

Education and Research in Imaging in Tampere

Alessandro Foi

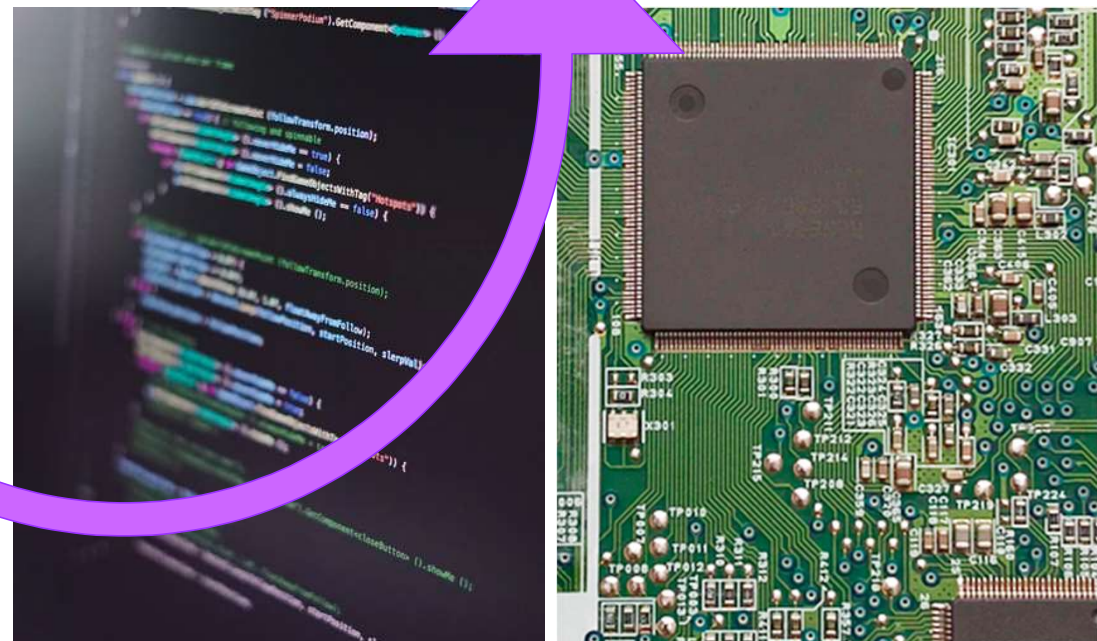
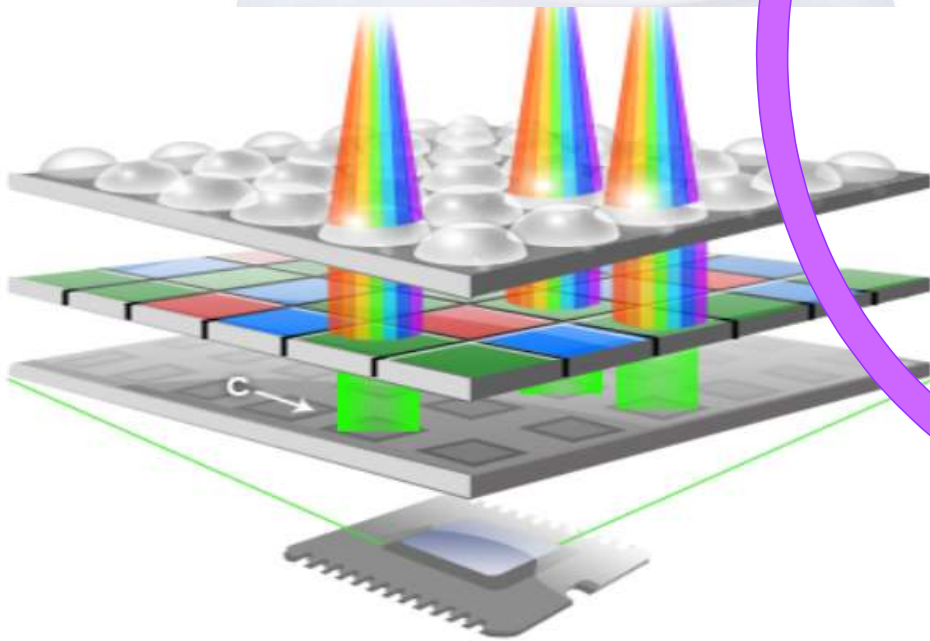
Professor of Signal Processing

