

# Keiland W. Cooper

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Graduate Scholar  
Department of Neurobiology and Behavior  
University of California, Irvine  
*cv last updated May 25, 2021*

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## EDUCATION

### University of California, Irvine

Ph.D., Neuroscience

*Advisors: Dr. Norbert Fortin*

*In progress*

### Indiana University, Bloomington

B.S., Cognitive Science *with Honors*;

Computation specialization

Certificate in Neuroscience; Minor in Psychology

*Advisors: Dr. Ehren Newman, Dr. Mike Jones*

*May the Fourth, 2019*

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## RESEARCH EXPERIENCE

- 2019-now ..... with Dr. Norbert Fortin | Neuroscience
  - *Non-spatial theta sequences and precession*
  - *11 brain region electrophysiology*
- 2020-now ..... with the GCCR | Neuroscience
  - *COVID-19 and the chemical senses*
- 2020-now ..... with ContinualAI Research | Artificial Intelligence
  - *Building tools to aid AI research*
- 2019-2020 ..... with Dr. Bruce McNaughton | Neuroscience
  - *Hippocampal and cortical replay during sleep*
- 2016-2019 ..... with Dr. Ehren Newman | Neuroscience / Cognitive Science
  - *Computational modeling of ACh + brain oscillations*
  - *Entorhinal region electrophysiology*
  - *Hippocampal imaging with Miniscopes*
  - *Theta + optic flow rodent behavior*
- 2018-2019 ..... with Dr. Mike Jones | Cognitive Science
  - *Catastrophic Forgetting in connectionist language models*
- 2017-2018 ..... with Dr. Amit Hagar | Philosophy + Physics
  - *The natural computation of the brain*
- 2015-2016 ..... with Dr. Susane Ressler | Microbiology
  - *Structural biochemistry of synaptic proteins*

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AWARDS	Norman Weinberger Award	<i>UC Irvine CNLM</i>	2021
	Graduate Research Fellowship (GRFP)	<i>National Science Foundation</i>	2021
	Best International AI Research Organization	<i>Wealth &amp; Finance</i>	2020
	DTEI Pedagogical Fellowship	<i>UC Irvine</i>	2020
	UC Irvine Recruitment Fellowship	<i>UC Irvine</i>	2019
	Cognitive Science Outstanding Research	<i>Indiana University</i>	2019
	GRFP (Honorable Mention)	<i>National Science Foundation</i>	2018
	Ewing Prize in Philosophy	<i>Indiana University</i>	2018
	Outstanding Contribution in Cognitive Science	<i>Indiana University</i>	2018
	Cognitive Science Research Project Award	<i>Indiana University</i>	2018
	Cognitive Science Research Project Award	<i>Indiana University</i>	2017

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PREPRINTS      **\*\*stars\*\*** = mentee; **bold** = me

- [10] Avalanche: an End-to-End Library for Continual Learning  
 Vincenzo Lomonaco, Lorenzo Pellegrini, Andrea Cossu, Antonio Carta, Gabriele Graffieti, ... **Keiland Cooper**, ... Davide Bacciu, Davide Maltoni. (2021) arXiv preprint
- [9] Hippocampal ensembles represent sequential relationships among discrete nonspatial events  
 Shahbaba, B., Li, L., Agostinelli, F., Saraf, M., Elias, G. A., **Cooper, K. W.**, Baldi, P., Fortin, N. J.. (2021) Under Review

- PEER  
 REVIEWED
- [8] Recent smell loss is the best predictor of COVID-19 among individuals with recent respiratory symptoms.  
 Gerkin, R. C., Ohla, K., Veldhuizen, M. G., Joseph, P. V., Kelly, C. E., Bakke, A. J., ... **Cooper, K.W.** ... and Baguma, M. . (2020) Chemical senses
- [7] Smell and taste changes are early indicators of the COVID-19 pandemic and political decision effectiveness.  
 Pierron, D., Pereda-Loth, V., Mantel, M., Moranges, M., Bignon, E., Alva, O., **Cooper, K. W.**, ... Dinnella, C. . (2020) Nature Communications  
 ↳ *#4 of Top 100 Nature Communications papers of 2020*
- [6] COVID-19 and the chemical senses: supporting players take center stage.  
**Cooper, K. W.**, Brann, D.H., Farruggia, M.C., Bhutani, S., Pellegrino, R., Tsukahara, T., Weinreb, C., Joseph, P.V., Larson, E.D., Parma, V. and Albers, M.W.,. (2020) Neuron  
 ↳ *Top ten Neuron papers of 2020*
- [5] More than smell COVID-19 is associated with severe impairment of smell, taste, and chemesthesis.  
 Parma, V., Ohla, K., Veldhuizen, M. G., Niv, M. Y., Kelly, C. E., Bakke, A. J., **Cooper, K. W.**, ..., Hayes, J. E.. (2020) Chemical Senses
- [4] Coronaviruses and the chemical senses: past, present, and future  
 Pellegrino, R., **Cooper, K. W.**, Di Pizio, A., Joseph, P. V., Bhutani, S., and Parma, V. . (2020) Chemical senses

