David Aaron Nicholson

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Positions and Research Experience

Emory University, Atlanta GA.
Postdoctoral fellow. April 2018-present.
Advisor: Astrid Prinz.
Research developing algorithms for continuous or "lifelong" machine learning.

Emory University, Atlanta GA.
Graduate student. March 2011-December 2017.
Postdoctoral fellow. January 2018-March 2018.
Advisor: Samuel Sober.
Doctoral research on thalamostriatal and cerebellothalamic pathways in songbirds.

Emory University, Atlanta GA.
Lab rotation. January-June 2011.
Advisor: Dieter Jaeger.
Rebound bursts in motor thalamus of mice elicited by substantia nigra input.

Emory University, Atlanta GA.
Lab rotation. July-September 2010.
Advisor: Robert Liu.
Expression of *Arc* along rostrocaudal axis of primary auditory cortex.

University of South Florida, Tampa FL.
August 2009-August 2010.
Undergraduate research. Advisor: Toru Shimizu.
Function of the pigeon ventral tegmental area in visually-elicited courtship behavior.

University of South Florida, Tampa FL.
Undergraduate research. July-September 2010.
Advisor: K.T. Scott.
Carbon-concentrating mechanisms of Thiomicrospira crunogena.

Education

Fall 2017, Ph. D. in Neuroscience, Emory University, Atlanta, GA.
Spring 2010, B.S. in Biology (Summa Cum Laude), University of South Florida, Tampa, FL. Minor in Spanish.

Publications

D.A. Nicholson, T. Roberts, S.J. Sober. Thalamostriatal and cerebellothalamic pathways in a songbird, the Bengalese finch. *Journal of Comparative Neurology* 2018.
https://onlinelibrary.wiley.com/doi/abs/10.1002/cne.24428
(originally submitted to biorxiv: https://www.biorxiv.org/content/early/2017/10/02/197590)

Quasem, I., Achille, A. N., Caddick, B. A., Carter, T. A., Daniels, C., Delaney, J. A., ... & Ference, C. M. (2017). Peculiar citric acid cycle of hydrothermal vent chemolithoautotroph hydrogenovibrio crunogenus, and insights into carbon metabolism by obligate autotrophs. *Fems Microbiology Letters*, *364*(14). https://academic.oup.com/femsle/article-abstract/doi/10.1093/femsle/fnx148/3958794

Mangiapia, M., MCB4404L, U. S. F., Brown, T. R. W., Chaput, D., Haller, E., Harmer, T. L., ... & **D.A. Nicholson**. (2017). Proteomic and mutant analysis of the CO2 concentrating mechanism of hydrothermal vent chemolithoautotroph Thiomicrospira crunogena. *Journal of bacteriology*, *199*(7), e00871-16. http://jb.asm.org/content/199/7/e00871-16.short

D.A. Nicholson. A Comparison of Machine Learning Algorithms Applied to Birdsong Elements. Proceedings of the 15th Python in Science Conference. http://www.nicholdav.info/static/Nicholson_SciPY2016.pdf

L.A. Hoffmann, C.W. Kelly, **D.A. Nicholson**, S. J. Sober. A Lightweight, Headphones-based System for Manipulating Auditory Feedback in Songbirds. 2012. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3564484/

Conference Presentations

D.A. Nicholson, Y.Cohen. Neural networks for segmentation of vocalizations. Oral presentation at PyData NYC conference; November 2017; New York City, NY.
Video: https://youtu.be/1XEDFpUGmqs

D.A. Nicholson. Hybrid Vocal Classifier: a Python Package to Automate Labeling of Birdsong. Oral presentation at: SciPy 2017 conference; August 2017; Austin, TX.
Video: https://youtu.be/BwNeVNou9-s

D.A. Nicholson. Hybrid Vocal Classifier: a package for automated classification of birdsong. Poster presentation at: PyCon 2017; May 17-25, 2016; Portland, OR.
http://www.nicholdav.info/static/Nicholson_PyCon2017.pdf

D.A. Nicholson. Comparison of Machine Learning Algorithms Applied to Birdsong Elements. Poster presentation at: SciPy 2016; July 11-17, 2016; Austin, TX.

D.A. Nicholson. Support vector machines: for the birds? Curly Braces conference. November 2015.
Video: https://youtu.be/ghgniK4X_Js?list=PLXZcxuM7p6DguxHV0d3jY43CTB3an68DI

D.A. Nicholson, T. Roberts, S.J. Sober. Disynaptic pathways from the cerebellum to the cortex and basal ganglia in a songbird. Annual Meeting of the Society for Neuroscience. October 2015.

D.A. Nicholson, T. Roberts, S.J. Sober. Multiple pathways from the cerebellum to the forebrain through thalamus in a songbird. Gordon Conference on the Cerebellum. August 2015.

D.A. Nicholson, S.J. Sober. Projections from the cerebellar nuclei to the dorsal thalamus in a songbird, and their involvement with vocal motor control. Annual Meeting of the Society for the Neural Control of Movement. April 2015.

D.A. Nicholson, S.J. Sober. Projections of the cerebellar nuclei in a songbird. Annual meeting of the Society for Neuroscience, November 2014.

