OPTI-596: Computational Imaging and Machine Vision Seminar

This course explores the emerging new fields of *Computational Imaging and Machine Vision. The fields* combine ideas in *technical optics, fourier optics, information theory, image processing, computer graphics, and computer vision.* The course will introduce state-of-the-art topics in computational imaging and machine vision, such as different methods for *3D imaging, light fields, holographic displays* and much more!

It will be held in a "part lecture, part seminar"-style that gives the students the opportunity to contribute actively and to sharpen their presentation skills. The instructor introduces the students to the core topics in a course lecture. At the end of each lecture, important shortcomings or open questions of the introduced methods are formulated. The students will find the answers to these problems by reading and presenting papers from a selection provided by the lecturer.

Besides the technical aspects of each method and the related papers, the course will also focus on teaching students how to give a good presentation, which means that different presentation styles and techniques will be discussed as well.

Technical topics that will be reviewed and presented:

- Light field imaging, Plenoptic Representations, Aperture Synthesis
- Active and Passive Triangulation, Structured Light 3D imaging
- Appearance capturing and Photometric Stereo
- Time-of-Flight imaging, Imaging Around Corners and through Scatterers
- 3D Imaging of Specular Objects, Deflectometry
- Event Cameras, Motion Processing
- Interferometry, Holography, Lensless Imaging, wavefront sensing
- Light Transport, Direct and Global separation
- Light field Displays and Holographic Displays
- … and many more

Number of allowed students for this course is limited. More information will be published soon.