

**Scott R. Cole**  
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<https://srcole.github.io>

## Education

*Ph.D. Candidate in Neuroscience*  
University of California, San Diego  
GPA: 3.9/4.0

2014 - 2018  
La Jolla, CA

*B.S. in Bioengineering, Electrical Engineering specialization, Math minor*  
Clemson University  
GPA: 4.0/4.0

2010 - 2014  
Clemson, SC

## Publications

1. **Cole SR**, Voytek B. (2018) Hippocampal theta bursting and waveform shape reflect CA1 spiking patterns. *bioRxiv*. [[link](#), [code](#)]
2. **Cole SR**, Voytek B. (2018) Cycle by cycle analysis of neural oscillations. *bioRxiv*. In review at *PLOS Computational Biology*. [[link](#), [code](#)]
3. **Cole SR**, van der Meij R, Peterson EJ, de Hemptinne C, Starr P, Voytek B. (2017) Nonsinusoidal oscillations underlie pathological phase-amplitude coupling in the motor cortex in Parkinson's disease. *Journal of Neuroscience*, 37(18) 4830-4840. [[link](#), [code and data](#)]
4. **Cole SR**, Voytek B. (2017) Brain oscillations and the importance of waveform shape. *Trends in Cognitive Sciences*, 21(2), 137-149. [[link](#)]
5. Mohammed FS, **Cole SR**, Kitchens CL. (2013) Synthesis and Enhanced Colloidal Stability of Cationic Gold Nanoparticles using Polyethyleneimine and Carbon Dioxide. *ACS Sustainable Chem. Eng.*, 1(7), 826-832. [[link](#)]

## Presentations

1. **Cole SR\***, Voytek B. Cycle by cycle analysis of neural oscillations. *Society for Neuroscience (SfN) Annual meeting*. San Diego, CA. 2018 Nov. [[link](#)]. \*Symposium Organizer
2. **Cole SR**, Voytek B. Brain oscillations and the importance of waveform shape. *International Conference on Biomagnetism (BIOMAG)*. Philadelphia, PA. 2018 Aug. [[link](#)]
3. **Cole SR**. Burritos are 10 dimensional. *Ignite San Diego*, San Diego, CA. 2017 May. [[link](#)]
4. **Cole SR**. Using Python and Fabric for analyzing brain signals on OSG connect. *Open Science Grid (OSG) All Hands Meeting 2017*, San Diego, CA. 2017 Mar. [[link](#)]
5. **Cole SR**, Peterson EJ, de Hemptinne C, Starr P, Voytek B. Deep brain stimulation changes the shape of motor cortical beta oscillations in Parkinson's Disease. *Cognitive Neural Systems (CNS) Seminar Series*, San Diego, CA. 2015 Nov. [[link](#)]
6. **Cole SR**, Steele TWJ. Biodegradable elastomers for targeted drug delivery applications. *Society for Biomaterials symposium*, Clemson, SC. 2012 Sep.

## Posters

1. Yang Y, **Cole SR**, Gilja V, Voytek B. Decoding finger movement from neural signals using brain oscillation symmetry. *Society for Neuroscience (SfN) Annual meeting*, San Diego, CA. 2018 Nov.
2. Jackson N, **Cole SR**, Voytek B, Swann NC. Characteristics of beta waveform shape in Parkinson's disease detected with scalp EEG. *Society for Neuroscience (SfN) Annual meeting*, San Diego, CA. 2018 Nov.
3. Washington A, **Cole SR**, Voytek B. Bursting properties of oscillations: open source software development. *Chancellor's Research Excellence Symposium*, San Diego, CA. 2018 Oct.
4. **Cole SR**. Burritos of San Diego: 10-dimensional analysis. *UCSD Neurosciences Graduate Program Retreat*. Lake Arrowhead, CA. 2018 May. [[link](#), [code](#)]
5. **Cole SR**, Voytek B. Waveform shape of hippocampal theta oscillations reflects interneuron spike timing. *Society for Neuroscience (SfN) Annual meeting*, Washington, DC. 2017 Nov. [[link](#)]
6. **Cole SR**, Voytek B. Brain oscillations and the importance of waveform shape. *Edmond and Lily Safra*

Center for Brain Sciences at the Hebrew University of Jerusalem - Annual retreat, Ein Gedi, Israel. 2017 Jan. [\[link\]](#)

7. **Cole SR**, Voytek B. The nonsinusoidal features of neural oscillation waveforms contain physiological information. *Society for Neuroscience (SfN) Annual meeting*, San Diego, CA. 2016 Nov. [\[link\]](#)
8. **Cole SR**, Peterson EJ, de Hemptinne C, Starr P, Voytek B. Deep brain stimulation changes the shape of motor cortical beta oscillations. *Society for Neuroscience (SfN) Annual meeting*, Chicago, IL. 2015 Oct. [\[link\]](#)
9. Noto T, **Cole SR**, Gao R, Peterson EJ, Voytek B. Neural network properties can be inferred from electrophysiological power spectral geometry. *Society for Neuroscience (SfN) Annual meeting*, Chicago, IL. 2015 Oct.
10. Thielk M, **Cole SR**, Sharpee T, Gentner TQ. Neural representation of morphed motifs in European Starling NCM. *MURI Winter School: Dynamics of multifunction brain networks*, San Diego, CA. 2015 Jan.
11. **Cole SR**, Voytek B. Effect of noise on a pulse-coupled neural network with phase-amplitude coupling. *Center for Science of Information Summer School*, San Diego, CA. 2014 Aug. [\[link\]](#)
12. **Cole SR\***, Mason JI\*, Lestrangle SJ, Alvarez TL. Effects of stereoscopic vision training on the vergence system of binocularly normal subjects. *Biomedical Engineering Society Annual Meeting*, Seattle, CA. 2013 Sep. \*contributed equally
13. **Cole SR**, Dean D, Kitchens CL. Synthesis and cytotoxicity of one step synthesis cationic gold nanoparticles. *Biomedical Engineering Society Annual Meeting*, Seattle, CA. 2013 Sep.
14. **Cole SR**, Mohammed FS, Kitchens CL. Synthesis, characterization, and the effect of carbon dioxide on polytheleneimine-capped gold nanoparticles. *International Conference of Young Researchers on Advanced Materials*, Singapore. 2012 Jul.
15. **Cole SR**, Mohammed FS, Kitchens CL. Synthesis of gold and silver nanoparticles functionalized with polyethyleneimine. *Society for Biomaterials symposium*, Clemson, SC. 2011 Oct.