Head of Signal and Image Restoration Group

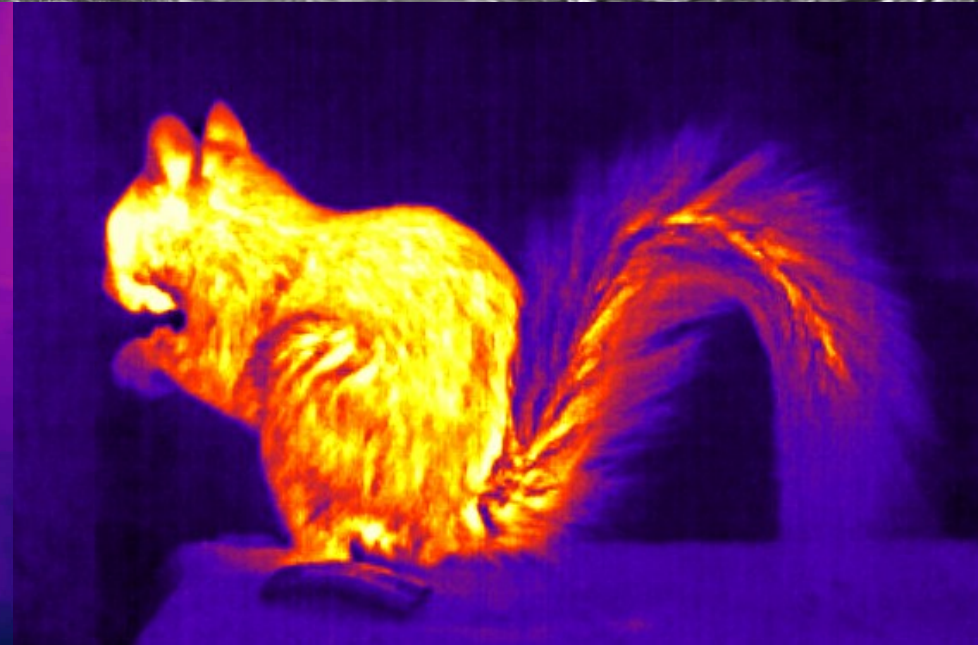
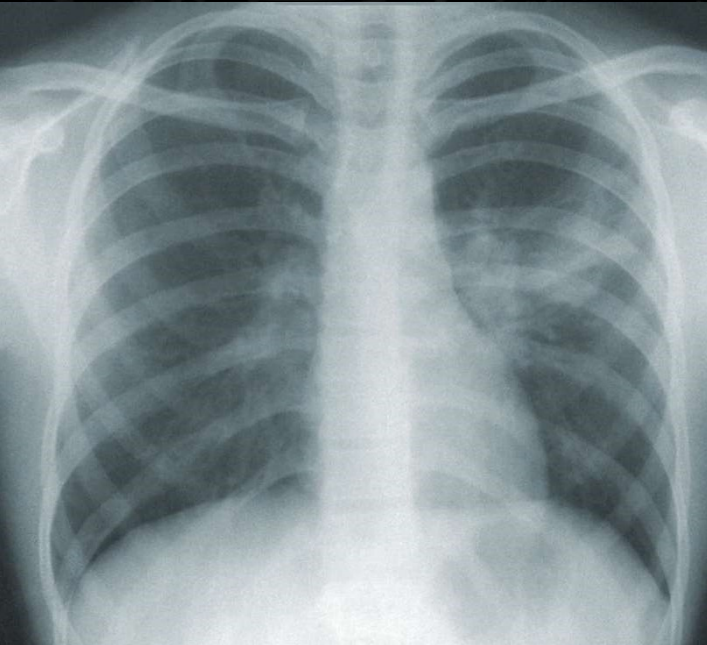
