



## Position for Early Stage Researcher (36 months)

*SwitchBoard* is an Innovative Training Network (ITN) funded by the European Commission's Horizon 2020 programme under the Marie Curie Actions, comprising 11 European Universities, research institutions and companies, coordinated by Eberhard Karls Universität Tübingen, Germany. The duration of the project, entitled "In the eye of the observer: Visual processing at the heart of the retina", is 48 months, starting on November 01, 2015. The network will progressively open a total of 15 (3 year) full-time positions for PhD training.

### Project Title

**Development of a new DMD-based multi-disciplinary light modulation and beam shaping architecture**

### Project description

It is known that the sclera scatters light and thus the current existing capabilities of retinal imaging involve performing the imaging through the lens of the eye. If instead of illuminating the retina and collecting the back reflected light through the lens we do it through the sclera one will need to compensate the scattering in order to obtain high resolution imaging capabilities. However, illumination through the sclera is simpler and more robust. In this research project we propose to develop an adaptive optics configuration and image processing mechanism that will yield high resolution imaging through the sclera. This will be done by properly estimating the amount of scattering when the IR illumination is inserted and then correcting it by proper wave front modulation of the illumination beam.

### Methods

- Laboratory working guidelines
- Equipment operating review
- Spatial light modulators basics
- How to operate Digital light processing spatial light modulator
- Electro Optical design around DMD (digital micromirror device) modulators.
- Light sources (coherent and non coherent) characterization in optical systems
- Coherent and non coherent beam shaping optics.
  - diffractive phase mask design and testing (IFTA procedures of phase shift quantifications, laser source coupling with Phase mask in design and practical levels).
- Principles of structured light systems and specifically structured light with DLP systems
- Sensor selection approach and sensor optics and Image processing approaches in receiving channel of optical systems
- Projection system testing and measurement approaches (distortion, uniformity, power, spectrometry)
- Thermal effect and considerations in electro optical architecture establishment

Optical component testing and electro optical setup establishment guidelines  
Operating hardware drivers for variety of light sources and operating methods  
Operating hardware electronics with DMD modulator  
Electro optical experiments and data reading guidelines  
Malfunction search and find methodology  
Documentation guidelines  
Working with subcontractors and leading tasks given by project manager  
Working with vendors and leading tasks given by project manager  
Working with lasers and laser safety  
Quality assurance guidelines

## Team

Electro optics Lab in which most of the work will be held.

Lab consists of electro optics table for setup establishment and testing. Electronics measuring tools, electro optics measuring tools (power meter, spectrometer, beam profiling tools) DLP hardware operating computing systems, Laser driving tools. Thermal measurement tools. Electro mechanical tools. Vision tools (IR cameras, VIS cameras, Sensors), Surface analysis tools

Electro optics design engineer: Micha Dror

Electronics hardware and software engineer: Gaby Shugol

Mechanical Engineer: Nati Ben Chamo

Direct Supervisor: Yuval Kapellner (CTO)

## Candidate profile

We are looking for a candidate with an M.Sc degree in electronics engineering majoring optics, knowledge in image processing and optical modulation is preferable. Background in neuroscience is preferable.

## Eligibility Criteria

The EU has strict eligibility criteria for Early Stage Researchers: Candidates

- must not have resided or carried out their main activity in the country of the host institution for more than 12 months in the 3 years immediately prior to their recruitment.

- should not possess a PhD

- should have less than 4 years of research experience. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided.

## Envisaged JOB STARTING DATE:

**Spring 2016**

## How to apply & Contact:

Please send your application including

- (1) CV
- (2) Letter of intent
- (3) Study record
- (4) The name of two referees

to Mr. Yuval Kapellner (Yuval\_k@ekb.co.il)