

# GABRIEL OBREGON-HENAO

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## EDUCATION

### University of Washington, Seattle, WA, USA

*Ph.D. candidate in Neuroscience*

September 2015 – Present

### Escuela de Ingeniería de Antioquia – Universidad CES, Envigado, Antioquia, Colombia

*Joint B.Sc. Degree in Biomedical Engineering*

July 2004 – July 2010

- Graduated with honors for thesis work on piezoelectric immunosensors.

### The Columbus School, Envigado, Antioquia, Colombia

*Bilingual (English/Spanish) high school with emphasis on pre-health sciences*

June 2000 – June 2004

- Graduated with honors for excellence in mathematics and the arts.

## RESEARCH EXPERIENCE

### University of Washington, Seattle, WA, USA

**Position:** Ph.D. candidate

September 2016 – Present

**Supervisors:** Elizabeth Buffalo, Ph.D. and Jeffrey Ojemann, M.D.

- Investigating the dynamic interaction between eye movements, neural oscillations, and declarative memory in human epilepsy patients performing a free-viewing task.

### University of Washington, Seattle, WA, USA

**Position:** Ph.D. rotation student

September 2015 – September 2016

- Built a virtual reality environment for studying walking behavior in the fruit fly under Prof. John Tuthill.
- Applied connectivity measures to infra-slow human electrocorticography recordings under Profs. Kurt Weaver and Jeffrey Ojemann.
- Applied source imaging techniques and pupillometry to investigate the neural substrate of cognitive load in a human auditory task under Prof. Adrian KC Lee.

### Massachusetts General Hospital, Boston, MA, USA

**Position:** Research technician at Neuroscience Statistics Research Laboratory

May 2011 – August 2015

**Supervisors:** Patrick Purdon, Ph.D. and Emery Brown, M.D./Ph.D.

- Developed a novel MEG/EEG source localization algorithm (SPIGH) using ideas from compressed sensing.
- Collaborated on extending the SPIGH algorithm to help resolve sources in deep brain structures.
- Worked on applying the SPIGH algorithm for the localization of epileptogenic foci in patients with intractable epilepsy.

- Applied sparse source localization methods for the analysis of REM sleep and dexmedetomidine-induced sedation.
- Helped to improve previous dynamic source localization algorithms by incorporating connectivity information, as derived from DTI.

**Scripps Institution of Oceanography, La Jolla, CA, USA**

**Position:** Student intern at Jaffe Laboratory for Underwater Imaging      September 2009 – January 2010

**Supervisor:** Jules Jaffe, Ph.D.

- Worked on the construction, calibration, and field-testing of underwater imaging technologies for studying endangered marine ecosystems.
- Developed a statistical signal processing algorithm for analyzing underwater images of zooplankton.

**Scripps Institution of Oceanography, La Jolla, CA, USA**

**Position:** Student intern at Center for Marine Biotechnology and Biomedicine      August – September 2009

**Supervisor:** William Fenical, Ph.D.

- Worked on the fermentation of marine microorganisms found to produce chemical compounds for the treatment of contemporary diseases.

**Mayo Clinic College of Medicine, Rochester, MN, USA**

**Position:** Student intern at Cell Imaging and Physiology Laboratory

February – July 2009

**Supervisors:** Gary Sieck, Ph.D. and Carlos Mantilla, M.D./Ph.D.

- Applied image processing and 3-D reconstruction techniques to dendritic tree confocal imaging stacks from a spinal cord injury animal model.

## PUBLICATIONS

Krishnaswamy, P., **Obregon-Henao, G.**, Ahveninen, J., Khan, S., Babadi, B., Iglesias, J.E., Hämäläinen, M.S., and Purdon, P.L. (2017). Sparsity enables subcortical source estimation. *PNAS*, 114(48).

Pirondini, E., Babadi, B., **Obregon-Henao, G.**, Lamus, C., Malik, W.Q., Hämäläinen, M.S., and Purdon, P.L. (2017). Computationally-efficient algorithms for sparse, dynamic solutions to the EEG source localization problem. *IEEE Trans Biomed Eng.* doi: 10.1109/TBME.2017.2739824.

Prerau, M.J., Hartnack, K.E., **Obregon-Henao, G.**, Sampson, A., Merlino, M., Gannon, K., Bianchi, M.T., Ellenbogen, J.M., and Purdon, P.L. (2014). Tracking the sleep onset process: an empirical model of behavioral and physiological dynamics. *PLoS Comput. Biol.*, 10(10): e1003866.

\*Babadi, B., \***Obregon-Henao, G.**, Lamus, C., Hämäläinen, M.S., Brown, E.N., and Purdon, P.L. (2014). A subspace pursuit-based iterative greedy hierarchical solution to the neuromagnetic inverse problem. *Neuroimage*, 87: 427-443. (\***Joint-first author**).

\***Obregon-Henao, G.**, Babadi, B., Lamus, C., Brown, E.N., and Purdon, P.L. (2012). A fast iterative greedy algorithm for MEG source localization. *Conf Proc IEEE Eng Med Biol Soc.*, 6748-51.

## **PATENTS**

Krishnaswamy, P., **Obregon-Henao, G.**, Babadi, B., Hämäläinen, M.S., and Purdon, P.L. Deep brain source imaging with M/EEG and anatomical MRI. Patent publication number WO2016073985 A1, May 2016.

## **FELLOWSHIPS AND AWARDS**

**University of Washington, Seattle, WA, USA**

Computational Neuroscience Training Grant

September 2017 – Present

## **TALKS**

**IEEE Engineering in Medicine and Biology Society Conference, San Diego, CA**

A fast, iterative, greedy algorithm for MEG source localization

August 2012

## **TEACHING EXPERIENCE**

**University of Washington, Seattle, WA**

Teaching assistant for Introduction to Systems Neuroscience

Autumn 2016