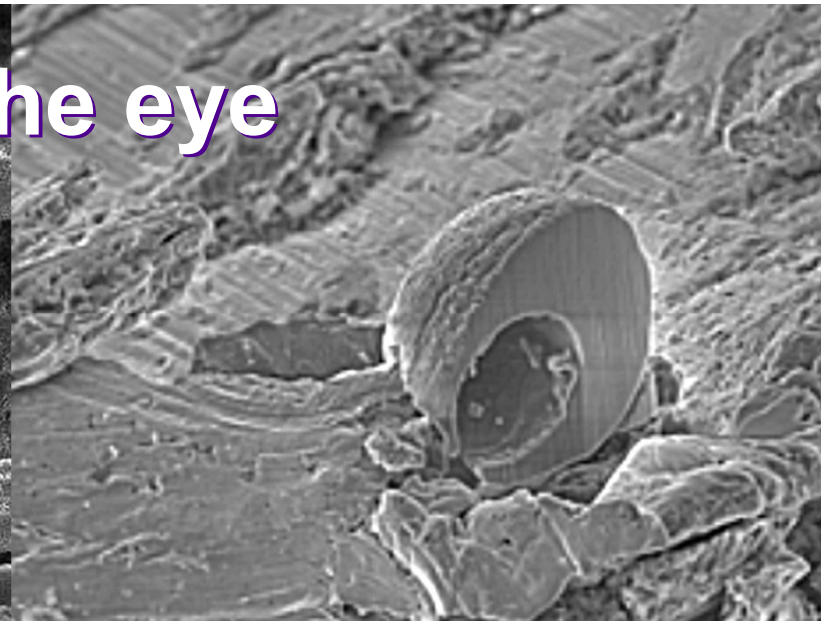
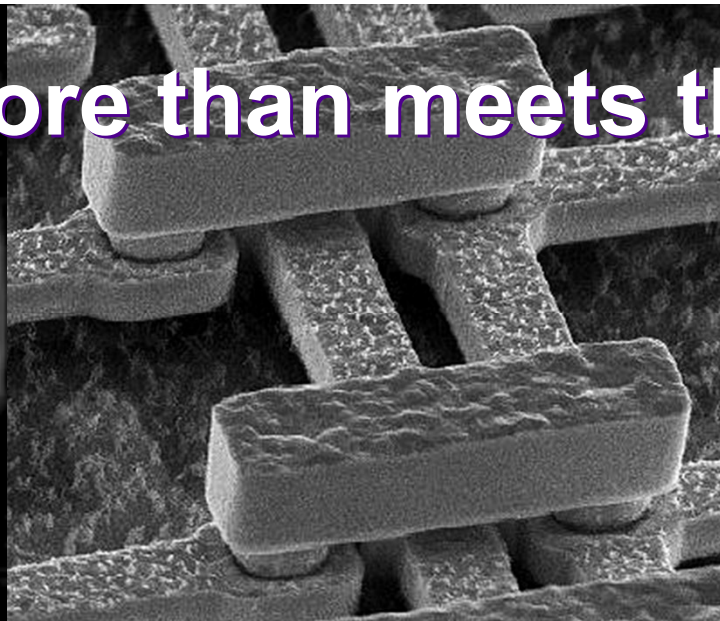
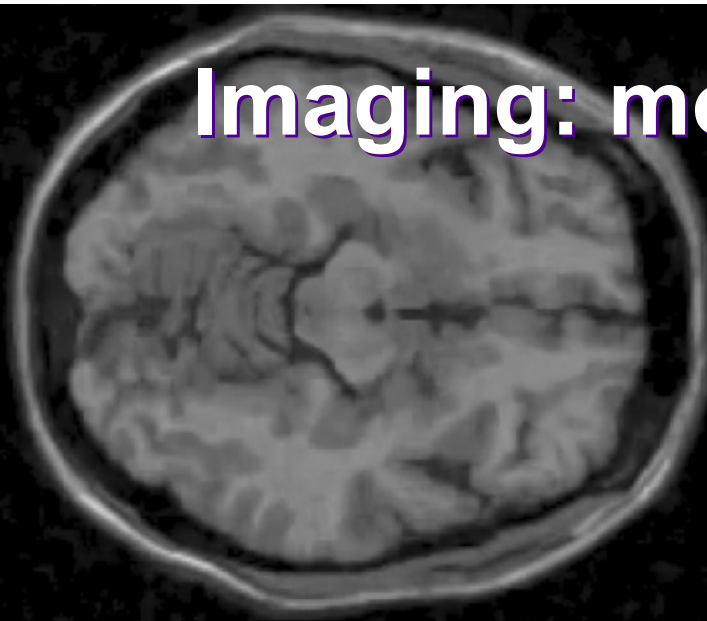
Imaging: more than meets the eye



