

## ***Ahmed El Hady***

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### **EDUCATIONAL BACKGROUND:**

- October 2008 – March 2013      PhD student, Department of Non Linear dynamics, Theoretical Neurophysics Research Group, Max Planck Institute for Dynamics and Self Organization, Goettingen, Germany.  
Advisors: Prof. Fred Wolf / Prof. Walter Stühmer / Prof. Theo Geisel  
Thesis title: “*Studies of cultured neuronal networks using light activated ion channels and pumps*”.  
(PhD defended October 2012, PhD title conferred March 2013)
- October 2007 – August 2008      Master courses, *International Max Planck Research School of Neurosciences*, Goettingen, Germany.
- 2001 – 2006      Faculty of Pharmacy, Cairo university  
B.Sc. (Honor), Pharmaceutical sciences

### **Schools:**

- November 26 – December 7, 2012      “Quantitative systems biology” winter school, *International Center for Theoretical Physics*, Trieste, Italy.
- August 2 – 30, 2009      “Methods in computational neuroscience” summer school, *Marine Biological Laboratory*, Woods hole, Massachusetts.
- May 10 – May 15, 2011      “FutureMed 2011” executive program, *NASA Ames Research Center*, San Jose, California
- October 23 – November 7, 2010      “Emerging techniques in neuroscience” program, *Kavli Institute for Theoretical Physics*, Santa Barbara, California

### **PROFESSIONAL EXPERIENCE:**

- March 2013 - Now      Postdoctoral fellow, Max Planck Institute for Dynamics and Self organization & Cellular Basis of Sensory Processing Research Center, Goettingen, Germany.
- April – September, 2007      Medical trainer, Medical department, T3A industrial, Cairo, Egypt.
- August 2006 – April 2007      Research and development specialist, Pharmaceutical dosage form design unit, T3A industrial complex, Assiut, Egypt.

## **TECHNICAL SKILLS:**

- **Experimental skills:** Primary neuronal cultures, In vitro multielectrode array recordings, Optogenetics, Confocal & fluorescence microscopy, Basic molecular biology techniques (cloning, site directed mutagenesis, western blot, PCR, RT-PCR, Microarray analysis), Immunocytochemistry.
- **Programming skills:** Matlab, NEURON, Python.

## **RESEARCH PROJECTS**

### **Current research projects:**

- “*In vitro closed loop optical neurostimulation*” with Prof. Fred Wolf (Max Planck Institute for Dynamics and Self Organization) and Prof. Walter Stühmer (Max Planck Institute for Experimental Medicine).
- “*Optophysiological studies of the firing rate dynamics of cortical neurons*” with Prof. Fred Wolf and Prof. Walter Stühmer.
- “*Patterning neuronal cell cultures*” with Prof. Christiane Thielemann (Hochschule Aschaffenburg).

### **Previous research projects:**

- “*Neuronal networks at the edge of chaos*” with Prof. Haim Sompolinsky, Woods Hole computational neuroscience course 2009.
- “*Psychophysics and modeling of contextual effects in motion processing*” with Prof. Stefan treue (German Primate Center).
- “*MTT viability assay for glutamate challenged pc12 cells: Optimization and comparison with trypan blue method*” with Prof. Walter Stühmer.
- “*Deterministic Chaos in a three theta neurons network*” with Prof. Fred Wolf.
- “*Role of protein phosphatase 2C in atherosclerosis*” with Prof. Josef Kriegelstein (Marburg Institute for Pharmacology and Toxicology).

## **AWARDS AND HONORS**

- Aspen Institute Seminar scholarship 2013
- Aspen Socrates Winter Seminar scholarship 2012
- Georg Lichtenberg fellowship 2009 – 2011
- MBL tuition fees scholarship 2009
- International Max Planck Research School Scholarship 2007 - 2008

## **TEACHING EXPERIENCE:**

- Supervision of the master thesis of Jatin Nagpal (Thesis title: “*Characterization of channelrhodopsin 2 response to fluctuating and constant light stimulation*”).
- Supervision of the bachelor thesis of Robert Samhaber (Thesis title: “*Patterned neuronal cultures on multielectrode arrays*”).
- Tutor, *Theoretical Neuroscience Course*, International Max Planck Research School of Neurosciences, Goettingen, Germany (January 7 – 11, 2009).
- Junior lecturer, *Translational neuroscience workshop*, Max Planck Institute for Experimental Medicine, Goettingen, Germany (June 6 – 8, 2008).

## **COURSES AND WORKSHOPS**

- “*Matlab for image analysis*” workshop, Physical chemistry institute, Goettingen (October 10 – 14, 2011).
- “*Introductory course in laboratory animals: Handling, Techniques and Theory*”, Max Planck Institute for Experimental Medicine, Goettingen (April 20 – 23, 2009).
- “*Analysis and models in neurophysiology*” course, Bernstein Center for Computational neuroscience, Freiburg (October 13 – 17, 2008).
- “*Mathematical Neuroscience*” workshop, Royal Society of Edinburgh, Edinburgh (March 17 – 19, 2008).

