

Institut d'Imagerie et d'Optique Appliquée (IOA)

- *Unit within STI (« Sciences et Techniques de l'Ingénieur »)*
- *3 Profs, 1 MER, (~70 collaborators)*

Applied Photonics Group



René Paul Salathé

Biomedical Photonics Group



Theo Lasser



Biomedical Imaging Group



Michael Unser

Nanostructuring Research Group

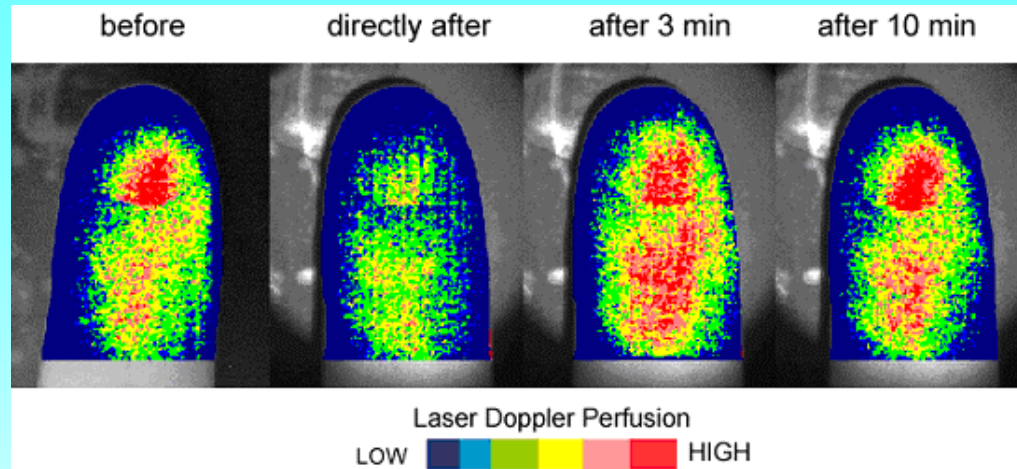


Patrick Hoffmann

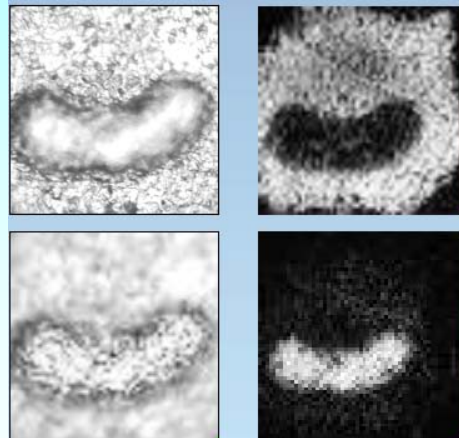
Biomedical Photonics Laboratory

(Theo Lasser)

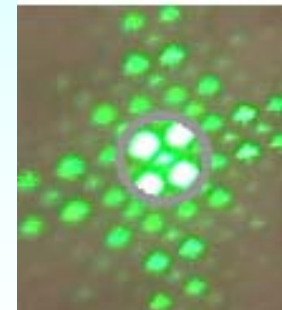
- **Bio-Imaging**
(A. Serov)



- **Bio-Microscopy**
(L. Froehly)

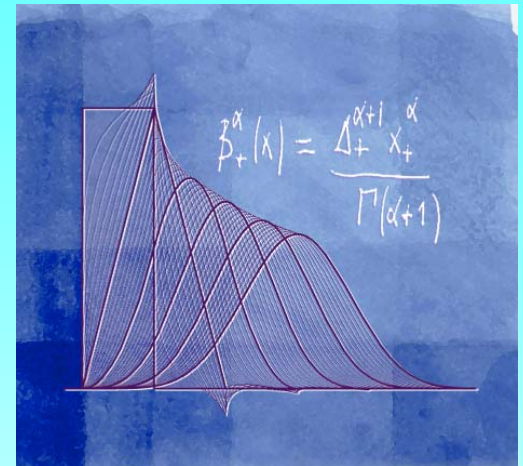


- **Single Molecule Detection SMD technology**
(Michael Götsch)

