

Geoffrey Newman, PhD

Department of Biomedical Engineering
Johns Hopkins School of Medicine
720 Rutland Avenue, Ross 720
Baltimore, MD 21205

Phone: (646) 344-0831
Office: 101 Clark Hall
Website: <http://geoffreynewman.me>
Email: geoffrey@geoffreynewman.me

EDUCATION

Ph.D. Biomedical Engineering, Johns Hopkins University (JHU), February 2016

- *Dissertation*: “Network Modeling of Motor Pathways from Neural Recordings”
- *Committee*: N. Thakor, N. Crone, E. Niebur

B.Eng. Biomedical Engineering, *Magna Cum Laude*, City College of the City University of New York (CCNY), 2008

- *Minor*: Applied Mathematics

Advanced Regents Diploma, The Bronx High School of Science, 2004

RESEARCH EXPERIENCE

Research Assistant – JHU Brain Computer Interface, PI: Nitish Thakor, 2008 – Present

- Employed signal processing and graph theory techniques to the field of neuroscience
 - Applied time-varying connectivity models to quantified the flow of neural information
 - Found functional units of neural computation using Eigenspectral clustering
- Utilized machine learning methods to predict movement intent from neural recordings
 - Decoded movement kinematics from noisy spiking activity of neural clusters
- Improved code run-time by implementing parallelization and deploying on a 96-node cluster

Research Assistant – CCNY Eye Movement and Vision, PI: Jay Edelman, 2006 – 2008

- Investigated movement planning of saccades via eye tracking data and non-invasive neural recordings
- Created a graphical user interface to simplify data preprocessing

PROFESSIONAL DEVELOPMENT **Fellow**, The Data Incubator, Summer 2015

Intensive two month training program in data science with an acceptance rate below 2%

- Scraped event photograph albums from newyorksocialdiary.com to form a 102k link weighted network of socialites appearing together based on the captions to evaluate network structure
- Built models to predict a new store’s Yelp rating, including ridge regression incorporating store categories and physical attributes, in addition to regularized support-vector regression using the word content of unstructured review text as features
- Applied MapReduce to the 12.2 GB English Wikipedia (5M articles) to model article statistics and determine the entropy of n-grams across simple English and Thai languages

SELECTED PROJECTS

Cute Pets NYC – Winter 2015–2016

- URL: <https://github.com/geoffreyn/CutePetsNYC>
- Twitter-bot that cycles through available pets on petango.com hourly to tweet an image and link to a currently adoptable dog or cat within the greater New York City area

Baltimore Tax Credit Map – Hackathon Project, Fall 2015

- URL: <http://www.baltimoretaxcredit.com> – Created at HopHacks
- Interactive online visualization of eligibility and claims for \$60M annually in Maryland homeowners' tax credits
 - Produced an API with Flask to hot-link each home on the map to its tax record
 - Awards: First place overall, best user experience (sponsored by Mission:Data), best use of Baltimore open data (sponsored by Booz Allen Hamilton)

Product Suggestion Service – Summer 2015

- URL: <http://geoffreynewman.me/demo/proposal>
- Suggests products with reviews closely matching the user provided description of a desired item
- Assigns a similarity score for each reviewed product to the user's search based on 581,933 reviews

PUBLICATIONS

Geoffrey Newman, Matt Fifer, Heather Benz, Nathan Crone, and Nitish Thakor. Eigenvector centrality reveals the time course of task-specific electrode connectivity in human ECoG. In *Neural Engineering (NER), 2015 7th International IEEE/EMBS Conference*. pages 336–339. IEEE, 2015.

Nitish Thakor, Matthew Fifer, Guy Hotson, Heather Benz, **Geoffrey Newman**, Griffin Mil-sap, and Nathan Crone. Neuroprosthetic limb control with electrocorticography: Approaches and challenges. In *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE*, pages 5212–5215. IEEE, 2014.

Geoffrey Newman*, Vikram Aggarwal*, Marc Schieber, and Nitish Thakor. Identifying neuron communities during a reach and grasp task using an unsupervised clustering analysis. In *Engineering in Medicine and Biology Society, EMBC, 2011 33rd Annual International Conference of the IEEE*, pages 6401–6404. IEEE, 2011.

Sarah Ying, **Geoffrey Newman**, Young-Seok Choi, Hyoung-Nam Kim, Alessandro Presacco, Mayuresh Kothare, and Nitish Thakor. Cerebellar ataxia patients are able to use motor imagery to modulate mu-band power in a pilot study of EEG-based brain-computer interface control. In *Neural Engineering (NER), 2011 5th International IEEE/EMBS Conference*, pages 192–195. IEEE, 2011.

