AIMed
CARDIOLOGY

The World's Leading Events on Artificial Intelligence in Medicine and Healthcare

17-18 JUNE 2019
RITZ CARLTON CHICAGO

PRELIMINARY AGENDA

7:30 - 8:45

AI in Medicine Primer

Dr. Anthony Chang *Children's Hospital of Orange County (CHOC)*
Founder AIMed, Chief Artificial Intelligence Officer

In this workshop, basic principles and current applications of data science and AI in medicine and healthcare will be presented. The following topics will be covered:

- Why AI in medicine and why now?
- Brief history of AI: From Turing to Jeopardy!
- Brief history of AI in medicine: From expert systems to deep learning
- Data in biomedicine and healthcare: A conundrum
- The data to intelligence hierarchy: A continuum
- AI and definitions: Assisted, augmented, and autonomous AI
- Machine learning: Supervised vs unsupervised learning
- Deep learning: Convoluted neural networks and more
- Natural language processing and cognitive computing:
- Applications and misconceptions of AI in medicine: The end of physicians?

8:45 - 09:00

Break

09:00 - 10:00

Session 1 - The View from the Top

Thierry Mesana *University of Ottawa Heart Institute*
President and CEO, Gordon Henderson Leadership Chair and Valve Surgery Research Chair

Large cardiac programs need to develop AI projects to support clinical decisions of the Heart Teams. AI and predictive analytics are needed to adapt to the changing clinical and financial environment. AI can also bring inovation solutions for follow-up chronically ill patients through hub-and-spoke models or at directly at home, through virtual home-based consultations, in order to reduce hospital readmissions. Healthcare leaders need to be sharing more "deep thinking" to redesign cardiac care that matters to their patients.

John Rumsfeld *American College Cardiology & University of Colorado School of Medicine*
Chief Innovation Officer and Professor of Medicine
There is a tremendous amount of investment in, and hype surrounding artificial intelligence (AI) in healthcare, including a lot of focus on cardiovascular (CV) care. Yet, to date, very little of this has translated in to changes in the way CV care is delivered. This brief talk will delve in to the current landscape of AI in relation to CV care, including various reasons why AI has not - at least yet - disrupted CV care. Emphasis will be placed on the evidence base and some methodologic issues. Then, potential areas to successfully apply AI to improve CV care and outcomes will be explored. Finally, current efforts to advance evidence-based implementation of AI in CV care by the American College of Cardiology will be presented.

10:00 - 10:30   **Break**

10:30 - 11.30   **Session II**
Cardiovascular imaging, Cognititive Computing and Natural Language Processing.

Partho Sengupta *WVU Heart & Vascular Institute*
Chief, Division of Cardiology, Director, Cardiovascular Imaging; Professor of Medicine
Numerous advances in cardiovascular imaging technology paralleled by simultaneous growth in wearable technology, mobile health devices, and electronic medical record integration encouraged increasingly complex and large multi-dimensional data acquisition. The massive influx of data with each scan is exponentially rising in all cardiovascular imaging modalities and will exceed the capabilities of current statistical software. The current model of clinical care with diagnostic data acquisition and interpretation have led to a number of issues in timing, efficiency, and inaccuracies in diagnosis. This presentation will discuss pragmatic steps towards technology enabled care using artificial intelligence that will allowing cardiologists to explore new opportunities and unravel new discoveries. The steps towards rapid precision phenotyping will eventually surpass conventional approaches for enhancing patient care and open new gateways in medical decision making.
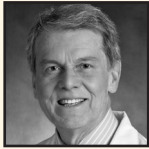
Joao Lima *John Hopkins Medicine*
Prof of Medicine, Radiology and Epidemiology John Hopkins

Pending

David E. Albert *AliveCor*
Founder & Chief Medical Officer at AliveCor
Can the latest implementation of AI, Deep Neural Networks, find patterns in the electrocardiogram (ECG) which have never been recognized and turn those into important clinical applications? My talk will cover exactly that idea. Using millions of 12-lead ECGs and associated clinical data, critical clinical situations such as Hyperkalemia, Low Ejection Fraction, and future Atrial Fibrillation can be identified. The tool that enables this magic is Machine Learning using Deep Neural Networks. I will cover the work being done by my company, AliveCor, in collaboration with our partner, the Mayo Clinic in developing these exciting new clinical applications of AI in Cardiology

Jai Nahar *George Washington School of Medicine*
Associate Prof of Pediatrics
With the advancements in Natural language processing, Conversational AI and
Virtual Voice Assistants are gaining increasing attention for developing provider,
patient and enterprise facing solutions.
This talk will focus on Conversational AI, Virtual voice assistants, their potential
uses in augmenting cardiovascular care, and challenges in their adoption.

11:30 - 13.00   Lunch

13:00 - 14.00   Session III
Essential Issues in AI in Medicine: From Bias to Regulatory Issues.

Sara Gerke *Harvard Law School*
Artificial Intelligence, and Law, Petrie-Flom Center
My presentation focuses on selected ethical and legal challenges of AI in cardiology.
Despite its vast potential to transform the field of cardiology for the better, AI also
raises ethical and legal challenges. I will begin by giving a brief overview and examples
of the potential of AI in cardiology to improve diagnosis and treatment across a wide
spectrum of cardiovascular conditions. I will then focus on three primary ethical
challenges in cardiology, discussing (1) informed consent to use, (2) algorithmic fairness
and biases, and (3) data privacy. This will be followed by an analysis of three legal challenges
in the US and Europe, namely (1) safety and effectiveness, (2) liability, and (3) cybersecurity.
Though highly promising, stakeholders, especially clinicians, patients, and AI makers,
must remain attuned to the ethical and legal challenges.