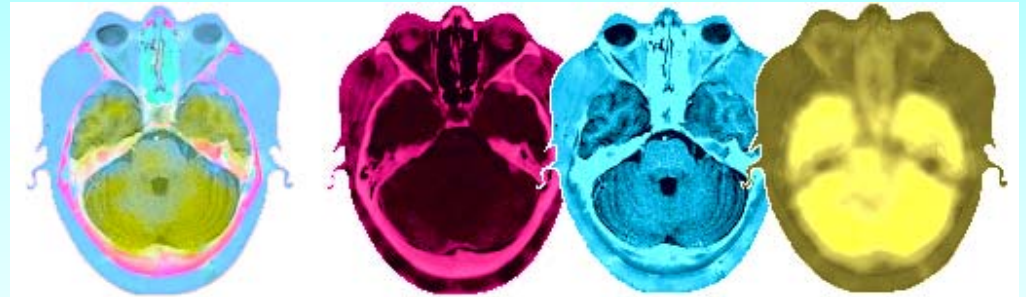


Biomedical Imaging Group (Michael Unser)

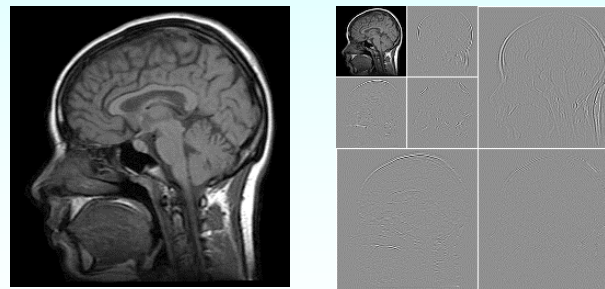
- **Image Processing**
(Philippe D ev enaz)



- **Mathematical Imaging**
(Tierry Blu)



- **Software**
(Daniel Sage)