Rong Liu, **Geoffrey Newman**, Sarah Ying, and Nitish Thakor. Improved BCI performance with sequential hypothesis testing. In *Engineering in Medicine and Biology Society, EMBC, 2011 33rd Annual International Conference of the IEEE*, pages 4215–4218. IEEE, 2011.

Simon Kelly, John Foxe, **Geoffrey Newman**, and Jay Edelman. Prepare for conflict: EEG correlates of the anticipation of target competition during overt and covert shifts of visual attention. *European Journal of Neuroscience*, 31(9):1690–1700, 2010.

Geoffrey Newman, Sarah Ying, Young-Seok Choi, Hyong-Nam Kim, Alessandro Presacco, Mayuresh Kothare, and Nitish Thakor. Brain computer interface in cerebellar ataxia. In *26th Southern Biomedical Engineering Conference SBEC 2010*, April 30-May 2, 2010, College Park, Maryland, USA, pages 289–292. Springer, 2010.

PUBLICATIONS
IN
PREPARATION
OR SUBMISSION

Geoffrey Newman, Matt Fifer, Nathan Crone, and Nitish Thakor. Task-specific sensorimotor networks revealed by eigenvector centrality in human ECoG. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, In Revision.

Rong Liu, Yongxuan Wang, **Geoffrey Newman**, Sarah Ying, and Nitish Thakor. Single-trial EEG classification in motor imagery BCI with a sequential decision-making method. *International Journal of Neural Systems*, In Review.

Geoffrey Newman*, Ryan Smith*, Nathan Crone, and Nitish Thakor. Detecting communities of motor and premotor neurons during a reach and grasp task. *Frontiers in Computational Neuroscience*, In Preparation.

Geoffrey Newman, Yujing Wang, Nathan Crone, and Nitish Thakor. Stability cluster analysis of human ECoG reveals distinct phases of neural processing. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, In Preparation.

AWARDS &
FELLOWSHIPS

NIH Neuroengineering Training Initiative Training Fellowship, 2008 – 2010. National Institute of Biomedical Imaging and Bioengineering (NIBIB), National Institute of Health (NIH) Grant T32EB003383

Howard Hughes Undergraduate Research Award, City College of New York, 2008

Whitaker Foundation Undergraduate Research Scholarship, City College of New York, 2004 – 2008

The Peter F. Vallone Academic Scholarship, City College of New York, 2004 – 2008

Advanced Placement Scholar with Distinction, Bronx High School of Science, 2004

INVITED
SEMINAR
TALKS

“*Network Modeling of Motor Pathways from Electrographic Recordings*,” DCS Corp, Aberdeen, MD, 2016

Morris Meister Research Lecture, “*Non-Invasive Brain-Computer Interface for Spinocerebellar Ataxia Patients*,” The Bronx High School of Science, Bronx, NY, 2009

CONFERENCE
PRESENTA-
TIONS

41st Annual Society for Neuroscience Meeting (SfN), Washington DC, November 12, 2011

33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston, MA, August 30, 2011

5th International Conference of the IEEE/EMBS Neural Engineering (NER), Cancun, Mexico, April 27, 2011

Training Grantees Meeting, National Institute of Biomedical Imaging and Bioengineering (NIBIB), Bethesda, MD, June 24, 2010

26th Southern Biomedical Engineering Conference (SBEC) 2010, College Park, MD, April 30, 2010

PROFESSIONAL ACTIVITIES **Assistant Managing Editor**, Medical and Biological Engineering and Computing, 2013 – 2015

Reviewer, Journal of Neuroscience Methods, 2015 – Present

Reviewer, Medical and Biological Engineering and Computing, 2014 – Present

Member, Institute of Electrical and Electronics Engineers (IEEE)

Member, Society for Neuroscience (SfN)

Member, Tau Beta Pi Engineering Honors Society (TBP)

TEACHING ASSISTANTSHIP System Bioengineering II (Neuroscience):
• Led weekly recitation for 50 students

Biomedical Instrumentation:

- Assisted 10 groups of 4 students in circuit design and debugging, in addition to Computer Aided Design
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MISC.

Programming Languages:

- Python, C++, Java, LaTeX, Qt, Matlab, HTML, SQL/MongoDB

Computer Systems and Software:

- Linux, Node.js, Qt, Photoshop, Cloud computing, Git

Languages:

- Native in English, reading and basic conversation competence in Japanese