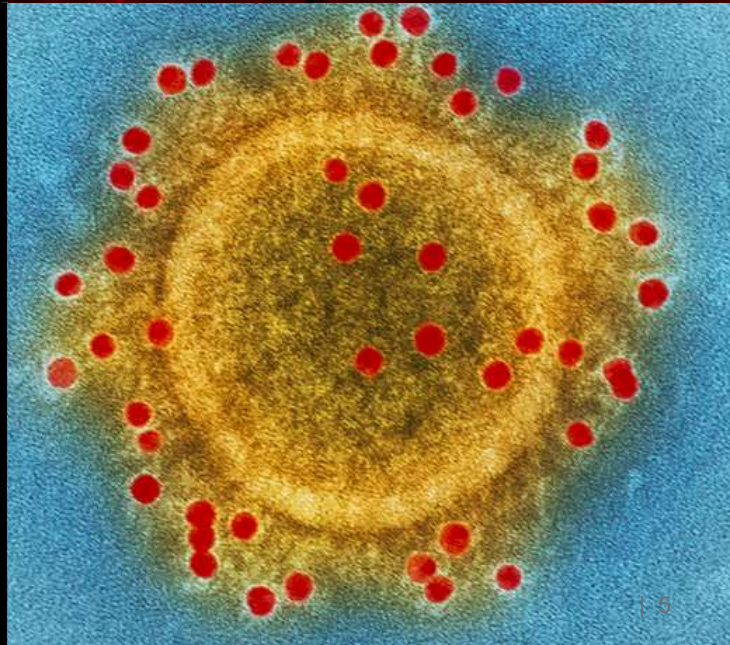
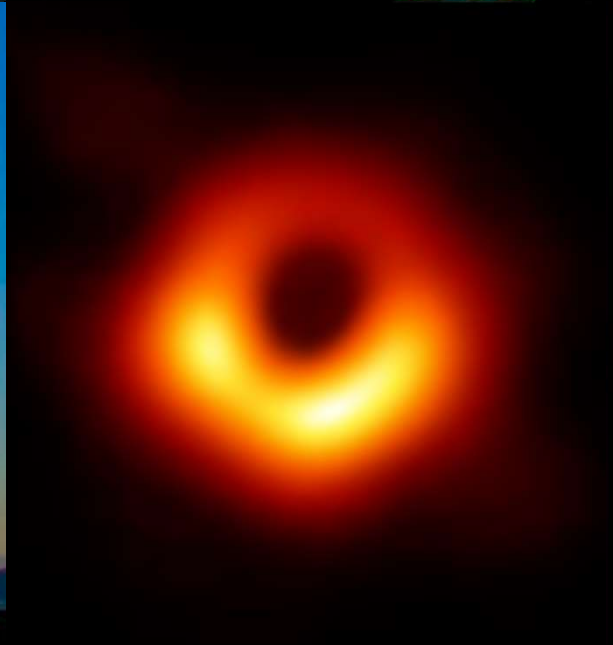
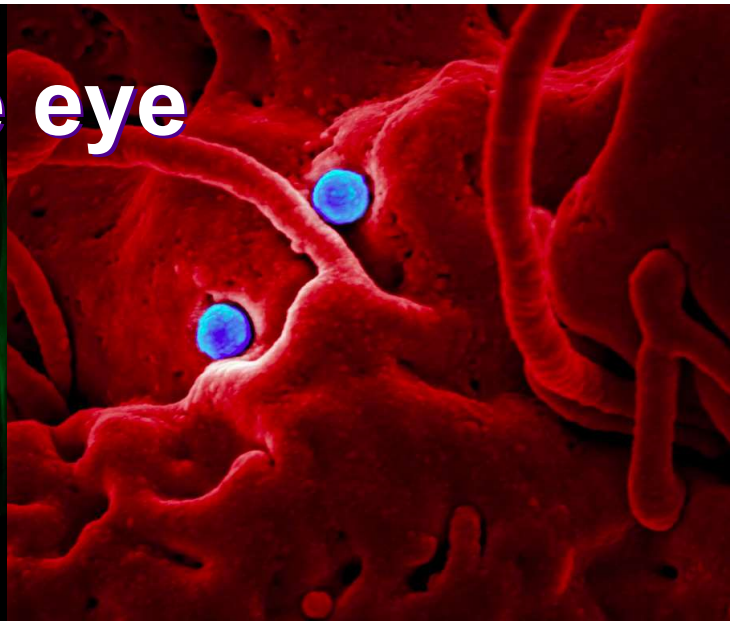
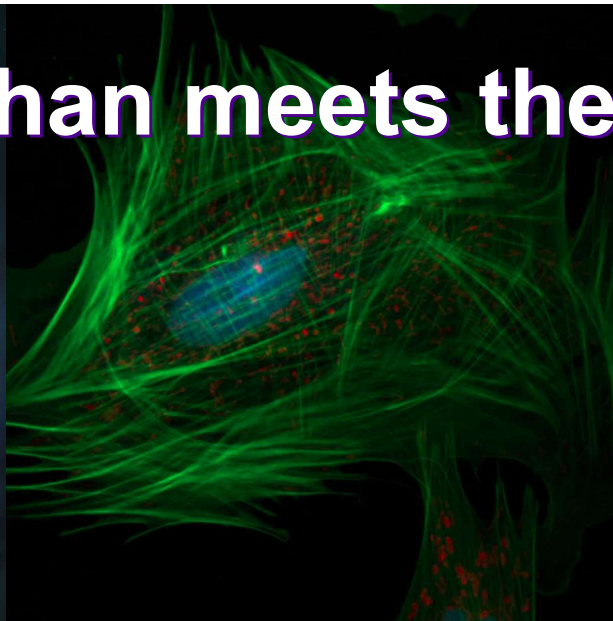
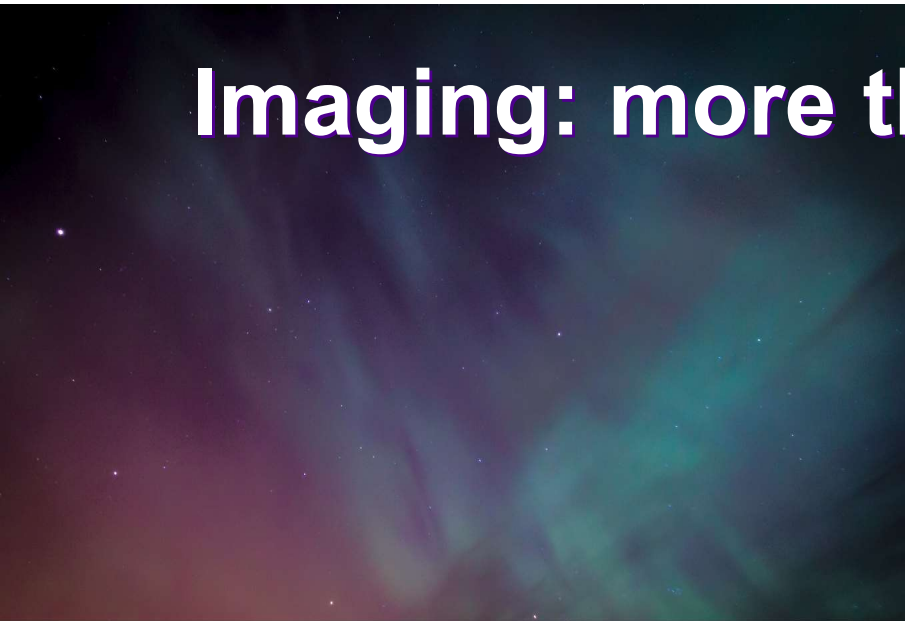
Imaging: more than meets the eye