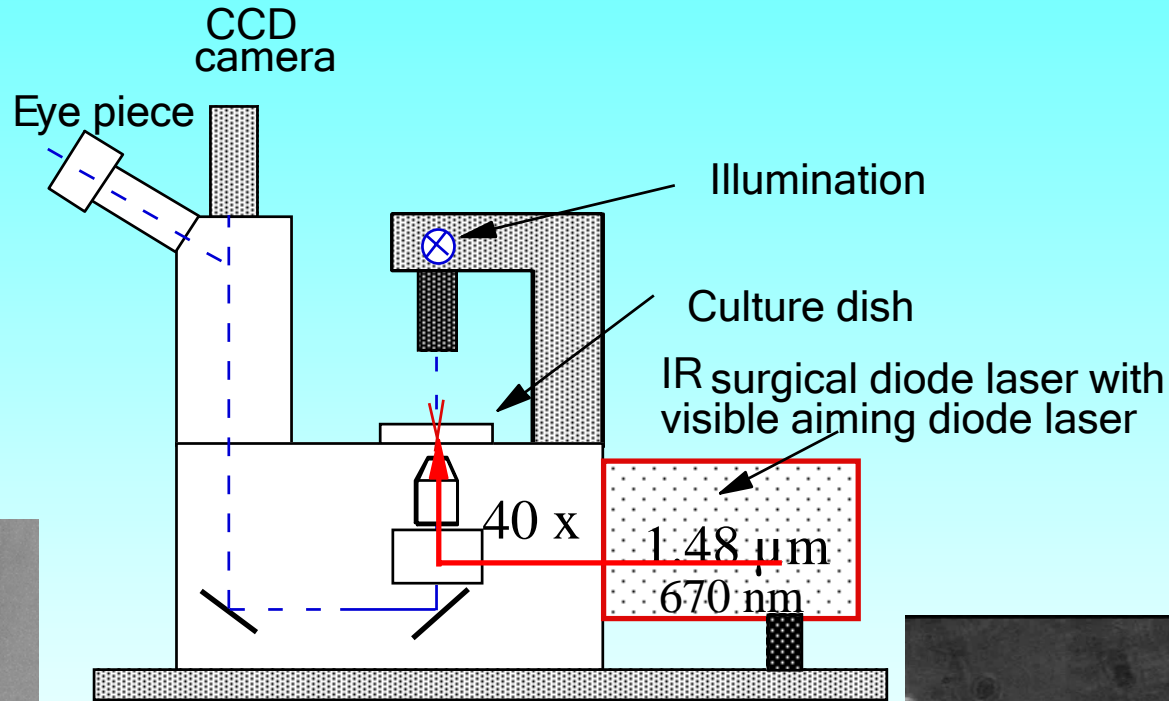


Advanced Photonics Group.....

→ Laser micro-surgery

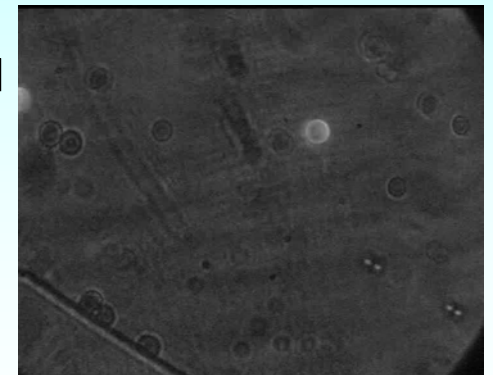


Guy Delacrétaz



Laser drilled oocyte

*Laser trapped spermatozoid →
/ biomolecules →*

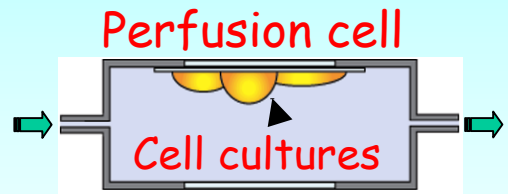


Advanced Photonics Group.....

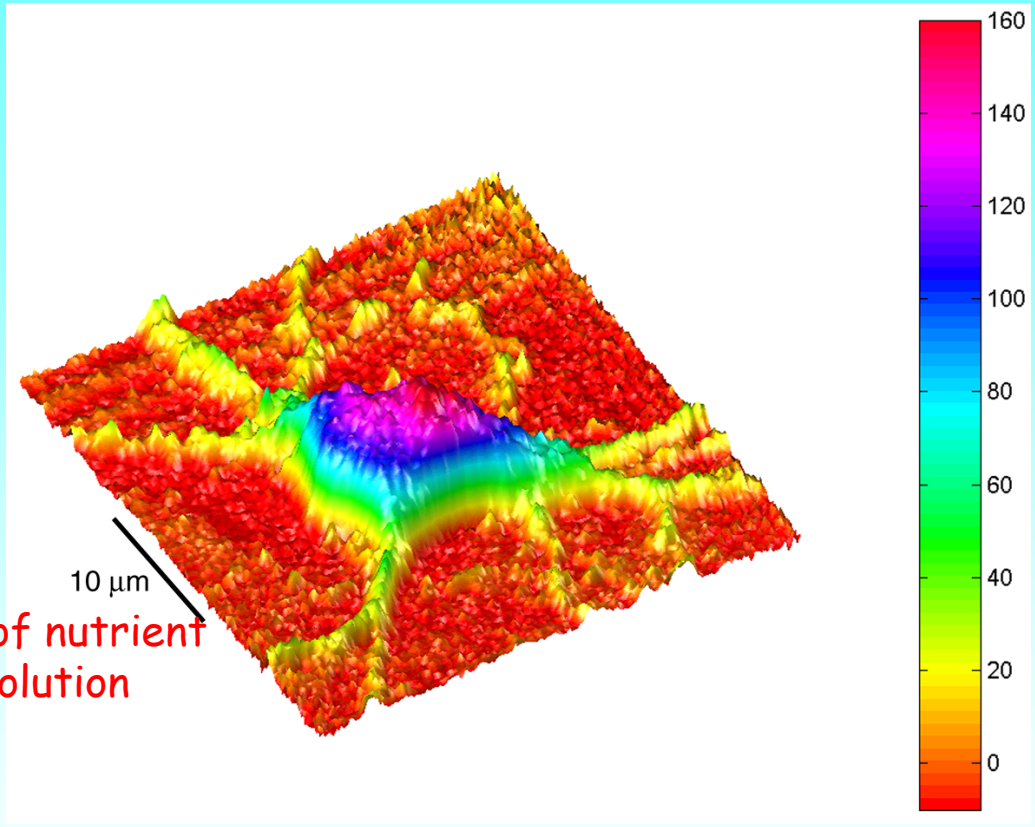
→ Digital Micro-Holography (DHM)