[3] Medial entorhinal cortex activates in a traveling wave in the rat  
Hernandez-Perez, J. J., **Cooper, K. W.**, Newman, E. L.. (2020) eLife

[2] Can the Machine Understand: An Evidence Based Approach to the Chinese Room  
**Cooper, K. W.**. (2018) IU Journal of Undergraduate Research

THESIS

[1] Cholinergic modulation may explain hippocampal encoding and retrieval mode switching  
**Cooper, K. W.**. (2019) Indiana University, Bloomington Undergraduate Thesis

*Total citations (as of last update):*

 Google Scholar: **360** |  Semantic Scholar: **281**

SELECTED  
ABSTRACTS  
+ TALKS

**\*\*stars\*\*** = mentee; **bold** = me

- [17] Deep neural network models learn distinguishable features from hippocampal local field potential and ensemble data  
**\*\*Pan, C. J., Cooper, K. W., Li, L., Agostinelli, F., Saraf, M., Elias, G. A., Baldi, P., Shahbaba, B., Fortin, N. J..** (2021) UROP Symposium.
- [16] Avalanche: an End-to-End Library for Continual Learning  
**Cooper K. W.**, Lomonaco, V., Pellegrini, L., Carta, A., Cossu, A., Graffieti, G.. (2021) ContinualAI Meetup.
- [15] Hippocampal theta oscillations support nonspatial sequence coding in hippocampal neurons  
**Cooper, K. W.**, Shahbaba, B., Li, L., Agostinelli, F., Saraf, M., Elias, G. A., Bornstein, A., Baldi, P., Fortin, N. J.. (2021) SFN Global Connectome.
- [14] The neuroscience and AI feedback loop: Catastrophic Forgetting and Sequences  
**Cooper, K. W.**. (2020) UCI AGS Symposium.
- [13] The Art of Email  
**Cooper K. W.**. (2020) UCI GPS-STEM.
- [12] Dual processes of hippocampal mode switching  
**Cooper, K. W.**. (2020) Neuromatch online Conference.
- [11] Continual Learning: neuroscience + AI.  
**Cooper, K. W.**. (2020) Continual AI Meetup.
- [10] Cholinergic abolition disrupts encoding and retrieval mode switching  
**Cooper, K. W.**. (2020) 11th Annual Emerging Scientists Symposium.
- [9] The neuroscience and AI feedback loop  
**Cooper, K. W.**. (2019) UCI Brain.
- [8] On neuroscience and AI  
**Cooper, K. W.**. (2019) IUJUR Research Slam.
- [7] Is theta a traveling wave in the medial entorhinal cortex?  
Hernández J, **Cooper, K. W.**, Newman E.L.. (2018) Program No. 330.10. Society for Neuroscience.

- [6] Consequences of Catastrophic Forgetting on Semantic Representations Learned by Deep Neural Embedding Models  
**Cooper, K. W.**, Dachapally P.R, Jones M.N. (2018) Midwest CogSci.  
↳ *Best poster award*
- [5] Is theta in the Medial Entorhinal Cortex a Traveling Wave?  
**Cooper, K. W.**, Hernández, J., Newman, E.L.. (2018) Society for Neuroscience, Greater Indiana Chapter.
- [4] 3D Brain Model Extraction and Virtual Applications  
**Cooper, K. W.**. (2018) (Panelist) Media School Graduate Association Conference.
- [3] FlapAI: Genetically Evolved Neural Networks  
**Cooper, K. W.**. (2018) Midwest Undergraduate Cognitive Science Conference.
- [2] Bridging the Gap: Natural Computation and Neural Systems  
**Cooper, K. W.**. (2017) Indiana University Undergraduate Research Conference.
- [1] Downstream Hippocampal Activity Prediction with Neural Networks  
**Cooper, K. W.**, Osborn, Z.. (2016) Midwest Undergraduate Cognitive Science Conference.

