

15 Jan – 31 Mar 2021

Online for 2 months

THE PROMISES AND DARK SIDES OF
**ARTIFICIAL INTELLIGENCE
IN NMR, MRI AND NEUROSCIENCE**

Online Workshop

gidrm2020.uniroma2.it

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- TOPICS**
- Hardware and sequence design through AI
 - AI for image reconstruction
 - AI for image analysis and statistical inference
 - Interpretability and Explainability
 - Clinical Applications
 - Current challenges and future perspectives

The primary goal of this workshop is to bring together the diverse but overlapping communities of physicists, chemists, computer scientists, biologists, clinicians and neuroscientists to explore novel, out-of-the box angles through which trans-disciplinary challenges in NMR, MRI and neuroscience research and technology can be tackled using Artificial Intelligence. This will include proposing a vision of the most promising directions and short/mid-term future scientific, technological, ethical and regulatory synergies.

PRACTICAL INFO

- **Jan 15th –Mar 31st, 2021 – Asynchronous Workshop:** All talks will be recorded in advance and available anytime to all attendees and speakers. Every talk will be coupled to a **virtual discussion room** for asynchronous Q&A at gidrm2020.uniroma2.it
- **Feb 19th, 2021 – Live Workshop:** Talks will be presented or reproduced in presence of the speakers (see detailed program). **This is your chance to meet the speakers, ask your questions LIVE and discuss your collaborative ideas!**
- **Registration** (deadline: Feb 14, 2021) will be handled through GIDRM – click [here](#) to register.
- **Fees: Free for 2020 GIDRM members. GIDRM Membership is € 35 (\$41) for non-GIDRM members - € 20 (\$25) if you are aged under 28. Includes 1-year GIDRM membership (valid through 2021) and free access to all 2021 GIDRM days and school held online.**
- **30 ECM credits included** for Medical Doctors, Physicists, Chemists (National Italian Health System), accreditation provided by [biomedica](#) (accessible Feb 19^o-March 31^o)

Local Organizing Committee

Prof. Nicola Toschi – Prof. Maria Guerrisi – Dr. Andrea Duggento
 Dr. Allegra Conti – Dr. Silvia Minosse- Dr. Francesco Di Cio-Dr. Antonio Canichella

Scientific Committee

Marco Geppi - Marcello Alecci - Silvia Borsacchi - Mariapiña D'Onofrio
 Simonetta Geninatti Crich - Giacomo Parigi - Giuseppe Pileio
 Nicola Toschi - Maria Guerrisi - Francesco G. Garaci - Roberto Floris
 Federico Giove - Andrea Duggento - Allegra Conti - Silvia Minosse- Francesco Di Cio

Asynchronous Workshop (accessible Jan 15th - March 31st 2020)

- Marco Geppi – University of Pisa (Italy) - Opening remarks
- Nicola Toschi – University of Rome Tor Vergata (Italy) - Welcome and introduction to the workshop
- Andrea Duggento – University of Rome Tor Vergata (Italy) - Focused introduction to deep learning for biomedical applications

Hardware and sequence design through AI

Keynote Lectures

- Florian Knoll – NYU Langone Health (United States) – **"Potential and potential pitfalls of AI for the diagnostic MRI pipeline"**
- Jongho Lee – Seoul National University (Republic of Korea) – **"Deep Designed RF"**

Oral Communications

- Manu Veliparambil Subrahmanian/Gianluigi Veglia – University of Minnesota (United States) – **"Artificial Intelligence in RF Pulse Design: from High Resolution NMR to Imaging"**
- Mads Sloth Vinding – Aarhus University (Denmark) – **"Optimal and DeepControl in MRI pulse sequence"**

AI for image reconstruction

Keynote Lectures

- Andreas Maier – Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany) **"Known Operator Learning - An approach to unite machine learning, signal processing, and physics"**
- Jong Chul Ye – Korea Advanced Institute of Science and Technology (Republic of Korea) – **"Unsupervised deep learning for MR reconstruction using physics-informed cycleGAN"**

Oral Communications

- Vegard Antun – University of Oslo (Norway) - **"AI generated hallucinations in the sciences - On the stability accuracy trade-off in deep learning"**
- Mehmet Akcakaya – University of Minnesota (United States) - **"Self-Supervised Deep Learning of MRI Reconstruction without Reference Data"**
- Enhao Gong – Stanford University (United States) «tbc»