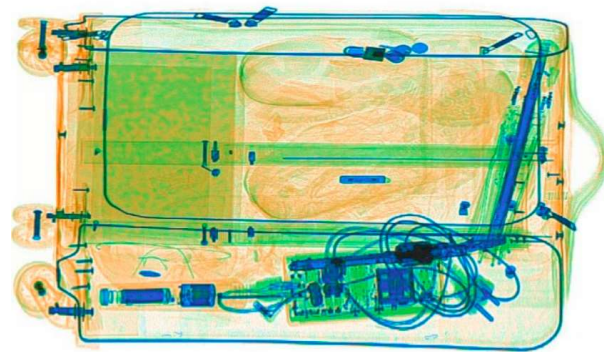
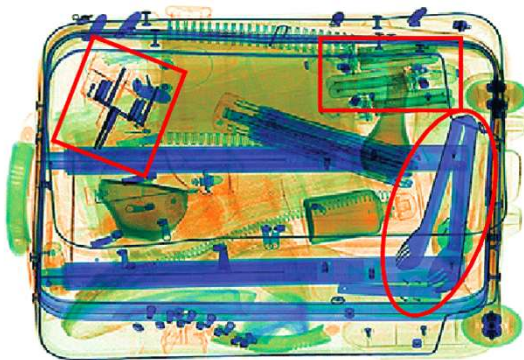
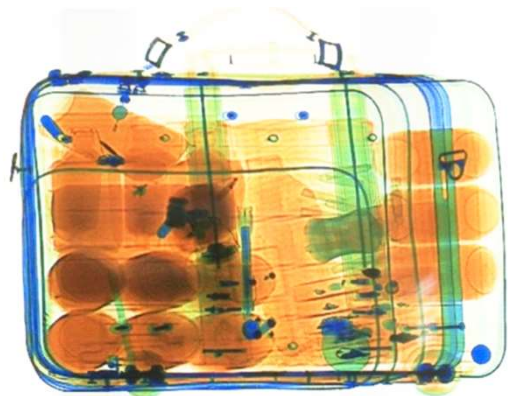
Imaging: more than meets the eye