J. R. Edgerton, **D. A. Nicholson**, D. Jaeger. Effects of basal ganglia output on motor thalamus in mice.

Teaching experience

August-November 2017. Short course on scientific computing and data science. Sponsored by Atlanta BEST program, for sixty graduate students and post-doctoral fellows from Emory, Georgia Tech, and GSU: https://github.com/NickleDave/BEST-data-science-short-course

March 2017. Intro to machine learning with scikit-learn. Open-Source Analysis Workshop in Atlanta. https://github.com/NickleDave/intro-ml-sklearn

March 2017. Coding bootcamp sponsored by Emory Women In Neuroscience (EWIN). Organized bootcamp and taught sessions on Python to attendees. https://github.com/NickleDave/EWIN-coding-bootcamp

Spring 2013. Graduate teaching assistant. IBS514: Cellular, Developmental, and Molecular Neuroscience.

Fall 2012. Invited lecturer. NBB120: Neuroscience for Non-Science Majors. Taught a class and ran a lab exercise about sensorimotor integration.

Spring 2012. Graduate teaching assistant. IBS514: Cellular, Developmental, and Molecular Neuroscience.

Workshops organized

March 2017. Open-Source Analysis Workshop in Atlanta. Day-long workshop for Atlanta scientists on using open-source tools for analysis:
https://nickledave.github.io/2017/03/23/open-source-analysis-in-neuro-atlanta.html
https://github.com/NickleDave/open-analysis-atlanta

Technical Talks

March 2018. “A compact statistical model of Bengalese Finch song syntax: a case study in reproducibility”. Atlanta Jupyter User’s Group. https://www.meetup.com/Atlanta-Jupyter-User-Group/events/248894686/

January 2018. “Neural Networks for Segmentation of Vocalizations”. Jupyter Day Atlanta II. https://atl-jugheads.github.io/jupyter-day-atlanta-ii/

January 2018. “Neural Networks for Segmentation of Vocalizations”. Atlanta Jupyter User’s Group. https://www.meetup.com/Atlanta-Jupyter-User-Group/events/246623197/

November 2017. “Teaching Data Science to Scientists”. PyData NYC. Lightning talk. https://speakerdeck.com/nickledave/teaching-data-science-to-scientists

August 2016. “Fit Your Learning Curves for Fun and Profit”. Jupyter Day Atlanta.

https://jupyterday-atlanta-2016.github.io/#davidnicolson
https://github.com/NickleDave/learning-curves

August 2016. “Python: For the Birds and For the Brains”. PyData Atlanta.
https://www.meetup.com/PyData-Atlanta/events/233206387/?eventId=233206387

Honors, awards, and fellowships

2014. Outreach Award. Emory Neuroscience Program.

Fall 2010-Spring 2011. Trainee. NIGMS Training Grant in Integrative Biology: Neuroscience. Emory University.

Fall 2009. Undergraduate Research Grant. University of South Florida.

Spring 2009. Fred L. & Helen. M Tharp Endowed Scholarship.

Academic Service, Volunteer, Outreach

August 2017-present. Co-organizer, Data Science For Scientists ATL. Plan events, coordinate monthly meetings, invite speakers, run listserv and Slack team, set up and maintain Github organization page.

March 2018. Brain Awareness Month visit to Main Street Academy in College Park, GA. Visit classroom of Kristin Jackson Pritz, taught middle schoolers about the brain. Ran interactive demos with real brain specimens.

March 2017. Brain Awareness Month visit with Alex Dunlap to Benjamin E. Mays High School in South Atlanta. Visited classroom of Aruna Kailasa, taught four classes of high schoolers about the brain.

September 2012-Fall 2015. Graduate student representative, Atlanta chapter of the Society for Neuroscience. Brain Awareness organizer. Helped match teachers with volunteers and maintain on-line spreadsheets with that information; tallied and reported outreach results to the event sponsor, the Atlanta chapter of the Society for Neuroscience. Visited classrooms and developed presentations for those visits 3-5 times per semester.

June 2014. Volunteer teacher with BME graduate student Elizabeth Amadei at ION (Institute on Neuroscience)/TEACH workshop run by the Center for Behavioral Neuroscience; talked with high school students and teachers about sensorimotor systems, then reinforced the concepts that we taught about by leading a lab based on the Backyard Brains RoboRoach, a kit for making “cyborg” roaches that can be “controlled” by electrically stimulating the antennae to change sensory feedback.

March 2014. “Hands on Brains” booth at Atlanta Science Festival Expo Day. Applied for and was awarded funding from Emory’s Center for Science Education, recruited labs at Emory to provide activities at the booth, contributed to development of those activities, helped set up and run booth all day at the Expo. Booth had an estimated 2000 visitors.

May 2013. Brain Awareness Month. Classroom visit to Unidos Charter with Spelman undergraduate Melissa Carr-Reynolds. Gave a presentation about language and the brain in Spanish and English (Unidos is a dual-language school with a 50% Hispanic population).

September 2011 – January 2013. Neuroethics Program, Emory Center for Ethics. Contributor to Neuroethics Program blog, reporting on papers discussed in journal club and writing about ethical issues related to my research. Example: http://www.theneuroethicsblog.com/2012/09/snakes-on-brain-or-why-care-about.html

September 2008 – April 2009. ENLACE (Engaging Latino Communities for Education), University of South Florida, Tampa. Mentor: lead study groups in an AVID classroom. Tutor: one-on-one teaching of the sciences, mathematics, and Spanish.

Professional memberships

Society for Neuroscience (2010-present)

Languages

Spanish. Conversational level: fluent; Written level: academic.