## **PROFESSIONAL SCIENTIFIC ACTIVITIES:**

- Co-Chair (with Prof. Hagai Bergman), “*Closed Loop Methodology in Neural Systems*” Technical Workshop, FENS 2014 (July 5 – 9, 2014, Milan).
- Discussion leader, *Gordon Research Seminar on Photosensory Receptors 2014* (From Biophysics and Physiology to Optogenetics and Clinical Applications, April 6 – 11, 2014, Italy).
- Guest editor (with Prof. Steve Potter and Prof. Ebehard Fetz) of the special topic issue “*Closing the loop around neural systems*” in *Frontiers in Neural Circuits*.
- Organizer, Bernstein focus for Neurotechnology course on “*Patterning neuronal cell cultures*”, (Goettingen, Germany, September 5 – 7, 2011).
- Organizer, Goettingen Graduate School for Molecular Biosciences and Neuroscience course on “*Multielectrode array recordings*”, Goettingen, Germany (January 17 – 20 , 2011).

## **SCIENTIFIC TALKS:**

### **Invited talks:**

- Edmond Lily Safra Center for Brain Sciences retreat 2014, Ein Gedi, Israel.
- Network Biology Laboratory seminar series, Technion, Haifa, Israel.
- EPFL computational neuroscience seminar series, Lausanne, Switzerland.
- Max Planck Institute Florida seminar series, Jupiter, Florida.
- Donders discussions 2010, Nijmegen, Netherlands.
- Janelia farm conference on “Genetic manipulation of neuronal activity II” 2010, Virginia, Washington.
- Neuroseminar, Department of biomedical engineering, Georgia Institute of Technology, Atlanta, Georgia.

### **Contributed talks:**

- “Timescales in neuronal population encoding and their biophysical basis” symposium, 2013 German Neuroscience Society Meeting, Goettingen, Germany.
- 2012 Gordon Research Seminar on “Photosensory receptors”, Galveston, Texas.

## **PUBLICATIONS:**

Witt A., Neef A., **El Hady A.**, Wolf F., Battaglia D. Controlling the oscillation phase through precisely timed closed loop optogenetic stimulation: a computational study. *Front. Neural Circuits*. 7:49.

**El Hady A\***, Afshar G\*, Bröking K., Schlüter O., Geisel T., Bamberg E., Stühmer W., Wolf F. Optogenetic stimulation effectively enhances intrinsically generated network synchrony. *Front. Neural Circuits* 7:167

Neef A\*, **El Hady A\***, Nagpal J\*, Bröking K., Afshar G., Schlüter O., Geisel T., Bamberg E., Fleischmann R., Stühmer W., Wolf F. Continuous Dynamic Photostimulation - inducing in-vivo-like fluctuating conductances with Channelrhodopsins. *arXiv:1305.7125[q-bio.NC]*

Samhaber R\*, **El Hady A\***, Bröking K., Daus A., Stühmer W., Thielmann C., Wolf F. Neuronal islands on multi-electrode arrays using FP- $\mu$ CP. *Manuscript in revision*.

Afshar G\*, **El Hady A\***, Geisel T., Bamberg E., Stühmer W., Wolf F. Optogenetic network potentiation tightens the coupling between leaders and follower neurons in burst synchronization. *Manuscript in preparation*.

\*Equally contributing authors

## **CONFERENCE PROCEEDINGS:**

**El Hady A.**, Stühmer W. In vitro closed loop optical network electrophysiology: an introduction. AIP Conf. Proc. (2013) 1510, 234 – 243

Neef A\*, **El Hady A\***, Lazarov E., Bröking K., Geisel T., Stühmer W., Wolf F. Non-invasive characterization of individual neurons with Continuous dynamic photo-stimulation. *Society for Neuroscience conference 2012 abstract, New Orleans, United States*.

**El Hady A.**, Afshar G., Geisel T., Stühmer W., Wolf F. Optogenetic modification of network burst structure: a mechanistic study. *Gordon Research Conference on Photosensory receptors and Signal transduction 2012, Galveston, United States*.

Neef A., Piper C., **El Hady A.** Imaging of optogenetically induced pH changes. *Janelia farm conference on biological sensors 2012, Virginia, United States*.

Bröking K., **El Hady A.**, Fleischmann R., Geisel T., Wolf F. Photoelectric effect in multielectrode arrays. *Proc. Of the 8<sup>th</sup> International meeting on substrate-integrated micro electrode arrays, Reutlingen germany. p. 230 – 231*.

Neef A.\*, **El Hady A\***, Nagpal J, Bröking K, Afshar G., Schlüter O., Geisel T., Bamberg E., Fleischmann R., Stühmer W., Wolf F. Continuous dynamic photostimulation – inducing in – vivo like fluctuating conductances with Channelrhodopsins. *J Mol Neurosci (2012) 48 (Suppl 1):S84-S85*.

Afshar G\*, **El Hady A\***, Schlüter O., Geisel T., Stühmer W., Wolf F. Optogenetic modification of network burst structure. *Society for Neuroscience conference 2011 abstract, Washington DC, United States*.

**El Hady A.**, Afshar G., Schlüter O., Geisel T., Stühmer W., Wolf F. Optogenetic induction of network level plasticity. *Front. Comput. Neurosci. Conference Abstract: BC11: Computational Neuroscience & Neurotechnology Bernstein Conference & Neurex Annual Meeting 2011*.

**El Hady A.**, Broeking K., Afshar G., Schlüter O., Stühmer W., Wolf F. In Vitro Closed loop Optical Electrophysiology of Networks I: Whole field illumination Paradigm *Proc. Of the 7<sup>th</sup> International meeting on substrate integrated micro-electrode arrays, Reutlingen, Germany, p. 253 – 255*.