Christian Depeursinge



Flow of nutrient solution



- DHM allows: - Quantitative three dimensional picture rendering
- In-vivo real time study of cell deformation

→ Optical Coherence Tomography (OCT)

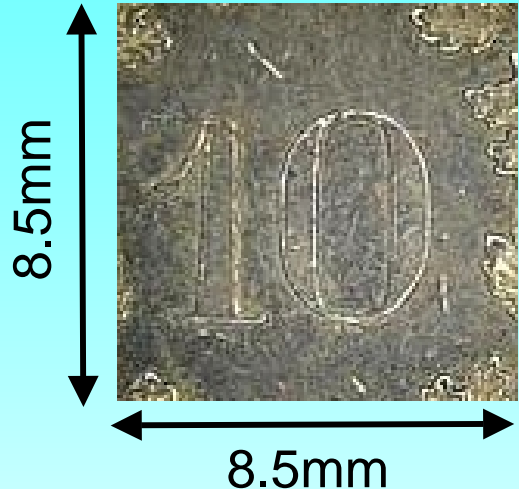
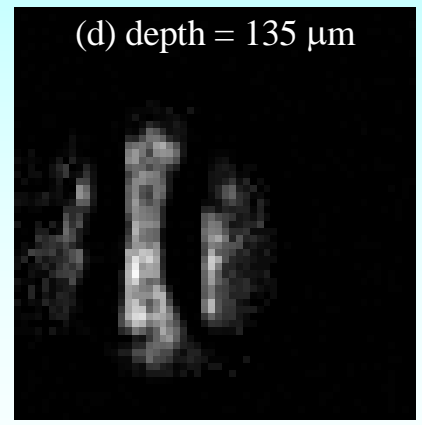
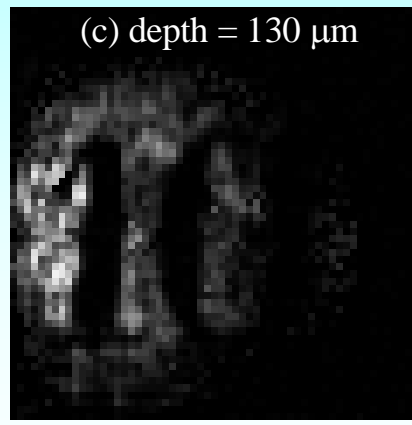
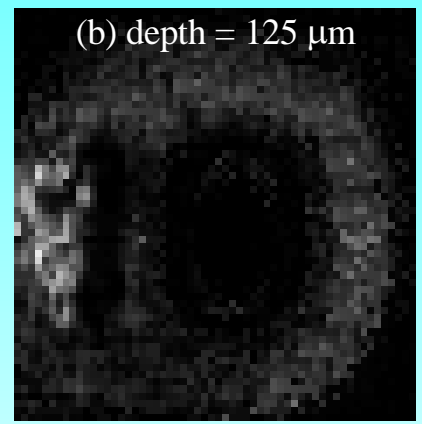
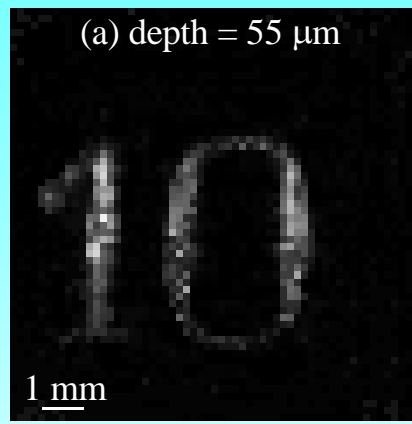