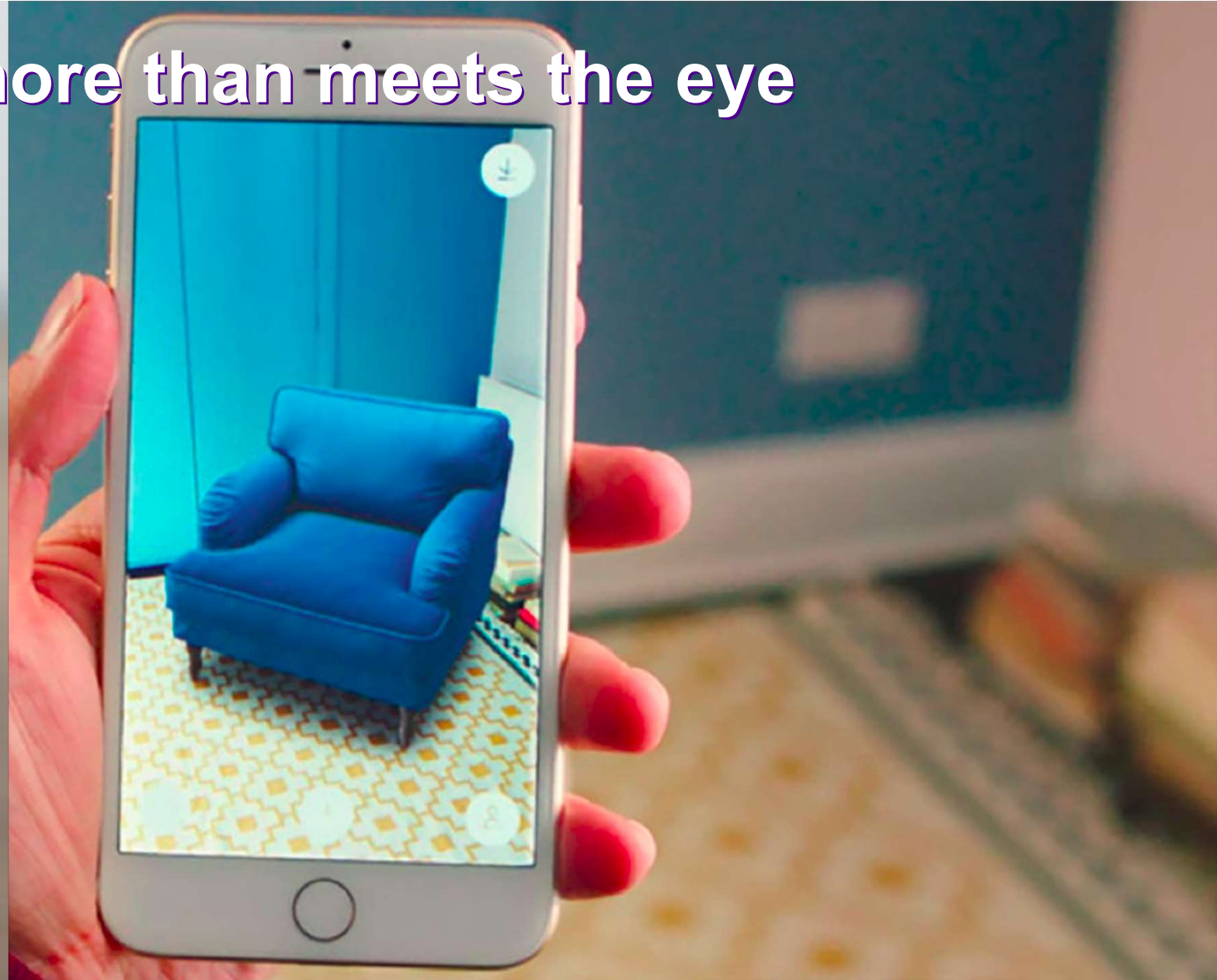
Imaging: more than meets the eye



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Imaging: more than meets the eye