#### TEACHING

<i>as Co-Instructor:</i>		<i>enrollment:</i>	
Continual Learning	<i>Neuromatch</i>	<i>TBD</i>	<i>Su 2021</i>
Autonomous Robotics	<i>Indiana Univ.</i>	<i>18</i>	<i>Sp 2019</i>
Programming in Cognitive Sciences	<i>Indiana Univ.</i>	<i>27</i>	<i>Sp 2018</i>
<i>as Teaching Assistant:</i>		<i>enrollment:</i>	
Mind, Memory, and the Brain	<i>UC Irvine</i>	<i>142</i>	<i>Sp 2021</i>
Neurobiology and Behavior Laboratory	<i>UC Irvine</i>	<i>196</i>	<i>Wt 2020</i>
Neurobiology and Behavior Laboratory	<i>UC Irvine</i>	<i>93</i>	<i>Fa 2020</i>
Brain and Behavior	<i>UC Irvine</i>	<i>366</i>	<i>Fa 2020</i>
Cognitive Psychology	<i>Indiana Univ.</i>	<i>80</i>	<i>Fa 2018</i>
Introduction to Neuroscience	<i>Indiana Univ.</i>	<i>106</i>	<i>Fa 2017</i>

#### MENTORED STUDENTS

Chelsea Pan *now Zendesk*  
Troy Good *now Amazon*

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## NETWORKS

### *Present:*

Cognitive Science Society  
Continual AI (co-founder)  
Psi Chi  
Sigma Alpha Pi  
AI for People

Society for Neuroscience  
Indiana Academy of Science  
Sigma Xi  
Carboncopies Foundation  
Internet Society

### *Past:*

IU Student Org. for Cog Sci (President)

ADAPT Consulting (VP)

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## SCI COMM + OUTREACH

AskANeuroscientist

*Founder; Live Q/A via in class video-chat (>400 students)*

Hoosier STARS

*Co-founder; K-12 neuro demos reaching >300 students*

Quora Writer

*Answers to neuroscience and AI questions (800k+ views)*

CNLM Ambassadors

*Co-chair; SoCal Learning and memory outreach*

The Boys and Girls Club

*Taught primary school aged students about the brain*

IU Science Fest

*Led a booth with hands on sheep brain interaction*

Celebrate Science Indiana

*Led an EEG and brain booth > 500 people*

Observatory Guide

*Volunteer astronomical guide at the Kirkwood Observatory*

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## UNIVERSITY SERVICE

End Racism Initiative

*University of California, Irvine*

*2020 -*

Education Policy Committee

*Indiana University*

*2016 - 2017*

Faculty Council

*Indiana University*

*2016 - 2017*

Office of First Year Experience

*Indiana University*

*2015 - 2016*

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## REFeree SERVICE

Physiological Reviews

Computer Vision and Pattern Recognition

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## TRAININGS + WORKSHOPS

FFASt Workshop on Scientific Leadership

UC Irvine

*2021*

Certified Peer Reviewer

Elsevier

*2020*

Computational Psychiatry Course

University of Zurich

*2020*

The Meaning and History of the Constitution

Hillsdale College

*2020*

Estes Cognitive Electrophysiology Workshop

University of Pennsylvania

*2020*

NIH Grant Writing Workshop

UC Irvine

*2020*

HHMI Productivity Workshop

UC Irvine

*2020*

Nonlinear Dynamics: Math. and Comp. Approaches

Santa Fe Institute

*2019*

Complexity Science

Santa Fe Institute

*2018*

Science Communication Workshop

Indiana University

*2017*

High Performance / Supercomputing Workshop

Indiana University

*2017*

Aseptic Surgery: Proper Practice Training

Indiana University

*2016*

Animal Handling and Animal Care Training

Indiana University

*2016*

IUNI Network Science Workshop	Indiana University	2016
First Aid and CPR Certified	American Red Cross	2014
Pediatric Neurosurgery Shadowing	Riley Hospital	2014

