

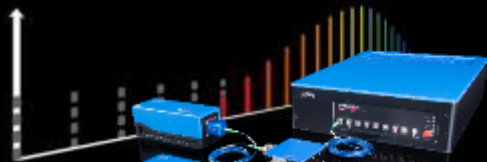
PIC laser engines for life-science applications

Dr. Patrick Leisching, VP R&D

TOPTICA Photonics AG

EPIC Online Technology Meeting on Photonic Integrated Circuits for Sensing Applications

28.09.2020



TOPTICA Group: Key figures



Key Figures 2020

Employees: 320

Revenues: 75 Mio €

Founded: 1998

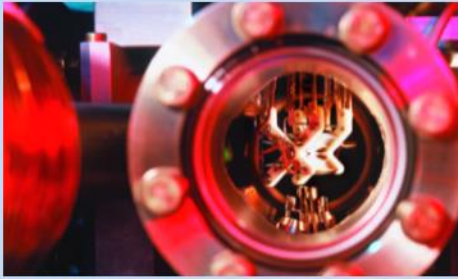
Locations: Munich & Berlin (Germany)
Farmington & Boulder (USA)
Tokyo (Japan)
Peking (China)

Technology

Diode Laser Systems	190 – 3500 nm
Ultrafast ps/fs Fiber Lasers	488 – 2200 nm, 5 – 15 μm
Terahertz Generation	0.1 – 6 THz
High Power Laser Diodes	630 – 1120 nm (eagleyard Photonics)

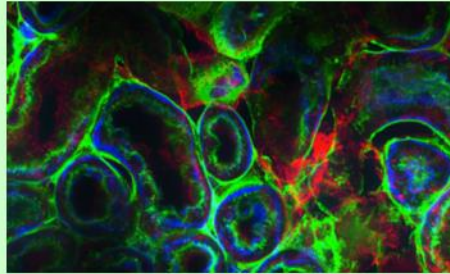
TOPTICA Photonics: Markets

Quantum Technologies



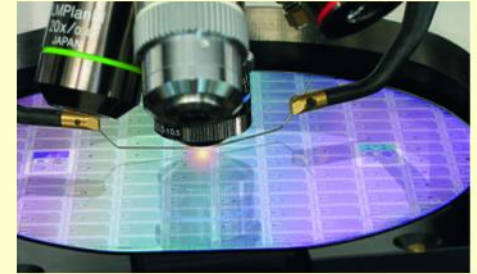
- ▶ Bose-Einstein Condensation
- ▶ Laser Cooling
- ▶ Rydberg Excitation
- ▶ Quantum Information
- ▶ Coherence Control
- ▶ LIDAR
- ▶ Optical Clocks
- ▶ Frequency Comb Spectroscopy

