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Coworkers

- Prof. Hans-Ulrich Bucher, MD
- PD Dr. Jean-Claude Fauchère, MD
- Dr. Derek Brown, Biophysicist
- Dr. Geert Morren, Biomedical Signal Analysis
- Dr. Andrea Bauschatz, MD
- Dr. Ursula Wolf, MD
- Daniel Haensse, Ph. D. Student, Electrical Engineering ETH
- Manuel Murbach, MS Student, Electrical Engineering ETH
- Marcel Meerstetter, MS Student, Electrical Engineering ETH
- Martial Jacoma, MS Student, Electrical Engineering ETH
- Robert Hunger, MS Student, Electrical Engineering ETH
- Thilo Grundmann, Computer Science Student, TU Hamburg
- Angela Chappatte, MD Student, University Zurich

Research areas

- Near-infrared spectrophotometry
 - Functional imaging of brain activity
 - Oxygenation
 - Frequency domain spectroscopy

Brain activity: Two signals

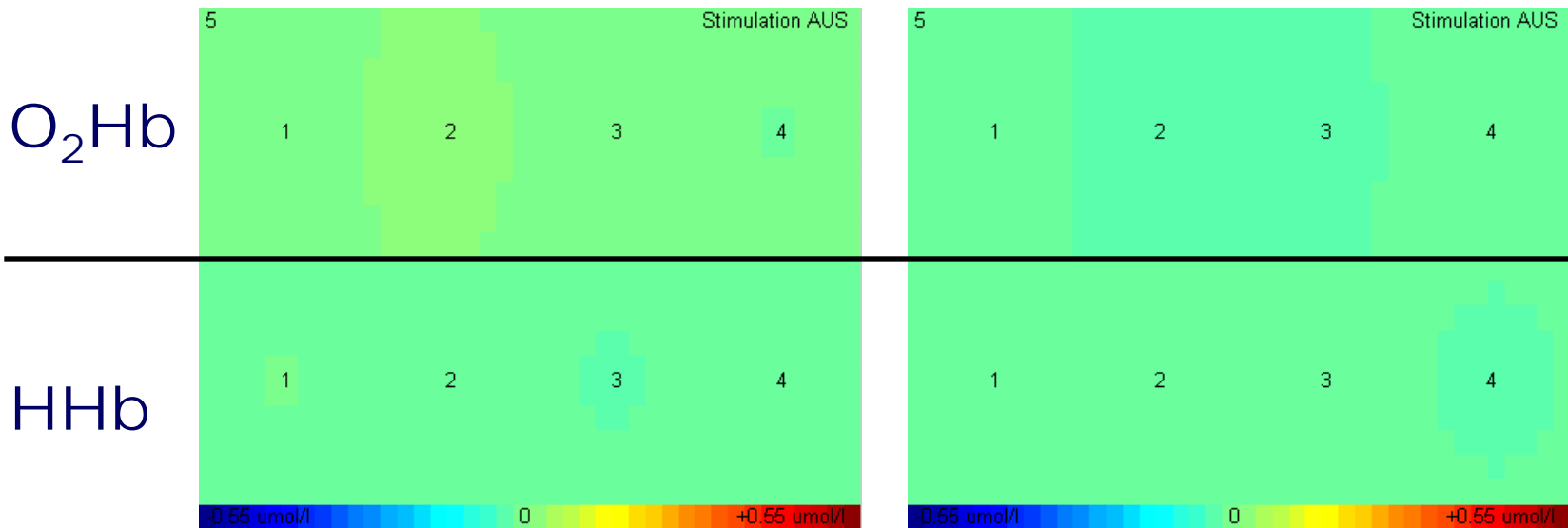
- Fast neuronal signal
 - Neuron
 - Milliseconds
- Slow hemodynamic signal
 - Hemoglobin concentration
 - Change in blood flow
 - Seconds

