



UNIVERSITÀ DI PISA  
**DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE**  
**Dottorato di Ricerca in Ingegneria dell'Informazione**

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Doctoral Course

**“Deep Learning for Medical Image Analysis”**

Assistant Professor Xiaomeng Li

*Department of Electronic and Computer Engineering,  
The Hong Kong University of Science and Technology, Hong Kong SAR*

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**Short Abstract:**

Medical imaging plays a crucial role in the entire spectrum of healthcare, encompassing wellness, screening, early diagnosis, treatment selection, and follow-up. This course will delve deeply into recent advancements in artificial intelligence for medical image analysis, with a specific focus on deep learning approaches for disease screening and detection using medical images. The topics covered in this course include the fundamentals of deep neural networks, the basics of medical imaging, and an exploration of state-of-the-art deep learning models within the context of various medical images. The objective of the course is to equip students from diverse backgrounds with both a conceptual understanding and practical grounding in cutting-edge research on deep learning and medical image analysis.

**Course Contents in brief:**

Day 1: Introduction to Deep Learning Fundamentals (Course overview, Classification, Segmentation, 3D, and Videos).

Day 2: Medical Images (Retinal Images, Multi-modal Data, Ultrasound, Pathology, CT, MRI).

Day 3: Advanced Topics (Semi-supervised learning, Unsupervised learning, Covid-19).

Day 4: Advanced Topics (Generalization, Privacy, Attention)

**Total # of hours of lecture: 16**

**References:**

[1] Reference 1 – “*Deep learning for medical image analysis*” by S. Kevin Zhou, Hayit Greenspan, Dinggang Shen, 2017.

[2] Reference 2 – “*Introduction to deep learning for healthcare*”, Cao Xiao, Jimeng Sun, 2021.

## CV of the Teacher

Xiaomeng Li is an Assistant Professor of Electronic and Computer Engineering and Computer Science and Engineering at The Hong Kong University of Science and Technology. Her research lies in the interdisciplinary areas of artificial intelligence and medical image analysis, aiming at advancing healthcare with machine intelligence. Specifically, she works on making machine learning more reliable, human-compatible, and statistically rigorous, and is especially interested in applications in healthcare. She is an associate director of the Center for Medical Imaging and Analysis.

Dr. Li received her Ph.D. degree from the Chinese University of Hong Kong. Before joining HKUST, she was a postdoc research fellow at Stanford University, working with Prof Lei Xing. She is the author of more than 70 peer-reviewed publications such as IEEE Transactions on Medical Imaging, Medical Image Analysis, CVPR, ICCV, MICCAI, etc. She has been involved in several sponsored research projects in mainland China and Hong Kong SAR. Her Google Scholar has more than 4500+ citations with h-index 21.

**Final Exam: To be decided** (a final project during the last day).

## Room and Schedule

Room:

*Aula Riunioni del Dip. di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor*

Schedule:

Day 1 – Monday, 21 July 2025, 9:00-13:00

Day 2 – Tuesday, 22 July 2025, 9:00-13:00

Day 3 – Thursday, 23 July 2025, 9:00-13:00

Day 4 – Monday, 28 July 2025, 9:00-13:00