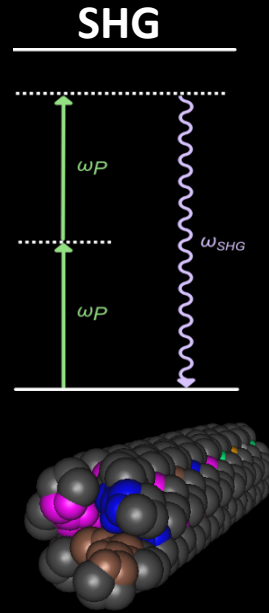
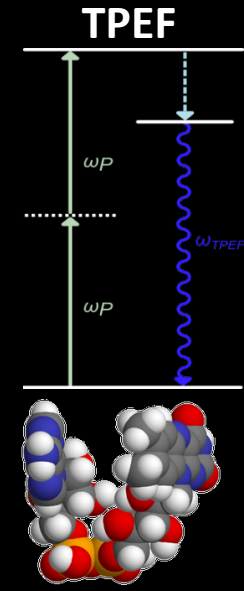
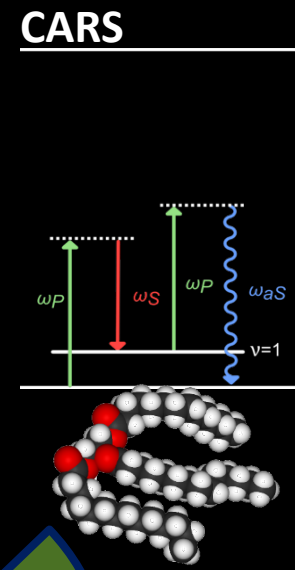
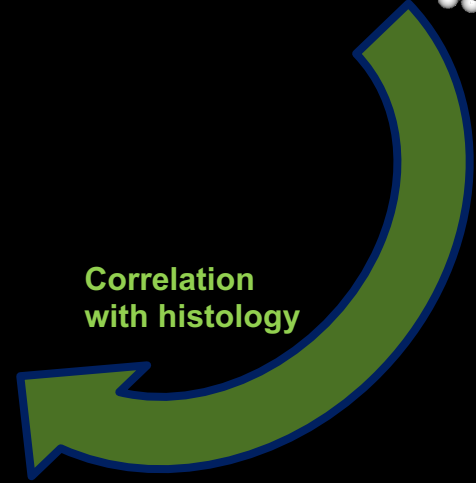
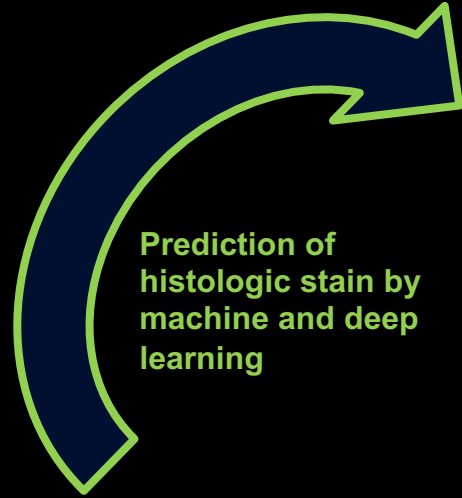


Compact multimodal non-linear imaging platform for biomedical diagnosis

Juergen Popp

Leibniz Institute of Photonic Technology Jena, Germany

Innovation and technology: Multimodal Microscopic Tissue and Cell Diagnosis



1 mm

CARS
SHG
TPEF

Computer based spectral histopathology

- Automatic prediction of tissue or cell types / disease
- Instant feedback by AI together with the pathologist
- Smaller workload due to automatization

Product and Service: Compact Multimodal Microscope for Use in Clinics or Biomedical Laboratories and Automatic Analysis of Multimodal Images

