



## PhD course announcement:

### Eye tracking in Desktop, Natural and Virtual Environments

26 – 30 June 2017 | Karlsruhe Institute of Technology, Germany

<http://tinyurl.com/phdcourse-eyetracking>

#### Lecturers:



**Martin Meißner**  
Marketing & Innovation



**Jella Pfeiffer**  
Institute for Information  
Systems & Marketing  
Engineering



**Thies Pfeiffer**  
Center of Excellence  
Cognitive Interaction  
Technology



**Jacob Orquin**  
Consumer Psychology



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#### Purpose and content:

##### Description:

Much of the rapid growth of research on attention and especially eye tracking has been driven by the fast technological development in recent years and a sharp decline in the costs of eye tracking equipment. Remote, head-mounted, and mobile devices are used in many PhD projects because it is getting easier to generate larger samples of respondents in new, unexplored environments. Eye tracking makes it possible to track and study attentional processes in great detail, classically in front of computer screens, but also in mobile contexts, for example, when using digital devices, like smartphones or smartglasses (Google glasses, Microsoft HoloLens).

The qualifications and skills obtained during master programs often hardly prepare PhD students to conduct eye tracking studies, to avoid potential pitfalls when using the eye tracking equipment and to analyze the complex eye tracking datasets. Especially in the beginning of a PhD project these

challenges appear to be overwhelming. PhD students completing the course will gain an overview of research in the field of bottom-up and top-down attentional processes. We will also discuss latest developments in the field of eye tracking, including learning and contextual biases in decision sequences. Furthermore, we will show how eye tracking can be used in virtual environments, for example with head mounted displays or in CAVEs. From a practical perspective PhD students will get insight how to set up eye tracking experiments. They will also conduct a first empirical study on their own and analyze an eye tracking dataset. PhD students will have the opportunity to use remote and mobile eye tracking devices together with their own laptops and use the provided software to analyze their datasets. Based on this experience, students will be able to critically reflect their experimental work and improve the planning of their own future empirical studies.

### Course Content:

The following topics will be part of the course:

- Eye tracking basics
- Bottom-up and top-down processes of visual attention
- Eye tracking measures and their meaning (pupil dilation, fixation duration, eye blinks, saccadic distances)
- Handling and management of eye tracking data
- Mobile eye tracking equipment and annotation of fixations
- Use of mobile eye tracking in virtual and augmented reality
- OpenSource eye tracking software
- Analysis of eye tracking data
- Hands-on experiment with portable eye tracking equipment (SMI Eye Tracking Glasses): Setup of a small experiment using low-frequency, portable eye-trackers to record data, analysis of the dataset, presentation of first results in class.
- Hands-on mobile eye tracking equipment: Track a short sequence with the mobile equipment
- Individual recommendations to the submitted research proposals

### **Format:**

The course has a lecture/discussion format and a hands-on experimental component. The interactive lectures will focus on the theoretical background of visual attention. In a hands-on practical exercise PhD students will setup a small eye tracking experiment and use eye tracking equipment to record eye movements. Students can then use the provided open source software for analyzing the data as well as other (open source) statistical software package of their choice. Finally, they will present their first results in class. PhD Students will be able to use their own laptops in combination with a portable plug-in low frequency eye tracking device. Moreover, we will also bring mobile eye tracking equipment to the class so that PhD students will get familiar with new mobile eye tracking technologies, existing open source software and the potential pitfalls of these new devices.

### **Learning objectives:**

After completing the course, PhD students will have:

- an understanding of problems associated with conducting eye tracking studies using different sorts of equipment
- an understanding of the data generating process
- an ability to assess the prospects and limits of their own empirical research
- an ability to setup eye tracking experiments on their own avoiding serious pitfalls related to the use of eye tracking technology
- an understanding of the various ways in which eye tracking data can be analyzed
- an understanding of state-of-the-art theories of visual attention

### **Prerequisites:**

This PhD course is targeted for PhD students from business, psychology, experimental economic research, information systems, engineers and other related fields, who are planning or starting an empirical research project using eye tracking. Basic knowledge (master level) in statistics as well as knowledge in statistic software packages like SPSS, SAS, Stata, R or other programs is desirable but is not a precondition.

**Application deadline:** March 31, 2017

**Fee:** None (costs for logistics, accommodations, food etc. are not covered)

### **Evaluation:**

Certificates of completion will be issued based on class attendance and participation and the submitted posters. Every student must submit a poster (pdf-format, DIN A0 format) of the (potential) eye tracking study of his/her PhD project to Martin Meißner ([Meissner@sam.sdu.dk](mailto:Meissner@sam.sdu.dk)) no later than March 31, 2017. The poster should include: (1) (preliminary) research question(s); (2) a description of the data or data collection process; (3) a description of the (planned) experiments/studies; (4) empirical results (if available) and (5) key references. During the PhD course every student will be asked to present his or her poster.

### **Please note (important!):**

- **We have decided to limit the course to only 16 participants! This is because we want to work closely together with all participants and give individual recommendations and feedback. We expect to get probably more than three times the number of applications. Therefore, we would like to encourage you to submit a well-designed poster that will be the basis of the decision who will be invited to take part in the course.**
- **Course participants must make their own accommodation reservations. We will pass on contact details of all participants to you so that you may arrange joint accommodation in Karlsruhe.**

**What other participants say about our eye tracking course in 2015:**

*“An interesting, insightful and enjoyable course on eye tracking!”*

*“I like that we got a very good overview of different relevant topics. I also find it very useful to present briefly our projects and received a lot of useful feedback.”*

*“In one week I improved to a degree of knowledge about eye tracking that I could hardly reach by myself in one or two months.”*

*“I really enjoyed the time in the course and the social events! It was a good idea to invite people from different disciplines.”*

*“Learned a lot, also about technological cutting-edge aspects of eye tracking from very nice people.”*