Kathy J Jenkins *Boston Children's Hospital*
Professor of Pediatrics, Senior Associate in Cardiology, Executive Director,
Center for Applied Pediatric Quality Analytics
Closing in on Real-Time Implementation
Medical care happens within a complex system, and system factors affect the quality of care
provided. While we can understand this conceptually, the system of care is poorly understood,
usually in hindsight. AI is a powerful tool to manage complexity, and offers the potential to
examine the care delivery system in its entirety, and the promise of new insight. This talk will
discuss this concept in more detail, and give several examples of current cardiology projects
using machine learning, natural language processing and predictive analytics at the system
level, moving ever closer to the elusive goal of active surveillance and real-time intervention.

14:00 - 14:30   **Break**

14:30 - 15.30   **Application**
Cardiology Cases and Discussion Language Processing.

Dr. Rajesh Dash *Stanford University*
*Assistant Professor of Cardiovascular Medicine & Preventive Cardiologist*
I will present the problem of poor adherence to medical guidelines, the impact it has on disease burden/mortality, and why a population/point of care hybrid solution can help solve the problem. Specifically, I will relate that over 50% of the patients in my preventive cardiology clinic were lacking guideline-based treatments when we first saw them. I'll then highlight the fact that this also is the case in virtually every other medical specialty. I'll then emphasize the importance of creating a platform (e.g. CLINT) that automates the mapping of patient data to appropriate guidelines and best practices, and how that platform scales elegantly to be used at a population level.

Devyani Chowdhury *Clinic for Special Children*
Director, Cardiology Care for Children
Patient experience: Patient experience transformation using predictive machine learning model. The predictive model identifies negative patient experience, allowing for pro-active pre-emptive intervention. It is a real time tool to improve patient experience.
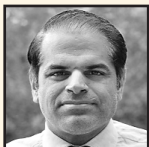
Dr. Babr Hasan *Children's Hospital at AKU*
Associate Professor, Department of Paediatrics and Child Health
Fetal echo: Predictive modeling based on 6 fetal echo dopplers for perinatal mortality and morbidity. The goal is to predict the compromised fetus. We have data on 700 patients and have done predictive modeling

David M. Axelrod *Stanford School of Medicine*
David Axelrod MD, Clinical Associate Professor, Pediatrics (Cardiology)
Virtual and augmented reality (often referred to as "extended reality" or XR when combined) aren't really new technologies — they've just recently hit the mainstream and become accessible to gamers and physicians alike. VR & AR experiences have been developed for clinical care, education, and research, and enthusiasm for these new technologies has highlighted the promise for a quantum leap in cardiovascular care. Using congenital heart disease as a springboard to discuss VR, AR, and immersive technologies in general, we will learn about the current programs in development, the important infrastructure required to create and maintain these clinical and educational programs, and the possibilities for future research with extended realities as a potent research tool. Challenges and limitations of the current and future development of extended reality technologies

will be discussed; the hype cycle in tech will be acknowledged with a specific focus on VR and AR in medicine. In summary, we will aim to balance the Silicon Valley mantra—"Disruption!"— with the bumper sticker slogan from the same technologic hub: "Please God, just one more bubble!"

15:30 - 16.00   **Break**

16:00 - 17.00   **Demonstration**
Interactive product demonstrations.

Open Forum
AI in Medicine for Cardiology
Current State of the Art and How to Get Started and Future

G. Hamilton Baker *Medical University of South Carolina*
Pediatric Cardiology
Machine learning/data analytics models are becoming more prominent in the clinical workflow. There are an exploding number of vendors with variable proven ROI. The most important question for decision makers in cardiovascular centers is how do we find the right AI tools and maximize ROI. This talk will present a thought-provoking methodology for answering this question, covering the relevant issues such as internal development of AI tools versus off-the-shelf solutions; strategies for clinical implementation - gauging effectiveness, consistency and identifying potential bias in ML algorithms. More importantly, developing an AI vision for your cardiovascular center which lays out an organized, proactive approach to AI implementation. This is essential to leveraging AI tools to improve patient care, empower providers and enhance value in a manner that keeps ethics, diversity and inclusion at the forefront.

Adjourn

Tuesday 18th June

07:30 - 08.45	**Workshop** **Introduction to Machine/Deep Learning and Convoluted Neural Network (CNN)**
08:45 - 09:00	**Break**
09:00 - 10:00	**Application** **Cardiology Imaging Cases and Discussion**
10:00 - 10:30	**Break**
10:30 - 11:30	**Demonstration I** **Data Science in Medical Imaging** **(Live Programming)**
11:30 - 13:00	**Lunch**
13:00 - 14:00	**Demonstration II** **Data Science in Medical Imaging** **(Live Programming)**
14:00 - 14:30	**Break**
14:30 - 15:30	**Application** **Radiology Imaging Cases and Discussion**
15:30 - 16:00	**Break**
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