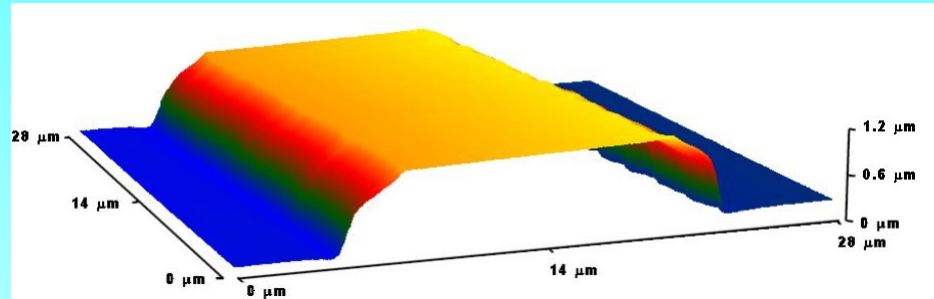
Image features:

- Sampling distances: 146.7 μm^2
- Depth resolution: 16.8 μm
- Acquisition time: 3.4 ms/slice
- Frame rate: 6 Hz
- Sensitivity: -54.8 dB

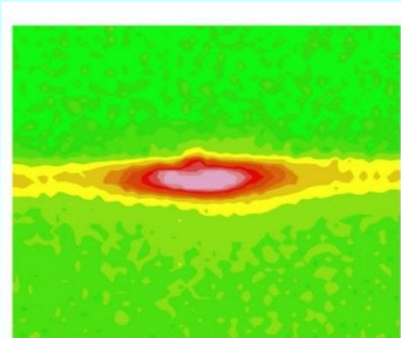
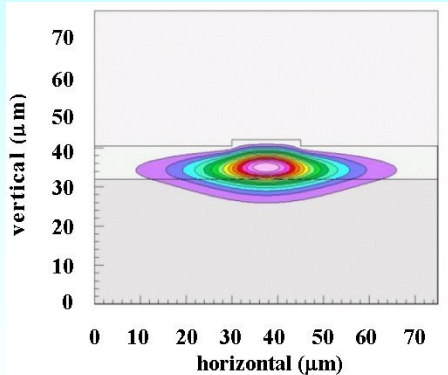




Markus Pollnau



Ti:sapphire rib channel waveguide created by Reactive Ion Etching (surface roughness < 4 nm)



Fluorescence output from laser-pumped rib channel waveguide: calculated (left) and measured (right)

Advanced photonics group.....

→ Laser micro-machining



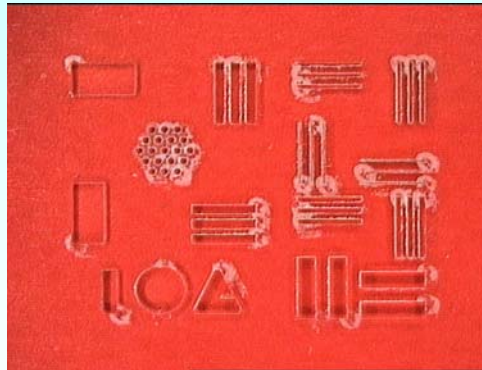
Thomas Sidler

Cutting of :