Functional near-infrared spectrophotometry and imaging



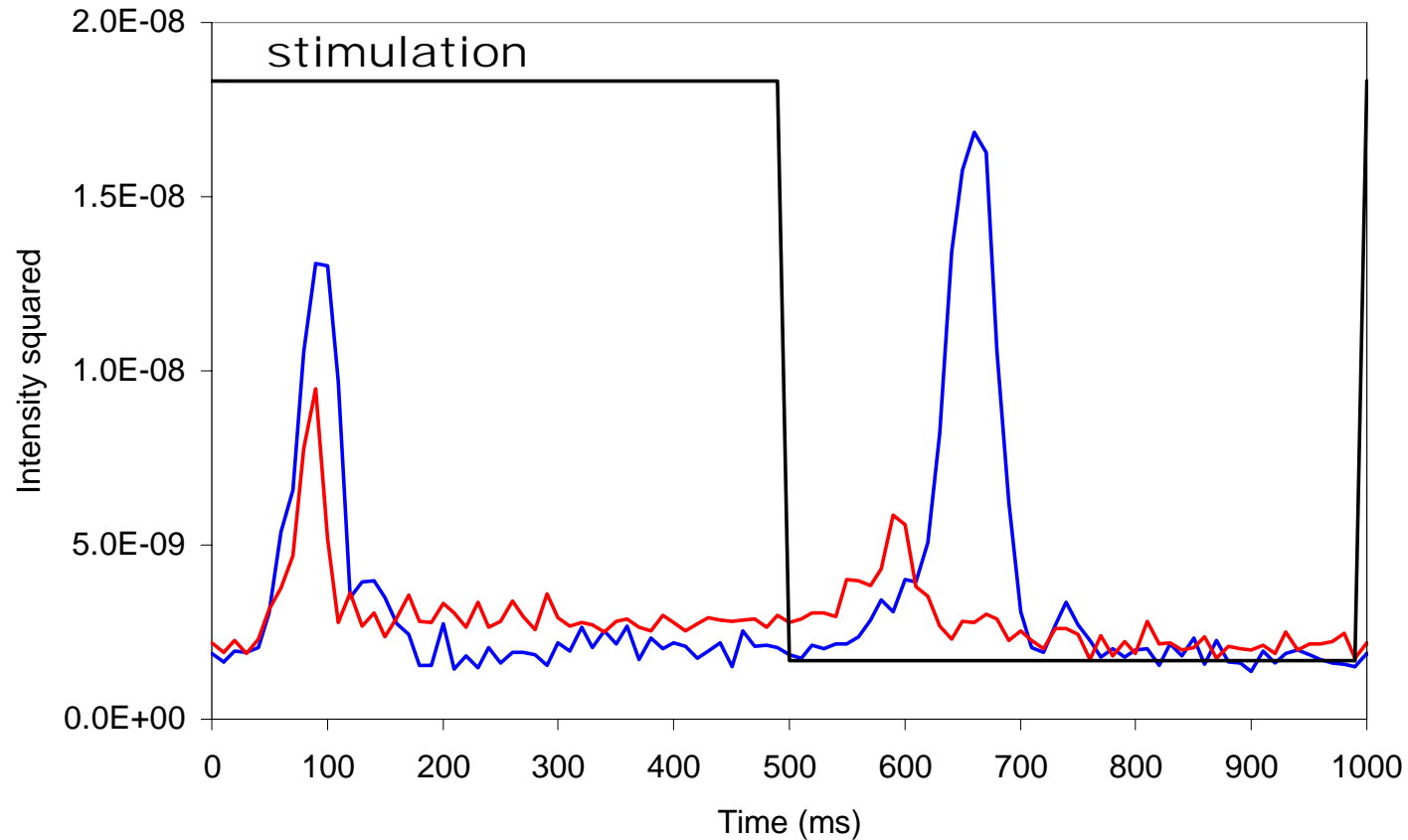
Stimulation
Ipsi-lateral

Stimulation
Contra-lateral



concentration
decreases ← → increases

Fast neuronal signal: Two infants



Instrumentation



Imaging Sensor

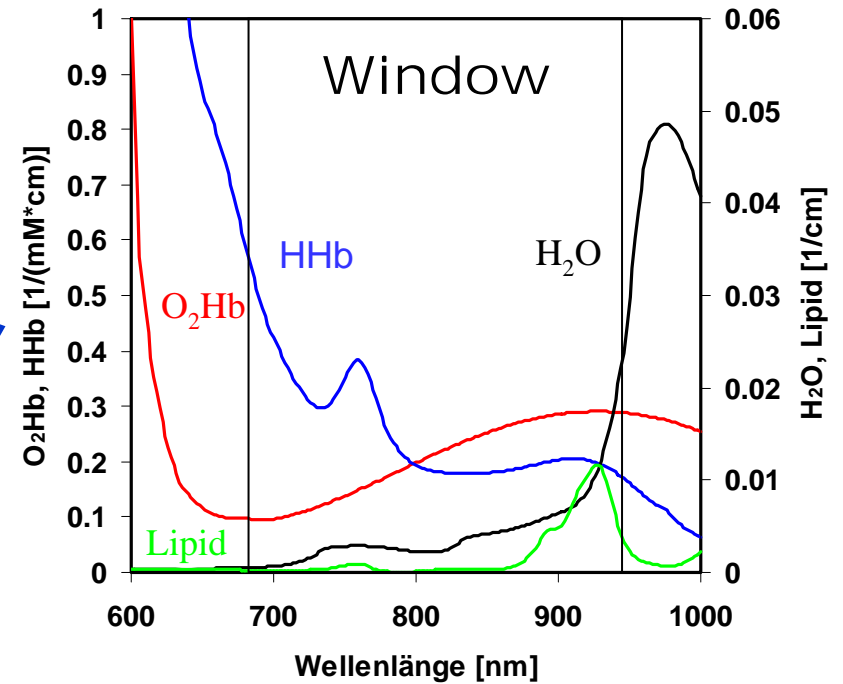
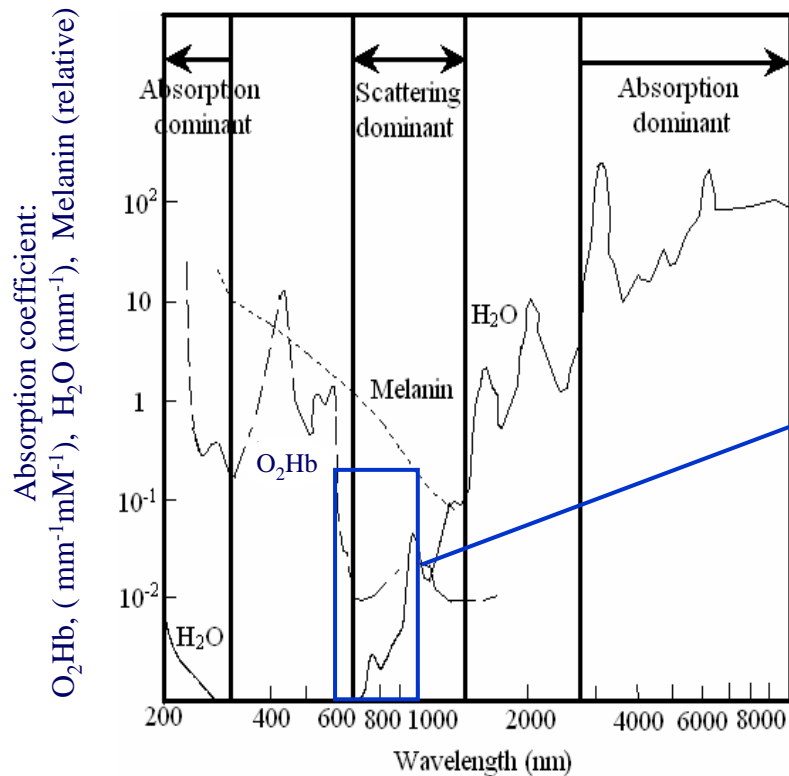


Instrument

Oxygenation by near-infrared spectrophotometry

- Hemoglobin concentration
- Hemoglobin flow
- Arterial, tissue and venous oxygen saturation of hemoglobin

Frequency-Domain Spectroscopy



Instruments

- High Speed Optical Brain Imager MCP II
- ISS[®] Inc. Imagent
- UV-VIS Spectrometer Shimadzu[®] UV 1601
 - 190nm –1100nm
- Hamamatsu[®] NIRO 300

Collaborations

- Medicine
 - Intensive care medicine, Pediatrics, (Neuro-) Surgery, Gynecology & Obstetrics, Traumatology, Sports medicine, Anesthesiology, Psychiatry
- Toxicology
 - Radiation of mobile phones
- Neuroscience
- Industrial
 - Miromico, ISS, Schiller

Expectation of bmpn

- Enhance
 - Interdisciplinary collaboration in research
 - Industrial collaboration
 - Teaching