

Keiland W. Cooper

Graduate Scholar
Department of Neurobiology and Behavior
University of California, Irvine
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✉ kwcooper@uci.edu
🏠 kwcooper.com
🆔 0002-0358-9645
🐦 @kw_cooper

EDUCATION

University of California, Irvine

Ph.D., Neuroscience

In progress

Advisors: Dr. Norbert Fortin

Indiana University, Bloomington

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

May the Fourth, 2019

Computation specialization

Certificate in Neuroscience; Minor in Psychology

Advisors: Dr. Ehren Newman, Dr. Mike Jones

RESEARCH TIMELINE

-
- 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
 - *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*

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 & 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

PREPRINTS [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 [8] Recent smell loss is the best predictor of COVID-19 among individuals with recent
REVIEWED 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: **352**

SELECTED ABSTRACTS + TALKS

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

MENTORED STUDENTS	Chelsea Pan	<i>now Zendesk</i>
	Troy Good	<i>now Amazon</i>

NETWORKS	<i>Present:</i>	
	Cognitive Science Society	Society for Neuroscience
	Continual AI (co-founder)	Indiana Academy of Science
	Psi Chi	Sigma Xi
	Sigma Alpha Pi	Carboncopies Foundation
	AI for People	Internet Society
	<i>Past:</i>	
	IU Student Org. for Cog Sci (President)	ADAPT Consulting (VP)

SCI COMM + OUTREACH	AskANeuroscientist	<i>Founder; Live Q/A via in class video-chat (>400 students)</i>
	Hoosier STARS	<i>Co-founder; K-12 neuro demos reaching >300 students</i>
	Quora Writer	<i>Answers to neuroscience and AI questions (800k+ views)</i>
	CNLM Ambassadors	<i>Co-chair; SoCal Learning and memory outreach</i>
	The Boys and Girls Club	<i>Taught primary school aged students about the brain</i>
	IU Science Fest	<i>Led a booth with hands on sheep brain interaction</i>
	Celebrate Science Indiana	<i>Led an EEG and brain booth > 500 people</i>
	Observatory Guide	<i>Volunteer astronomical guide at the Kirkwood Observatory</i>

UNIVERSITY SERVICE	End Racism Initiative	<i>University of California, Irvine</i>	<i>2020 -</i>
	Education Policy Committee	<i>Indiana University</i>	<i>2016 - 2017</i>
	Faculty Council	<i>Indiana University</i>	<i>2016 - 2017</i>

REFeree SERVICE	Physiological Reviews
	Computer Vision and Pattern Recognition

TRAININGS + WORKSHOPS	FFASt Workshop on Scientific Leadership	UC Irvine	<i>2021</i>
	Certified Peer Reviewer	Elsevier	<i>2020</i>
	Computational Psychiatry Course	University of Zurich	<i>2020</i>
	The Meaning and History of the Constitution	Hillsdale College	<i>2020</i>
	Estes Cognitive Electrophysiology Workshop	University of Pennsylvania	<i>2020</i>
	NIH Grant Writing Workshop	UC Irvine	<i>2020</i>
	HHMI Productivity Workshop	UC Irvine	<i>2020</i>
	Nonlinear Dynamics: Math. and Comp. Approaches	Santa Fe Institute	<i>2019</i>
	Complexity Science	Santa Fe Institute	<i>2018</i>
	Science Communication Workshop	Indiana University	<i>2017</i>
	High Performance / Supercomputing Workshop	Indiana University	<i>2017</i>
	Aseptic Surgery: Proper Practice Training	Indiana University	<i>2016</i>
	Animal Handling and Animal Care Training	Indiana University	<i>2016</i>
	IUNI Network Science Workshop	Indiana University	<i>2016</i>
	First Aid and CPR Certified	American Red Cross	<i>2014</i>
	Pediatric Neurosurgery Shadowing	Riley Hospital	<i>2014</i>

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?.* SciU
 - [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