Montréal, Montreal,  
Quebec, Canada



Dr. An Tang is an Associate Professor of Radiology at the Université de Montréal. He earned a specialty degree in radiology at the Université de Montréal in 2005 and completed a fellowship in abdominal imaging at the University of Toronto in 2006. That same year, Dr. Tang joined the team of radiologists at the Centre hospitalier de l'Université de Montréal (CHUM). Supported by fellowship awards from the Fulbright Program and the Canadian Institutes of Health Research, he completed a research fellowship in liver magnetic resonance imaging at the University of California, San Diego in 2011–12. He currently has active research funding from the Canadian Institutes of Health Research and MedTEQ. His current research interest is focused on imaging biomarkers of chronic liver disease and detection of liver cancer using artificial intelligence techniques.

**MODERATOR**

- AI: Primer
- CAR Hot Topics: AI in Canada: Investment, Implementation, and Regulation

**PRESENTATION**

- AI: What This Means for Our Profession

**Carlos H. Torres, MD, FRCPC**  
University of Ottawa, Ottawa,  
Ontario, Canada



Dr. Carlos Torres has been an Associate Professor of Radiology at the University of Ottawa Faculty of Medicine and a staff neuroradiologist at The Ottawa Hospital since 2008. Before joining the University of Ottawa and the Department of Diagnostic Imaging at The Ottawa Hospital in Ottawa, Canada, Dr. Torres completed a two-year neuroradiology fellowship at McGill University in Montreal.

Dr. Torres was until recently the Director of the Royal College Accredited Neuroradiology Fellowship Program, position he held since 2010. He has been the Director and Co-Director of multiple CME Courses in Europe, North America and Latin America and he is currently the Chair of the International Scientific Committee for the Ibero Latin American Society of Neuroradiology (SILAN). Dr. Torres has given more than 200 national and international invited lectures and has been invited to speak at the RSNA, ARRS, ASNR, ASSR, ASER, CAR and ENRS meetings. He is an International Visiting Professor for RSNA and for the Inter American College of Radiology (CIR). He has been Visiting Professor in different academic centres in Canada and

abroad. Dr. Torres is actively involved in medical education and research; his main areas of interest are demyelinating disease, brachial plexus, cord and tumor imaging. He has multiple peer-reviewed publications and has written 13 book chapters. He is Associate Editor of the journal *3D Printing in Medicine* and a member of the Editorial Board of the *RSNA Daily Bulletin*.

He has received numerous departmental, national and international awards for his teaching and research including undergrad teacher of the year award, fellow teacher of the year award, staff teacher of the year award and most recently the 2017 RSNA Honored Educator Award. In addition, Dr. Torres has been honoured with three international awards this summer. He received the National Order of Merit Award in the Rank of Officer from the Republic of Colombia for his scientific contributions in the field of Diagnostic Neuroradiology in Canada. He was appointed in June as Distinguished Professor of Radiology at Henan Provincial People's Hospital, Zhengzhou University in China, in recognition for his contribution to the hospital's Radiology Training Program, for his teaching as a Visiting Professor and for his participation in the Chinese Society of Radiology. And most recently he received the 2018 Anne G. Osborn ASNR Outreach Professor Award to represent the American Society of Neuroradiology in Myanmar.

**PRESENTATION**

- Unusual Cerebral Embolism

**PANELIST**

- Saturday Image Interpretation Panel

**Nancy Wadden, MD, FRCPC**  
Eastern Health, St. John's, Newfoundland  
and Labrador, Canada



Dr. Nancy Wadden is the Medical Director of the Breast Screening Program for Newfoundland and Labrador and Labrador and Clinical Associate Professor in the Faculty of Medicine at Memorial University of Newfoundland. Dr. Wadden is the chair of the Mammography Accreditation Program Staff Working Group and a member of the Standards in Breast Imaging in Canada for the CAR. She continues to be involved with The Canadian Society of Breast Imaging, The Canadian Breast Cancer Screening Initiative and The Working Group of the Canadian Mammography Quality Standards. She serves on several other provincial and national committees dealing with Diagnostic Imaging, Breast Screening and Breast Cancer.

**PRESENTATION**

- Mistakes We All Make: Breast Imaging

# FACULTY I CORPS PROFESSORAL

## Darcy J. Wolfman, MD

Johns Hopkins University, Washington, DC, USA



Dr. Darcy J. Wolfman is Section Chief of Genitourinary Imaging at the American Institute for Radiologic Pathology and Clinical Associate at Johns Hopkins School of Medicine in Washington, DC. She completed her diagnostic radiology residency at Ochsner Clinic in New Orleans, LA and abdominal imaging fellowship at Johns Hopkins University in Baltimore, MD. Dr. Wolfman serves on multiple national committees including the American College of Radiology Human Resources Commission and Ultrasound Committee for the American Board of Radiology. She also serves as a journal reviewer for multiple journals including American Journal of Roentology and Radiographics. In 2015, Dr. Wolfman was elected as a fellow of the Society of Radiologists in Ultrasound. Dr. Wolfman's area of clinical expertise is abdominal imaging including CT, MR and Ultrasound.

### PRESENTATIONS

- Plenary Lecture: Endometrial Imaging
- Practical Approach to Adnexal Masses

## Vivek Virmani, MD, DABR

Dr. Everett Chalmers Regional Hospital (DECH), Fredericton, New Brunswick, Canada



Dr. Vivek Virmani is a consultant radiologist at Dr. Everett Chalmers Regional Hospital (DECH). He completed fellowships in abdominal imaging and emergency radiology in Ottawa. He has an active interest in teaching and research, with more than fifty publications in peer-reviewed journals.

### JUDGE

- Scientific Research Projects

## Charlotte Yong-Hing, MD

University of British Columbia, Vancouver, British Columbia, Canada



Dr. Charlotte Yong-Hing is Co-Director of Breast Imaging at BC Cancer and Clinical Assistant Professor of Radiology at UBC. She has held executive positions for the BC Radiological Society since 2014 and has been Medical Practice Lead, General Radiography, for Lower Mainland Medical Imaging since 2012.

### JUDGE

- Value of Radiology Research Projects

## Daniel Zikovitz, PhD

GE Healthcare, Toronto, Ontario, Canada

Dr. Daniel Zikovitz is the Senior Solution Architect at GE Healthcare, where he is a digital evangelist, subject matter expert, and technology leader within the Canadian healthcare market. He works with cross-functional teams to influence and collaborate on providing leadership to development, design, and system deployment as per the defined architecture. Dr. Zikovitz also sits on the Ontario Brain Institute's Brain-CODE Analytics Advisory Committee. He completed his PhD in Technology & Life Sciences at York University in 2005.

### PRESENTATION

- Vendor Usage Scenarios and Demos

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À noter à votre agenda

# CAR 2019

April 11-14, 2019 | du 11 au 14 avril 2019  
Le Centre Sheraton | Montréal



Canadian Association of Radiologists  
L'Association canadienne des radiologistes

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