SMILE Sustainable Medical Imaging with Learning and Regularization

Lake Como School of Advanced Studies - 28 August – 1 September 2023

Home

Modern medical practice is experiencing a deep revolution in several fields, fostered by the request of a more personalized and sustainable approach to the patient. This development is crucially led by the availability of: i) new, affordable, smart technologies; ii) the idea of revising/rethinking old technologies which proved to be effective but not without risks. The complexity of the problems mentioned above involves multi-disciplinary research. In order to support this innovation, a great contribution is expected from the mathematical modelling and computational viewpoints, which must be able to tackle these difficult problems, also exploit at best the great potentialities offered by recent machine learning and artificial intelligence (AI) developments. Purpose of this school is to let PhD students and young researchers come in touch with recent,challenging, scientific problems related to innovative applications in Tele-health and Sustainable Medical Imaging, with an introduction to suitable mathematical and computational methods, also from a Green AI perspective.

The summer school consists of several blocks, each taught by a different expert in the field, including academic researchers and company data scientists. The total number of hours will be about 24 including talks from the participants, and corresponding to 3 ETCS. A final examination will be carried out about 2 weeks after the school for the students who need it for the recognition of the credits, and will concern a collective and/or individual work on specific assignments integrated in the programme. More details about the date and the modalities will be provided during the school.

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Speakers

- **Alessandro Benfenati**, Università di Milano
- **Federico Benvenuto**, Università di Genova
- **Cristina Campi**, Università di Genova
- **Paola Causin**, Università di Milano
- **Antonio Cicone**, Università dell'Aquila
- **Shyam Diwakar**, Amrita University Amritapuri
- **Claudio Landi,** See Through S.r.l.
- **Germana Landi**, Università di Bologna
- **Elena Loli Piccolomini**, Università di Bologna
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- **Federica Porta**, Università di Modena
- **Simone Rebegoldi**, Università di Firenze
- **Alessandro Turco**, Giotto S.p.A.

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**University of Milan
Department of Environmental Science and Policy**

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**University of Milan
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Department of Mathematics "Federigo Enriques"**

Protetto: School Materials

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Program

	Monday, Aug 28	Tuesday, Aug 29	Wednesday, Aug 30	Thursday, Aug 31	Friday, Sep 1
09:15 – 10:00		Imaging, inverse problems and regularization	Imaging Problems in Deep Learning Framework	Statistical estimation methods and applications in medical imaging Part I	Inverse Problems in nonstationary Signal and Image Processing
10:00 – 10:45					
10:45 – 11:15		Coffee Break	Coffee Break	Coffee Break	Coffee Break
11:15 – 12:00		Proximal Splitting Methods for Imaging	Models and Methods for Stochastic Optimization	Statistical estimation methods and applications in medical imaging Part II	Tele-Health applications
12:00 – 12:45					Perspectives and closing remarks
12:45 – 14:15	Welcome and Registration	Lunch	Lunch	Lunch	Lunch
14:15 – 15:00	Overview on Medical imaging	Sustainable Computed Tomography: Regularized Optimization for Reconstruction	Green AI and Deep Learning reliability for imaging	Diffuse Optical Tomography: Mathematical Model and Reconstruction	
15:00 – 15:30	Sustainable Computed Tomography: Mathematical Modeling and Imaging		Technical Aspects and Clinical Image Quality in Mammography Industry		
15:30 – 16:00			Medical CBCT: Open Challenges and Future directions		
16:00 – 16:30			Imaging in neurology: clinical applications		
16:30 – 17:00		Students talks	Students talks	Students talks	
		Social dinner			