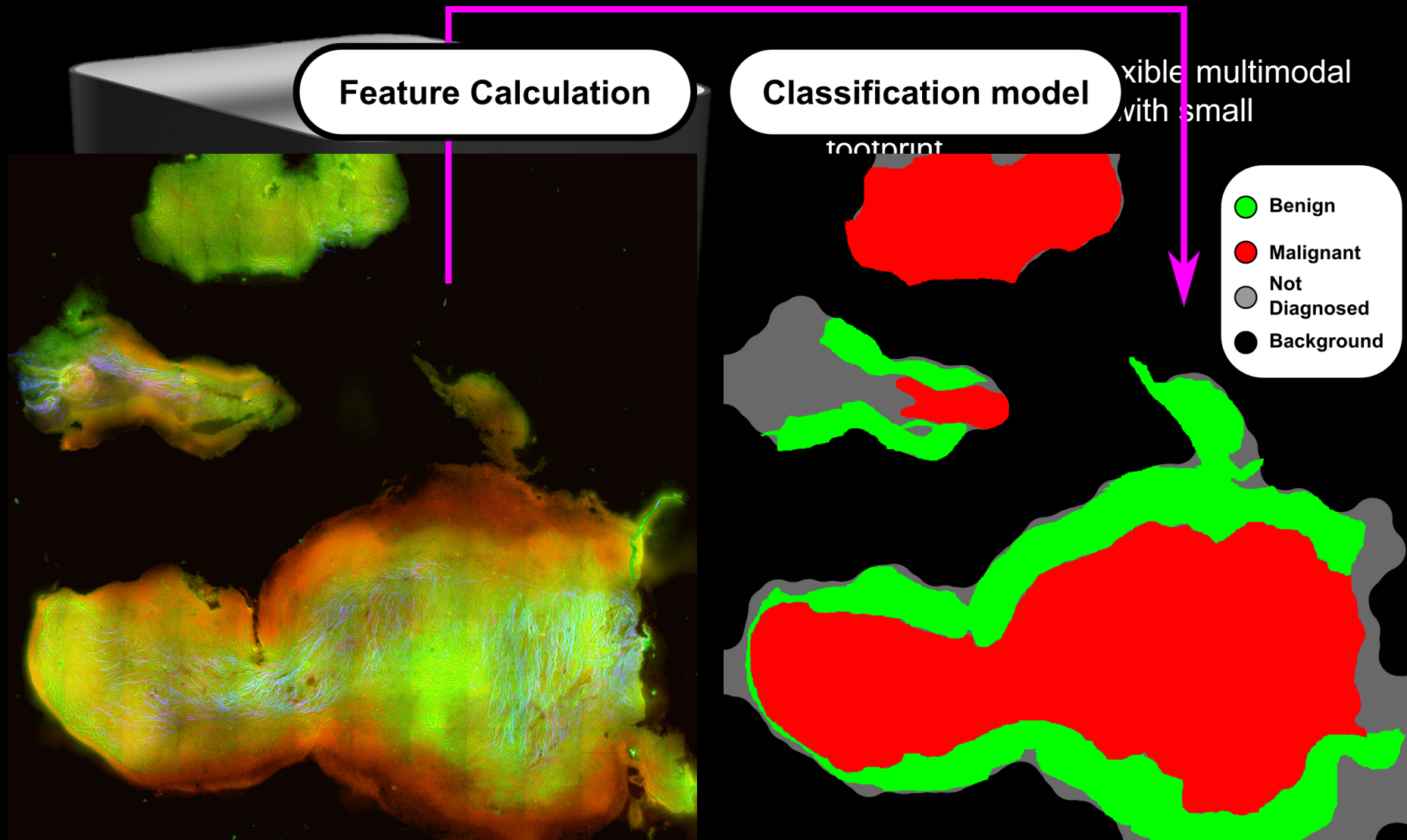


- highly mobile and flexible multimodal microscope system with small footprint
- Novel multi-color high power ultrashort fiber laser source suitable for 24 / 7 maintenance-free operation
- Imaging speed of 1 megapixel per second
- Diffraction limited spatial resolution
- Enlarged field of view (1,1 x 1,1 mm for a 20 x objective) suited for investigating large tissue specimens
- **Speed vs spatial resolution: 2 min per 1 cm²**

Bocklitz et al. BMC Cancer, 2016, 16, 534.

Meyer et al. 2013, Analyst, 138, 4048.

Product and Service: Compact Multimodal Microscope for Use in Clinics or Biomedical Laboratories and Automatic Analysis of Multimodal Images



Overall accuracy
cancer vs. not
cancer: 90 %

Heuke et al. Head & Neck 2016, DOI
10.1002/hed.24477

Bocklitz et al. BMC Cancer, 2016, 16, 534.

Meyer et al. 2013, Analyst, 138, 4048.

Challenges and Service: Compact Multimodal Microscope for Use in Clinics or Biomedical Laboratories and Automatic Analysis of Multimodal Images

Intellectual property:

Combination hardware (microscope & compact fiber laser source for clinical use) & automatic image analysis software

Partners:

- Friedrich-Schiller University (Institute for Physical Chemistry & Institute for Applied Physics)
- Fraunhofer Institute for Applied Optics and Precision Engineering IOF
- Jena University Hospital
- University Hospital Erlangen



Missing collaboration Partners and Challenges:

- Financial support in clinical validation / trial studies on large patient cohorts
- Support in hardware programming, electronics and augmented reality to display image analysis results
- Support in implementation of European Medical Device Regulation
- Support in obtaining CE marking
- Industry partner as customizer