

The Wizardry of Artificial Intelligence

AI and Machine Learning
in Cancer Imaging

Free registration

www.icimagingociety.org.uk

17 & 18 May, 2019

Champalimaud Foundation

Lisbon, Portugal

Organisation:



**Champalimaud
Foundation**

17 - 18 May
2019
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Dear colleagues and friends,

On behalf of the Champalimaud Foundation and the International Cancer Imaging Society, we would like to invite you to attend this special focus multidisciplinary meeting on the development and application of artificial intelligence (AI) and machine learning (ML) in Cancer Imaging.

AI and ML are set to have a deep impact on how radiologists, as well as clinicians, may work in the future. However, there has been limited opportunities for imagers, scientists, clinicians and industrial partners to interact, so as to understand clinical needs, to identify common goals and to prioritise developments.

This meeting will bring together specialists in oncology, cancer imaging, AI and ML, as well as industry members to present and discuss these issues. We welcome your participation in our program and look forward to see you in Lisbon!

Celso Matos, Dow-Mu Koh and Fred Prior
On behalf of the organising committee*

Scientific Programme

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In this session we will discuss the challenges that cancer imaging faces and describe the eventual state of cancer imaging and imaging service that should be reached in the future. We will also describe the problems that AI techniques might be able to address.

8:30 Registration

9:00 Welcome session

9:20 Session 1: Reviewing the Clinical Challenges

Chair: Andrea Rockall, London, UK

09:20 Common unmet clinical needs and challenges for cancer imaging: a clinical perspective.
(Eric van Cutsem, Leuven, Belgium) - (TBC)

09:40 Attitudes and perceptions of AI and Machine Learning in cancer imaging: findings of an international survey.
(Dow-Mu Koh, London, UK)

10:00 Clinical challenges in Diagnostic Radiology: From workflow to integrated diagnostics.
(Evis Sala, Cambridge, UK)

10:20 How can AI be harnessed to enhance cancer imaging?
(Charles Kahn, Pennsylvania, USA)

10:40 Discussions

11:00 - 11:30 Coffee Break



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In the technology session we will analyse the technology of AI and deep learning and address the assumptions and limitation of the current tools. We will discuss current bottlenecks in image annotation/ data curation, as well as potential approaches using smaller datasets.

Computer-aided diagnoses have been available for many years and promising products were offered, but dramatic changes in clinical practice have not taken place. What lessons have we learned? What issues should be addressed to have a clinically relevant AI/DL?

11:30 Session 2: Theory and practice of technology of AI and Deep Learning

Chair: Seong Ki Mun, Arlington, USA

11:30 Perspectives on AI and machine learning developments in Cancer Imaging.

(Maryellen Giger, Chicago, USA)

11:53 Image annotation and data curation.

(Jayshree Kalpathi-Cramer, Boston, USA)

12:16 AI and Machine Learning techniques for smaller datasets.

(Nickolas Papanikolaou, Lisbon, Portugal)

12:39 Discussions

13:00 - 14:00 Lunch

14:00 Session 3: Lessons learned in cancer imaging AI

Chair: Evis Sala, Cambridge, UK

14:00 Challenges of developing tools for tumour definition and segmentation.

(Antonio Criminisi, Cambridge, UK)

14:20 Computer aided diagnoses: lessons from breast imaging.

(Ulrich Bick, Berlin, Germany)

14:40 Using imaging datasets for machine learning: reality and challenges.

(TBA)

15:00 How to use retrospective data from biobanks and repositories.

(Luis Martí-Bonmatí, Valencia, Spain)

15:20 Discussions

15:20 - 15:50 Coffee Break

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What are the requirements in data curation, software, hardware, database, data base management, human engineering and others to develop large-scale AI/ML capabilities?

15:50 Session 4: Technical ecosystem necessary to develop next generation AI/ML capabilities

Chair: Nickolas Papanikolaou, Lisbon, Portugal

15:50 Data curation and quantitative analysis – NCI's cancer imaging archive.

(Fred Prior, Arkansas, USA)

16:10 Role of open source and open collaboration for imaging AI.

(Seong Ki Mun, Arlington, USA)

16:30 Radiomics pipelines and the cancer data ecosystem.

(Sandy Napel, Stanford, USA)

17:00 Discussion

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The technology will deliver solutions. What can we expect when AI/ML tools become effective? What are possible intended and unintended consequences? How should an ecosystem evolve to take advantage of new tools? How would we train future professionals? What are the legal and ethics fallout?

8:30 Session 5: Clinical and industrial ecosystem to take advantage of emerging AI/DL

Chair: Dow-Mu Koh, London, UK

8:30 Promise of AI in imaging: an industry perspective (TBA)

8:50 Integrating AI into imaging software solutions (Tanveer Syeda-Mahmood, San Jose, USA) - (TBC)

9:10 The application of AI in healthcare systems (Rowland Illing, London, UK)

9:30 Training the workforce: opportunities and challenges

(Nicola Strickland, President of the Royal College of Radiologist, London, UK) - (TBC)

9:50 Discussions

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10:10 Session lecture: Ethics in AI and Machine Learning

Chair: Celso Matos, Lisbon, Portugal

(Jorge Soares, The National Council of Legal Medicine & National Council of Ethics for Life Sciences, Lisbon, Portugal)

10:40 - 11:10 Coffee Break

A multidisciplinary panel will discuss and debate goals and priorities for AI and ML in cancer imaging.

11:10 Session 6: Multidisciplinary discussion: how to road-map the development of AI and Machine Learning for cancer imaging?

(Chairs: Celso Matos and Fred Prior)

This workshop will show how to setup a radiomics service/ laboratory in the clinical environment. 10 computers will be used to run scripts for developing radiomic signatures on anonymised imaging data in the field of rectal, prostate and breast cancer. The concepts of preprocessing, segmentation, feature engineering, model training, validation and testing with external data will be covered.

11:10 Live panel discussion with participants invited from academia, clinical practices and industry

12:40 Closing remarks and lunch

14:00 Session 7: Hands-on radiomics

Conducted twice, each limited to 20 participants. (Nickolas Papanikolaou, Lisbon, Portugal & João Santinha, Lisbon, Portugal)



Notes





Organising Committee

Celso Matos, Dow-Mu Koh, Fred Prior, Nickolas Papanikolaou, Andrea Rockall, Seong Ki Mun, Luis Martí-Bonmatí, Evis Sala

Registration dates

Until 15 May Free Registration

Registration form available at www.icimatingsociety.org.uk

Venue

Champalimaud Centre for the Unknown
Av. de Brasília
1400-038, Lisboa, Portugal

Official language

English. No translation system available.

Travel and accommodation

Travel and hotel arrangements are the responsibility of the participants.