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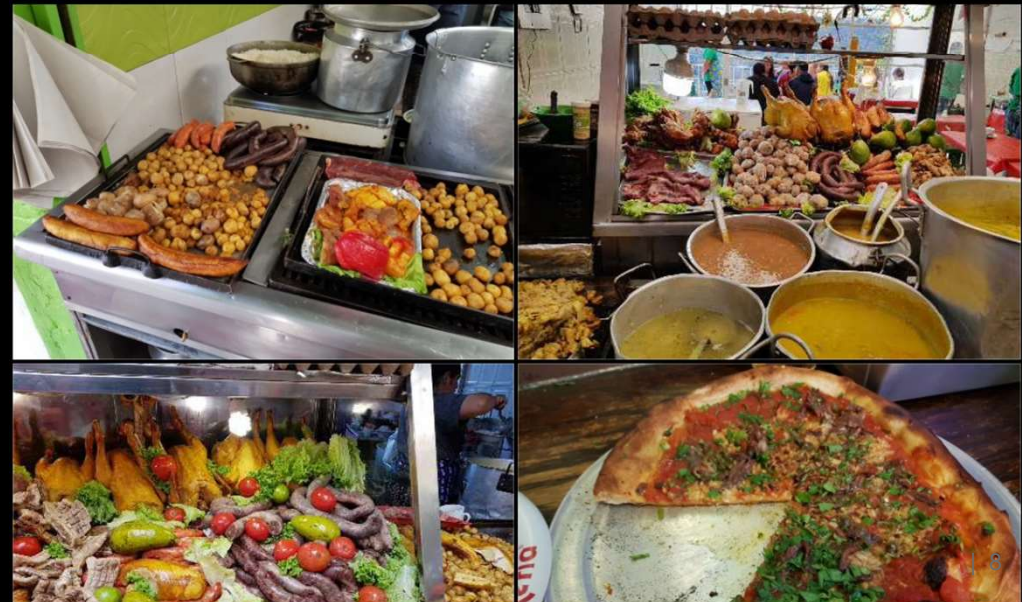
Filter results

All

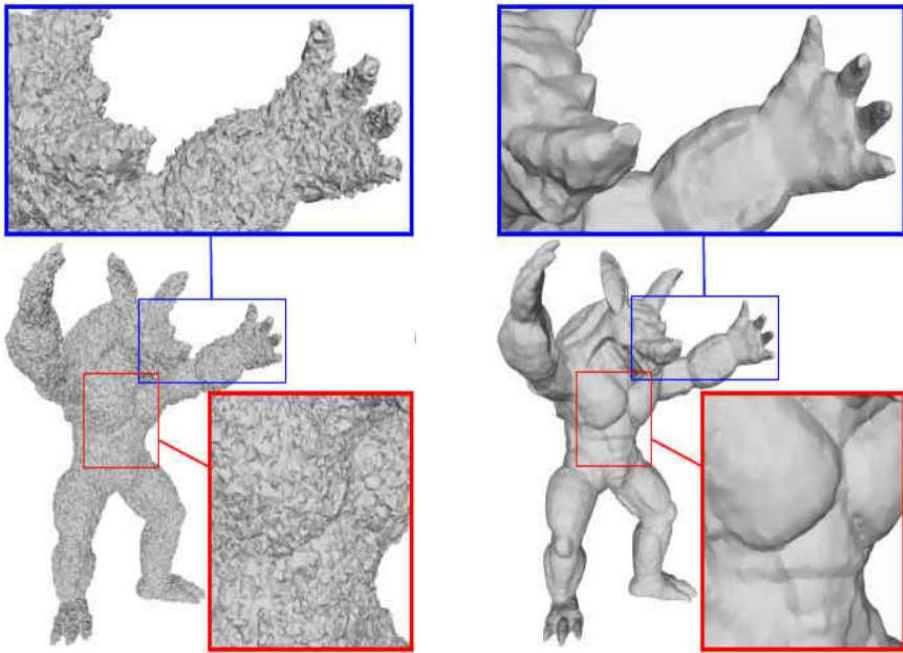
Camera

WhatsApp Images

Bread



Imaging: more than meets the eye



Imaging allows us to see what cannot be seen, like the inside of our living bodies, or even distant black holes.

