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 thorough GIDRM – click here to register.

• Fees: Free for 2020 GIDRM members. GIDRM Membership is € 35 (341) for non-GIDRM members - € 30 (421) 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 biomedia (accessible Feb 19’.March 31’)

Local Organizing Committee
Prof. Nicola Toschi – Prof. Maria Guerisli – Dr. Andrea Duggento
Dr. Allegra Conti – Dr. Silvia Minosse-Dr. Francesco Di Ciò-Dr. Antonio Canichella
Scientific Committee
Marco Geppi – Marcello Alecèl - Silvia Borsacchi - Mariapina D’Onofrio
Simonetta Gininatti Crièh - Giacomo Parigi - Giuseppe Pileio
Nicola Toschi – Maria Guerisli – Francesco G. Garaci – Roberto Floris
Federico Givo - Andrea Duggento - Allegra Conti Silvia Minosse- Francesco Di Ciò

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

Marco Geppi – University of Pisa (Italy) - Opening remarks

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

AI for image reconstruction

Keynote Lectures
Andrew 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 CGAN"

Oral Communications
Vegard Antun – University of Oslo (Norway) - "AI generated hallucinations in the sciences - On the stability accuracy trade-off in deep learning" Mehmet Akkaya – University of Minnesota (United States) - "Self Supervised Deep Learning of MRI Reconstruction without Reference Data"* Einhao Gong – Stanford University (United States) - "DeepControl in MRI pulse sequence"

Interpretability and Explainability

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

Oral Communications
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 in imaging of neurodegenerative diseases"* Hugo Aerts – Harvard Medical School, Boston (United States) - "Artificial Intelligence in Cancer Imaging"* Federica Agosta – Vita Santa Raffaele University (Italy) - "Artificial Intelligence for early diagnosis and clinical decision making in neurodegenerative disorders" Hugo C. Schmack – 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"

Oral Communications
Allegra Conti – University of Rome Tor Vergata (Italy) - "Dissecting the progression of multiple sclerosis through explainable ML techniques"* Antonio Maria Chiarelli – C. 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"

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.