Biophotonics



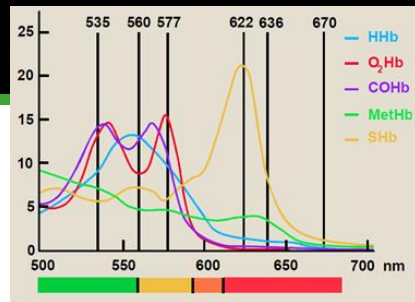
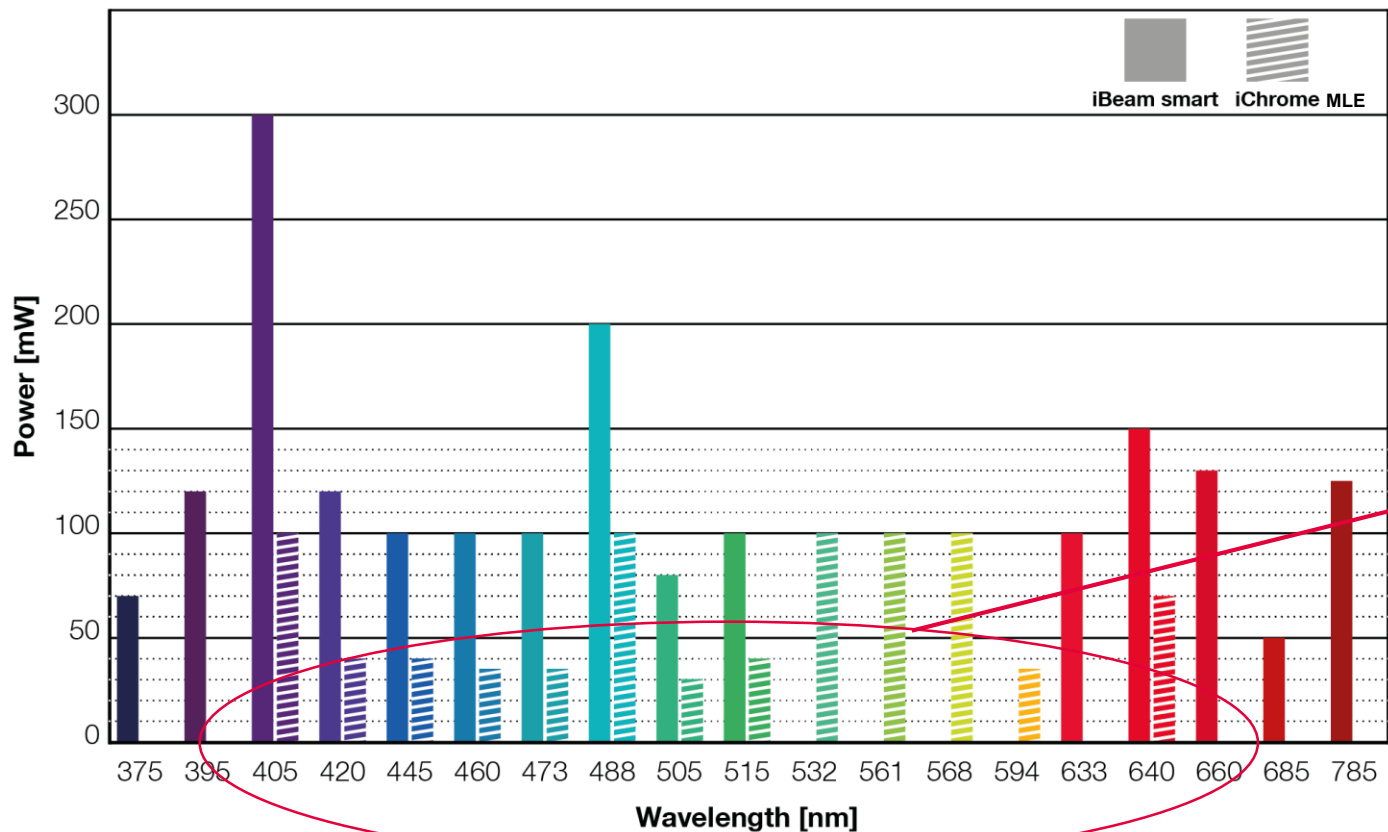
- ▶ Confocal Microscopy
- ▶ Multiphoton Microscopy
- ▶ SHG Microscopy
- ▶ Raman Microscopy
- ▶ FLIM, FRET, FRAP
- ▶ Flow Cytometry
- ▶ Microplate Readers
- ▶ High Throughput Screening

Materials



- ▶ Metrology
- ▶ Semicon Inspection
- ▶ Interferometry
- ▶ Holography
- ▶ Terahertz Spectroscopy
- ▶ Non-destructive Testing
- ▶ Gas Sensing
- ▶ Multiphoton Lithography
- ▶ Material Processing (Seeder)

Biophotonics: The most wanted wavelengths....



Point-of-care needs
405/488/561/640nm
on a chip

Target applications for „first light“ using waveguides

Confocal fluorescence microscopy:

- Multi-wavelength source for lab-on-a-chip
- Added value functions:
 - Variable optical attenuator
 - Optical switch