Imaging helps humans and robots to navigate, communicate, and make informed decisions.

Imaging saves lives, educates, drives scientific discovery, and stimulates creativity.

Imaging enables revolutionary applications such as autonomous vehicles, computer-aided and automated diagnostics, industrial robotization, and large-scale high-throughput safety-critical applications.

Imaging: a transdisciplinary endeavour

Imaging involves:

- physics of light and other electromagnetic waves;
- optical materials and structures;
- sensors transforming light into electrical and digital signals;
- mathematical and statistical modeling;
- signal processing and machine learning methods;
- powerful and efficient computing platforms;
- perception and cognition;
- application to biomedical and physical sciences, astronomy, robotics, and autonomous systems.

Tampere University: several decades of excellence in imaging

Foundations of current research groups laid during three consecutive Centre of Excellences in Signal Processing at Tampere University

Tight collaboration between Tampere University and Nokia during the development of mobile imaging and multimedia technology

Development of groundbreaking imaging technologies now found in millions of devices and widely used in the field

Key staff in the R&D imaging teams of major mobile imaging companies trained at Tampere University

... excellence continues, stronger than ever

Significant diversification, now covering all aspects of imaging

World-class imaging infrastructure at Tampere University:

- Centre for Immersive Visual Technologies (A. Gotchev)
- Computational Imaging and Digital Holography Laboratory (K. Egiazarian)
- Tampere University Microscopy Centre (M. Vippola)
- Tampere BioMediTech Imaging Facility (T. Ihalainen)
- Tampere University Hospital Imaging Centre (I. Rinta-Kiikka)

Growth of Imaging Industry Ecosystem in Tampere

Top editorial positions in the field:

- *Journal of Electronic Imaging* (K. Egiazarian, Editor-in-Chief since 2015)
- *IEEE Transactions on Image Processing* (A. Foi, Editor-in-Chief starting 2021)

TAU Imaging: key people (fundamentals)

Alessandro Foi, Professor of Signal Processing

noise modeling, image reconstruction, restoration, and enhancement

Atanas Gotchev, Professor of Signal Processing

light-field imaging, 3D visual cues, immersive imaging systems

Karen Egiazarian, Professor of Signal Processing

computational imaging, wavefield and phase imaging, diffractive imaging, mobile imaging

Ioan Tabus, Professor of Signal Processing

plenoptic image compression, immersive image representation and communication

Sampsa Pursiainen, Associate Professor of Applied Mathematics

inverse problems, modelling and imaging, electromagnetism, astrophysics

Moncef Gabbouj, Professor of Signal Processing

multimedia content-based analysis, indexing and retrieval, big data, machine learning

Joni Kämäräinen, Professor of Signal Processing

computer vision, machine learning, pattern recognition, robotics

Esa Rahtu, Assistant Professor (tenure track) in Signal Processing

computer vision, machine learning, image based localization and mapping

TAU Imaging: key people (applications)

Minnamari Vippola, Professor of Materials Science

electron microscopy, diffraction techniques, materials characterization

Pekka Jääskeläinen, Assistant Professor (tenure track) in Computer Engineering

customized co-processor design and compilation flow and heterogeneous parallel computing runtimes, photorealistic graphics rendering techniques for real-time

Jari Hyttinen, Professor, Head of BioMediTech

computational biophysics, bioimaging and biosensing, tissue engineering

Teemu Ihalainen, Academy of Finland Research Fellow

light and fluorescence microscopy techniques, super-resolution microscopy, live cell and tissue imaging

Soile Nymark, Academy of Finland Research Fellow

biophysics of the eye, physiology and pathophysiology of the retina

Jari Hietanen, Professor of Psychology

cognitive and neural processes and psychophysiological responses in human vision

Roope Raisamo, Professor of Computer Science

computer-human interaction, visual and multimodal interaction

Innovation success: imaging technology from Tampere University deployed in the industry

BM3D DENOISING IN KIRIN SYSTEM-ON-CHIP FOR SMARTPHONE



Let's shape the future of imaging together!

www.tuni.fi



Human
Potential
Unlimited.