

Doctor of Philosophy (PhD) UNIMORE Programs in:

- Clinical and Experimental Medicine
- Neurosciences
- Molecular and Regenerative Medicine

February 2023 Learning Activities- Medical School, Largo del Pozzo 71, Modena

Giorno	Attività	Aula
23 febbraio 2023	<u>Artificial intelligence and Biomedical Research</u>	Aula CS1.1 h 13.30-18

Presentatori Ing. Luca Chiantore, Direttore Generale UNIMORE; Prof. Marco Vinceti, Coordinatore PhD Program Clinical and Experimental Medicine

Docenti **Artificial Intelligence and Biomedical Research**

Artificial Intelligence is changing the workflow in many fields of the scientific world, helping in time optimization, data interpretation and problem solving. Here, the main applications of AI in different areas of health research are presented, with a special focus on standard methodologies, capabilities of AI and its limitations.

Prof.ssa Rita Cucchiara
(DIEF UNIMORE)

Artificial intelligence for Health: today and tomorrow challenges

Topics: the today AI in the deep learning revolution; the European and Italian AI Strategies and the new PNRR challenges; the capabilities of today AI based on deep neural networks; supervised/unsupervised machine learning by neural network; beyond the human neurons; the new foundational models; CNNS and transformers GPT and friends (chat GPT); analytical and predictive power: focus on computer vision; trustworthy AI: bias, robustness and explainability. Focus on explainability in radiology and visualization; the next human. robot, human-AI interaction (the new PNRR Fitformed rob)

Dott. Ermanno Cavalli
(Senior Data Scientist -
European Food Safety
Authority)

'Artificial Intelligence in Risk Assessment: The EFSA experience'. How to use AI to perform literature searches, systematic reviews and other steps of the risk assessment process. Key ethical issues in AI.

The presentation will focus on EFSA strategy about application of Artificial Intelligence in its processes. It will start from an historical overview of concrete and tangible application of Artificial Intelligence in the core scientific process of Evidence Management, and mainly in Scientific Literature Review. The presentation will evolve in explaining what the roadmap is that EFSA is implementing to transform itself into an AI-enabled organization by 2027. It will include a reflection on ethical aspects of Artificial Intelligence, analysed from the perspective of a governmental organization and regulatory agency active in area of public health.

"Virtual Brain and Artificial Intelligence: Frontiers for digital Neurosciences" –

Prof. Jonathan Mapelli
(BMN UNIMORE)

The digital twin of the brain is an effective tool not only for purely neuroscientific research but has recently shown the potential to assist neurosurgeons during intervention and neurologists in diagnostics and in therapeutic interventions. How can a brain digital twin be built? Which are the required tools, data and AI based approaches to make the brain digital twin real? The European and Italian strategy for the digital brain research action.

"Artificial intelligence and radiodiagnostic techniques in biomedical research"

Dott.ssa Giulia Besutti
(SMECHIMAI UNIMORE &
IRCCS Santa Maria RE)

Topics: the burst of AI in radiology and imaging research, importance of answering to a clinical need, applications of AI in radiology, focus on radiomics: definitions, methodology (image acquisition and segmentation, feature extraction and selection, model building and validation, traditional radiomics vs deep learning), research rationale and applications in oncology, challenges and limitations

"Artificial intelligence and neuroimaging in biomedical research"

Dott.ssa Erica Balboni
(BMN UNIMORE & Fisica
Medica AOU Modena)

Topics: brief summary of AI algorithms; information from neuroimaging considering different acquisition techniques; methods of applying AI in the reconstruction, processing and acquisition of neuroimages; comments on possible biases and standards of practice