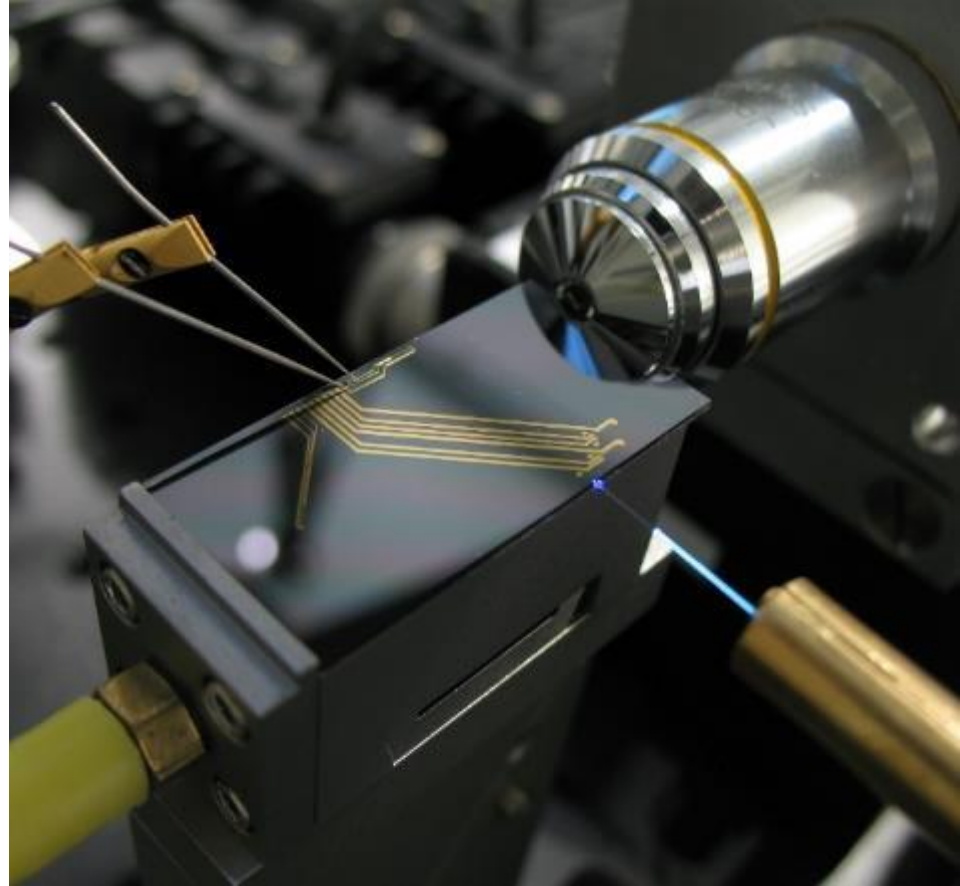
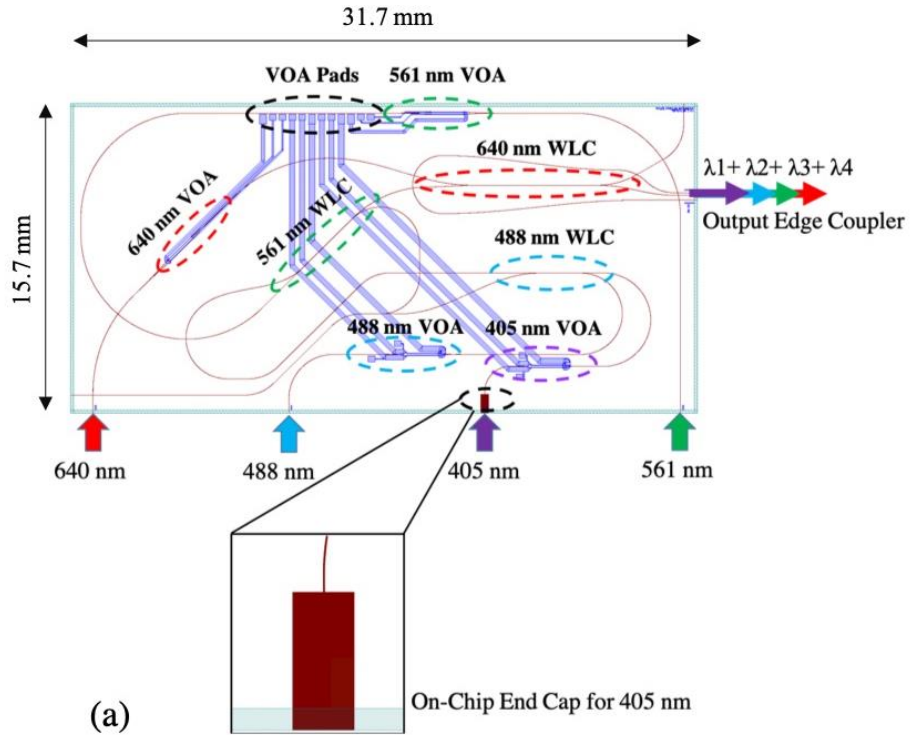