#### OPEN DATASETS

- [2] GCCR COVID-19 Questionnaire (2020) OSF
- [1] Extracellular recordings from across the dorsoventral axis of the medial entorhinal cortex of the rat. hc-27 (2020) CRCNS

#### ESSAYS

- [7] The Art of Email  
Keiland Cooper. (February 18, 2020) GPS-STEM
- [6] The Psychology of Risky Business  
Keiland Cooper. (July 23, 2018) Medium
- [5] Save Money, Close Deals, Clip Coupons: the Science of Decision Making  
Keiland Cooper. (July 11, 2018) Medium
- [4] The <Art> of Biting your Tongue  
Keiland Cooper. (October 19, 2017) LinkedIn Publishing
- [3] What Is Undergraduate Research And Why Is It Important?  
Keiland Cooper. (September 7, 2017) We Are IU
- [2] The Silent Battle for the Web May Change Everything as We Know It.  
Keiland Cooper. (December 5, 2016) Medium
- [1] The Whats and Whys of Schools App  
Keiland Cooper. (August 5, 2015) We Are IU

#### PRESS

- [22] John Desmond (April 15, 2021) *Scientists Working on Continual Learning to Overcome Catastrophic Forgetting*. AI Trends
- [21] Kyle Wiggers (April 9, 2021) *AI Weekly: Continual learning offers a path toward more humanlike AI*. VentureBeat
- [20] Grace Hauck (January 31, 2021) *Millions of COVID-19 survivors have lost senses of smell and taste. Researchers don't know if they'll come back*. USA Today
- [19] Brooke Jarvis (January 28, 2021) *What Can Covid-19 Teach Us About the Mysteries of Smell?*. The New York Times Magazine
- [18] Misha Gajewski (December 9, 2020) *Is Losing Your Sense Of Smell And Taste The First Sign Of Covid-19? More Research Says Yes*. Forbs
- [17] Vincent Racaniello (October 18, 2020) *TWiV 673: Wake up and smell the pandemic. This Week In Virology*
- [16] Sara Harrison (August 5, 2020) *Many COVID-19 patients lost their sense of smell. Will they get it back?*. National Geographic

- [15] Bob Curley (July 7, 2020) *Lifestyle Changes You Can Make to Help Lower the 19 Risk Factors for Alzheimers*. Healthline
- [14] Salynn Boyles (July 6, 2020) *Majority of Patients with Mild Covid-19 Experience Altered Smell/Taste*. Physicians Weekly
- [13] Katie Boateng (June 15, 2020) *Episode 64 - An Interview with Some of the Authors*. The Smell Podcast
- [12] Leslie Kay (June 13, 2020) *Why COVID-19 Makes People Lose Their Sense of Smell*. Scientific American
- [11] John E Hayes, Valentina Parma (June 4, 2020) *COVID-19, smell and taste how is COVID-19 different from other respiratory diseases?* . The Conversation
- [10] Anthony Cusumano (February 2, 2020) *What a difference a decade makes..* Katalys Tech
- [9] Kevin Casey (September 30, 2019) *5 AI fears and how to address them..* The Enterprisers Project
- [8] Kevin Casey (September 17, 2019) *How to explain natural language processing (NLP) in plain English*. The Enterprisers Project
- [7] David Roe (August 27, 2019) *Is Augmented Artificial Intelligence Already Disrupting Artificial Intelligence?*. CMS Wire
- [6] Kristine Fellizar (August 7, 2019) *Why Is My Arm Asleep? 6 Reasons Your Limbs Go Numb When You're Sleeping*. Bustle
- [5] Lauren Wellbank (August 1, 2019) *Neuralink Update: How far off is Elon Musks high tech vision for our brains?*. Parentology
- [4] Tina Arnoldi (July 19, 2019) *Ready for Amazon to Read Human Emotions?*. Theravive
- [3] Ann Lewandowski (September 28th, 2018) *IU undergraduates practice science outreach at Indiana high schools*. IDS
- [2] Alexandra Moussa-Tooks (August 14, 2018) *The art of dissemination part 3: Care to share?*. SclU
- [1] Liz Rosdeitcher (2017) *Community Partnerships..* Psyugrad

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ERDÖS N=4

*as of 2021:*

Paul Erdős → Noga Alon → Nicolò Cesa-Bianchi → Fabio Cuzzolin

*as of 2019:*

Paul Erdős → Ronald L. Graham → Feng Zhou → Michael J. Kahana → Ehren L. Newman