Ceramics



Glass



*Silicon
etc....*

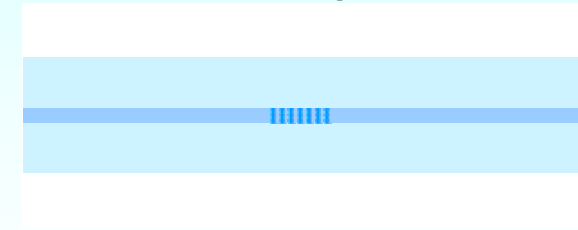
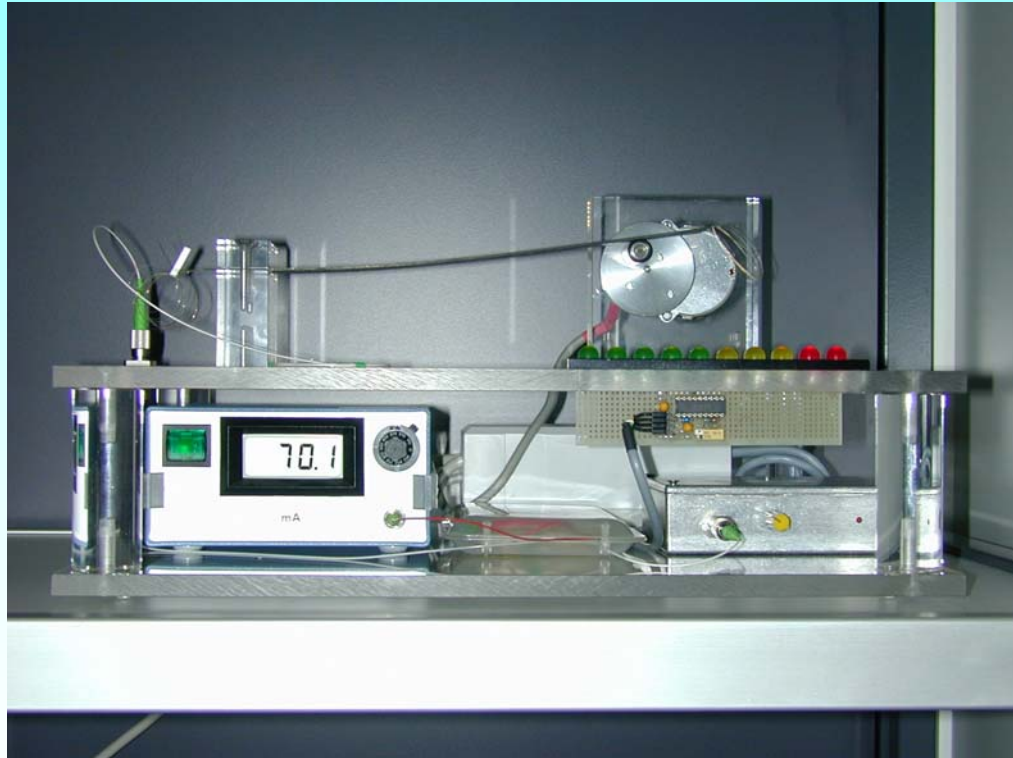


Advanced Photonics Group.....

- Bragg gratings*
- as sensors in composites in collaboration with LMAF (John Botsis) and LTC (Jan-Anders Manson)*



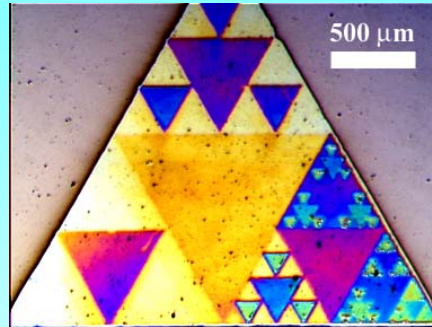
Hans Limberger



Nanostructuring Research Group



Patrik Hoffmann



Patterned TiO₂ deposit