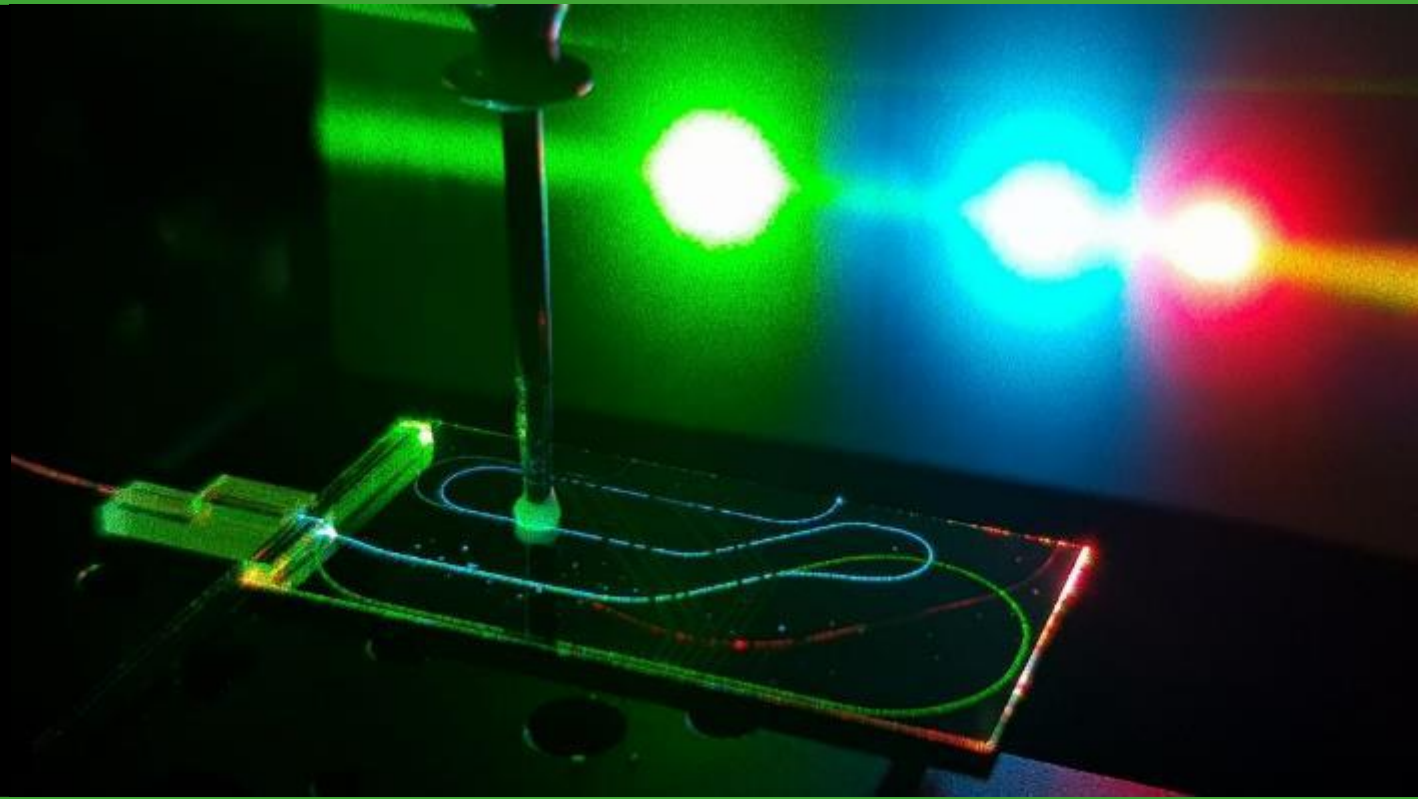
Flow-cell cytometry:

- Multi-wavelength source for point-of-care
- Programmable interference pattern at exit



Design of multi- λ source with EC, VOA and WLC





We are looking for partners to explore the future...

Miniaturized PIC multi-laser engines for life sciences

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Thank you for your attention! Questions?