### Open-source packages

Cole SR. (2018). Bycycle: Cycle-by-cycle analysis of neural oscillations. *Python*.

<https://github.com/voytekresearch/bycycle>

Voytek Lab. (2017). Neurodsp: A toolbox for analyzing oscillations in neural time series. *Python*.

<https://github.com/voytekresearch/neurodsp>

Cole SR & Peterson EJ. (2015). Pacpy: A library for calculating phase-amplitude coupling. *Python*.

<https://github.com/voytekresearch/pacpy>

### Scholarships & Grants

[Halicioğlu Data Science Institute Data Science Research Fellowship](#) - UC San Diego (\$3,000; mentor) 2018

[Chancellor's Research Excellence Scholarships](#) - University of California, San Diego (\$3,000; mentor) 2018

[Frontiers of Innovation Scholars Program](#) - University of California, San Diego (\$25,000; lead researcher) 2017

[Graduate Research Fellowship - National Science Foundation](#) 2014-2017

[Barry M. Goldwater Scholarship](#) 2013

### Travel grants

Conference financial aid - SciPy, Austin, TX 2017

Conference travel grant - Neurosciences Education and Research Foundation, San Marcos, CA 2016

Conference travel grant - Calhoun Honors College, Clemson University 2012, 2013

Educational enrichment travel grant - Calhoun Honors College, Clemson University 2012

### Awards

Faculty Scholarship Award - Clemson University 2014

Poly-Med Outstanding Senior Award - Clemson University Bioengineering Department 2014

Larry S. Bowman Outstanding Junior Award - Clemson University Bioengineering Department 2013

1<sup>st</sup> Place Undergraduate Oral Presentation - Society for Biomaterials Symposium, Clemson University 2012

S. W. Shalaby Outstanding Sophomore Award - Clemson University Bioengineering Department 2012

2<sup>nd</sup> Place, National Accounting competition - Future Business Leaders of America 2009

## Academic Activities

### Teaching

Clustering. Lecture. UCSD, Data Science in Practice ( <a href="#">Lecture</a> , <a href="#">Slides</a> )	May 2017
Filtering neural signals and processing oscillation amplitude, Lecturer, UCSD, Data Science in Practice ( <a href="#">Jupyter Notebook</a> )	May 2017
Filtering neural signals and processing oscillation amplitude. Lecture. UCSD, Fundamentals of statistics and computation for neuroscientists ( <a href="#">Lecture</a> , <a href="#">Materials</a> )	May 2016
Calculating phase and coherence in neural signals. Lecture. UCSD, Fundamentals of statistics and computation for neuroscientists ( <a href="#">Lecture</a> , <a href="#">Materials</a> )	May 2016
Neural signal processing. Teaching assistant. UCSD, COGS 160/260 (prof Eran Mukamel)	Mar-Jun 2016
MATLAB crash course, neural decoding workshop, & neural oscillations special project. Teaching assistant. UCSD, Neurosciences Graduate Program Bootcamp	Sep 2015, 2016
Electrical Engineering & Mathematics tutor - Clemson University Academic Success Center	2012-2014

### Mentoring

Xin Yue Xia – PhD rotation, neural oscillation analysis	Oct - Dec 2018
Sunny Pasumarthi – undergraduate research, neural oscillation analysis, python	Feb - Dec 2018
Yimeng Yang – undergraduate research, neural oscillation analysis, machine learning	Jan 2017 - Dec 2018
Andrew Washington – undergraduate research, neural oscillation analysis, open-source	Feb 2017 - Jun 2018
Pam Riviere – PhD rotation, neural oscillation analysis	Apr-Jun 2017
Rob Loughnan – PhD rotation, neural oscillation analysis	Jan-Mar 2017
Ryan Golden – PhD rotation, neural network modeling	Sep-Dec 2016
Katie McGreevey - summer research, nanoparticle synthesis	Jul-Aug 2011

### Professional Workshops

Neurohackademy - Seattle	Aug 2018
PyData NYC - New York	Nov 2017
SciPy - Austin	Jul 2017
Edmond & Lily Safra Center for Brain Sciences (ELSC) Annual Retreat - Ein Gedi, Israel	Jan 2017
Computational approaches to Memory and Plasticity (CAMP) - NCBS, Bangalore, India	Jul 2016
Open Science Grid (OSG) User School - University of Wisconsin, Madison	Jul 2016

### Peer review

NeuroImage (x2), eLife, Nature Neuroscience, Brain Topography	2015-present
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### Membership

Society for Neuroscience (SfN)	2014-2018
Undergraduate Clemson Bioengineering Society - President	2011-2014