

Sponsors: National Institutes of Health (NIH)/Radiological Society of North America (RSNA)/American College of Radiology (ACR)/Academy for Radiology & Biomedical Imaging Research (The Academy)

Artificial Intelligence (AI) in Medical Imaging Workshop

AGENDA

Thursday, August 23rd

8:30 AM – 4:40 PM

Reception (5:00PM – 6:00 PM)

OPENING & INTRODUCTION

8:30–9:45 AM SESSION A: AN OVERVIEW OF AI in MEDICAL IMAGING (75 minutes)

Session Chair: Kris Kandarpa

Co-Chair & Scribe: Curt Langlotz

1. Welcome from NIH and other program sponsors (Kris Kandarpa, National Institute of Biomedical Imaging and Bioengineering [NIBIB]; Curt Langlotz, Stanford; Bibb Allen, ACR)
2. AI in medical imaging: challenges and opportunities (Keith Dreyer, Harvard)
3. Current status and needs of research laboratories for AI in medical imaging (Curt Langlotz, Stanford)
4. Panel discussion Q&A: to include Jayashree Kalpathy-Cramer

9:45–10:00 AM BREAK (15 min)

BLOCK 1: FOUNDATIONAL RESEARCH IN MACHINE LEARNING

10:00–11:10 AM SESSION B: GAPS IN FOUNDATIONAL RESEARCH IN MACHINE LEARNING (70 min)

Session Chair: Brad Erickson

Co-Chair & Scribe: Jayashree Kalpathy-Cramer

1. Core infrastructure needs for machine learning research (Bradley Erickson, Mayo Clinic)
2. Advanced architectures for deep learning models (Jayashree Kalpathy-Cramer, Harvard)
3. Labeling and annotation methods for clinical images (Matt Lungren, Stanford)
4. Illustration and explanation methods for machine learning models (Shamim Nemati, Emory)
5. Panel discussion Q&A: next steps in AI/machine learning research

11:10–11:25 AM BREAK (15 min)

11:25 AM–12:30 PM SESSION C: DATA NEEDS FOR MACHINE LEARNING IN CLINICAL IMAGING (65 min)

Session Chair: Adam Flanders

Co-Chair & Scribe: Tessa Cook

1. Large, public, multimodal-image data sets for machine learning (Ge Wang, RPI)
2. Methods and standards for patient-mediated data sharing (David Mendelson, Mt. Sinai)
3. Clinical structured data capture for a learning health system (Tessa Cook, University of Pennsylvania)
4. Commercial data aggregation and sharing (Keith Bigelow, GE Healthcare)
5. Panel discussion Q&A: gaps in data availability for machine learning research

12:30–1:30 PM LUNCH (60 min)

BLOCK 2: TRANSLATIONAL RESEARCH IN MACHINE LEARNING

1:30–2:55 PM SESSION D: EXAMPLES OF MACHINE LEARNING IN THE IMAGING LIFE CYCLE (85 min)

Session Chair: Ge Wang

Co-Chair & Scribe: Matt Lungren

1. Image reconstruction and enhancement (Ge Wang, RPI)
2. Imaging quality control (David Larson, Stanford)
3. Image triage (Paras Lakhani, Jefferson)
4. Detection (Luciano Prevedello, Ohio State University)
5. Classification (Matt Lungren, Stanford)
6. Radiogenomics (Bradley Erickson, Mayo Clinic)
7. Panel discussion and Q&A: optimizing the imaging life cycle

2:55–3:10 PM BREAK (15 min)

3:10–4:40 PM SESSION E: ARTIFICIAL INTELLIGENCE IMPLEMENTATION ISSUES: THE LAST MILE (90 min)

Session Chair: Bibb Allen

Session Co-Chair & Scribe: Keith Dreyer

1. AI implementation challenges: data science to clinical practice (Bibb Allen, ACR)
2. Review and evaluation of AI algorithms for clinical practice (Nicholas Petrick, U.S. Food and Drug Administration [FDA])
3. Monitoring AI algorithm effectiveness in clinical practice: AI registries (Greg Pappas, FDA, National Institute of Standards and Technology [NIST])
4. AI registries (Judy Burleson, ACR National Radiology Data Registry [NRDR])
5. Industry perspective on deploying clinical AI tools (Kevin Lyman, Enlitic)
6. Use case development: implementation pathways for AI algorithms (Keith Dreyer, Harvard)
7. Panel discussion

5:00–6:00 PM RECEPTION

Friday, August 24, 2018

8:30 AM–10:00 AM (open session)

10:15–11:45 AM (closed session)

11:45 AM–1:00 PM (open session)

BLOCK 3: A VIEW TO THE FUTURE

8:30–10:00 AM SESSION F: THE HUMAN-MACHINE SYSTEM (90 min)

Session Chair: Steve Seltzer

Session Co-Chair & Scribe: Tarik Alkasab

1. The diagnostic cockpit (Steve Seltzer, Harvard)
2. Guidelines for a standardized data management framework (Robert Hanisch, NIST)
3. Common data elements for discrete data capture (Tarik Alkasab, Harvard)
4. Content-based image retrieval in geographically distributed systems; (Sameer Antani, National Library of Medicine [NLM])
5. Human-computer interaction (Ronald Summers, NIH-Clinical Center)
6. The NSF/NIH Smart Connected Health Initiative (Wendy Nilsen, National Science Foundation [NSF])
7. Discussion and Q&A (Steve Seltzer/Tarik Alkasab, Harvard)

10:00–10:15 AM BREAK (15 min)

BLOCK 4: BREAKOUT SESSIONS

10:15–11:45 AM PARALLEL SESSIONS (90 min)

1. Gaps in foundational machine learning research (Session B: Bradley Erickson, Mayo Clinic; Jayashree Kalpathy-Cramer, Harvard)
2. Machine learning data needs (Sessions C&D: Adam Flanders, Thomas Jefferson University; Tessa Cook, University of Pennsylvania)
3. Artificial intelligence implementation challenges (Sessions E&F: Bibb Allen, ACR; Tarik Alkasab, Harvard)

11:45 AM–1:00 PM INVITEE BREAKOUT GROUP REPORT OUT (75 min)

1. Group 1 report out (Powerpoint Summary)
2. Group 2 report out (Powerpoint Summary)
3. Group 3 report out (Powerpoint Summary)
4. Discussion
5. White paper writing group go-forward plan

1:00 PM ADJOURN