AI for image analysis and statistical inference

Keynote Lectures

- Chen Qin - The University of Edinburgh (United Kingdom) - **"Deep Learning for Dynamic MRI Reconstruction"**
- Daniel Remondini / Gastone Castellani – Bologna University (Italy) **"Artificial Intelligence in MRI: from raw data to analysis"**

Oral Communications

- Guy Gaziv - Weizmann Institute of Science (Israel) – **"Self-Supervised Natural Image Reconstruction and Rich Semantic Classification from Brain Activity"**
- Marco Palombo – University College London (United Kingdom) - **"Machine Learning Applications to Microstructure Imaging through Diffusion MRI"**
- Tiago Azevedo – University of Cambridge (United Kingdom) - **"A Deep Graph Neural Network Architecture for rs-fMRI Data"**
- Mike Germuska – Cardiff University (United Kingdom), **"Robust estimation of cerebral oxygen metabolism with machine learning"**
- Giovanna Maria Dimitri – Università degli Studi di Siena (Italy) - **"Brain MRI segmentation and reconstruction. A Deep Learning perspective"**
- Simeon Spasov – University of Cambridge (United Kingdom) - **"Overcoming the challenges of data paucity in deep learning for neuroimaging"**

Interpretability and Explainability

Keynote Lectures

- Paul Rad – The University of Texas at San Antonio (United States) - **"Explainable and Robust Deep Learning for Medical Domain"**

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- Riccardo Guidotti – University of Pisa (Italy) – **"Explaining Explanation Methods: from LIME to DoctorXAI"**
- David Schneeberger – University of Vienna (Austria) – **"Quo vadis Europe? A comparative outlook at proposed explainability regulation"**

AI for neuroscience and clinical applications

Keynote Lectures

- Duygu Tosun-Turgut – San Francisco Veterans Affairs Medical Center (United States) - **"Impact of AI and deep learning on imaging of neurodegenerative diseases"**
- Hugo Aerts – Harvard Medical School, Boston (United States) - **"Artificial Intelligence in Cancer Imaging"**
- Federica Agosta – Vita-Salute San Raffaele University (Italy) - **"Artificial intelligence for early diagnosis and clinical decision making in neurodegenerative disorders"**
- Hugo G. Schnack – UMC Utrecht (Netherlands) - **"AI for psychiatric imaging: promises and challenges"**
- Maryellen L. Giger – The University of Chicago (United States) **"Machine Learning on MRI of Breast Cancer"**

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- Allegra Conti – University of Rome Tor Vergata (Italy) - **"Dissecting the progression of multiple sclerosis through explainable ML techniques"**
- Antonio Maria Chiarelli – G. D'Annunzio University (Italy) - **"A Machine Learning Framework for Assessing the Effect of Prematurity on MRI Metrics of Functional Connectivity and Regional Brain Structure"**
- Patrick Bolan – University of Minnesota (United States) - **"Improving Advanced Imaging Workflows with AI"**
- Tommaso Banzato – University of Padova (Italy) - **"Clinical Applications of AI in Diagnostic Imaging"**
- Claudio Luchinat – University of Florence (Italy) - **"Predictive models from metabolomic data"**

Current challenges and future perspectives

Keynote Lectures

- Donatello Apollunio Gassi – Amazon Web Services (AWS), Giuseppe Leonardo Cascella – Ideate75 **"Unstructured data, ML and AI for healthcare and industry 4.0 applications"**
- Roberto Basili – University of Rome Tor Vergata (Italy) **"Interpretability and Explainability in Machine Learning: lesson learnt, challenges and directions from a NLP perspective"**
- Stefano Diciotti – Bologna University (Italy) **"Current challenges and future perspectives of machine learning techniques in medical imaging"**

Oral Communications

- Fabio Massimo Zanzotto – University of Rome Tor Vergata (Italy) - **"Clinician-in-the-loop AI: for a fairer model of clinical knowledge exploitation"**
- Marcello Cadioli - Philips Healthcare (Italy) **"AI for MRI: An industrial perspective and outlook"**
- Birgi Tamersoy – Siemens Healthcare (Italy) - **"AI for healthcare"**

Live workshop Feb 19th – (8.30- 18.30 CET see detailed programme)

Talks will be presented or reproduced in presence of the speakers for realtime Q&A and discussion and networking. The workshop will end with a live round table.