

# CLAYTON P. MOSHER

<https://www.linkedin.com/in/claytonpmosher>

127 S. San Vicente Blvd.

Advanced Health Sciences Pavilion, A6441

phone: (650)741-5267

[clayton.mosher@cshs.org](mailto:clayton.mosher@cshs.org)

## **EDUCATION**

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- 2009 – 2014      Ph.D. in Neuroscience; Minor in Statistics  
The University of Arizona, Tucson, AZ  
Thesis title: “Neurons in the monkey amygdala detect eye contact during naturalistic social interactions.”  
Advisor: Dr. Katalin M. Gothard  
Committee: Andrew J. Fuglevand, Konrad Zinsmaier, Joseph C. Watkins
- 2004 – 2009      B.S. in Health Sciences, Physiology (*Honors, Summa Cum Laude*)  
B.S. in Mathematics, Minor: Chemistry (*Summa Cum Laude*)  
The University of Arizona, Tucson, AZ  
Cumulative GPA: 4.00  
Honors thesis: “Behavioral triggers of skin conductance and their neural correlates in the primate amygdala.”

## **CURRENT POSITION**

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- 2017 – present      Postdoctoral Scientist  
Rutishauser Lab, Cedars-Sinai Hospital, Los Angeles, CA

## **PROFESSIONAL HISTORY**

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- 2016 – 2017      Research Specialist Principal  
The Gothard Lab, The University of Arizona, Tucson, AZ
- 2015 – 2016      Lead Psychophysiology Researcher  
MediaScience Consumer Neuroscience Research, Austin, TX
- 2014 – 2015      Postdoctoral Research Fellow  
Peter Rudebeck Lab  
Icahn School of Medicine at Mount Sinai, New York, NY
- 2009 – 2014      Graduate Research Assistant  
Katalin Gothard Lab  
Department of Neuroscience, The University of Arizona, AZ
- 2009 – 2012      K-12 science outreach instructor  
Science Foundation Arizona
- 2006 – 2009      Undergraduate research assistant  
Gothard Lab, Undergraduate Biology Research Program  
The University of Arizona, Department of Physiology

## **HONORS AND AWARDS**

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2013	Galileo Circle Scholar, The University of Arizona College of Science
2011-2012	K-12 Teaching Fellowship, Science Foundation Arizona
2010	Faculty of 1000 Award for Scientific Poster Presentation
2009 – 2012	National Science Foundation Graduate Research Fellowship
2009 – 2012	Arizona Science Foundation Graduate Research Fellowship
2009 – 2010	Graduate Diversity Fellowship, The University of Arizona
2006 – 2009	Undergraduate Research Fellowship, Undergraduate Biology Research Program, The University of Arizona
2008	Biomedical Research Abroad: Vistas Open Fellowship Weizmann Institute, Rehovot, Israel
2004 – 2008	Baird Foundation Scholarship, The University of Arizona
2004 – 2008	President's Award for Excellence, The University of Arizona
2004 – 2008	Provost Scholarship, The University of Arizona
2004 – 2009	Highest Academic Distinction, The University of Arizona

## **SERVICE & OUTREACH**

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2019 – present	Letters to Prescientist STEM mentor
2017 – 2018	Information Specialist at Los Angeles LGBT Center
2014 – 2015	New York Cares, Instructor of Computer Course for Senior Citizens
2013 – 2014	Adult literacy and English language tutor at Literacy Connects, Tucson AZ
2012	Neuroscience lecturer at Marana High School
2012	Neuroscience outreach volunteer at the Tucson Festival of Books
2012	Volunteer science instructor at Senita Valley Elementary School
2011 - 2012	The University of Arizona Optics Department Laser Fun Day
2011	Science Foundation Arizona Private Eye 5th grade teacher
2008	Brain Awareness Week, Society for Neuroscience Tucson Chapter

## **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

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2014 – 2015	New York Academy of Sciences
2012 – 2015	The Society for Social Neuroscience
2006 – present	The Society for Neuroscience

## **SCHOLARLY PRESENTATIONS**

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23 August 2019	The University of Michigan, Department of Anesthesiology, Anne Arbor, MI. “Cardiac-related modulation of the extracellular action potential waveform in vivo reveals multiple cell classes in human hippocampus.”
06 June 2019	University of California Davis, National Primate Research Center, Davis, CA. “Neurons in the amygdala support social communication among primates.”
02 Nov. 2016	Cedars-Sinai Medical Center, Department of Neurosurgery, Los Angeles, CA. “Social communication among primates activates neurons in the amygdala.”
25 Feb. 2015	Mount Sinai School of Medicine, Comparative Cognition Group, New York, NY. “Social communication among primates activates neurons in the amygdala.”
14 Feb. 2014	The National Institute of Mental Health, Laboratory of Neuropsychology, Bethesda, MA. “Neurons in the monkey amygdala mediate communication with facial expressions.”
26 Nov. 2013	California Institute of Technology, Department of Neurobiology, Pasadena, CA. “Neurons in the monkey amygdala mediate communication with facial

18<sup>th</sup> November, 2019

	expressions.”
02 May 2013	Department of Physiology, The University of Arizona, Tucson, AZ. "Single unit activity in the amygdala during the production of facial expressions."
19 March 2012	Cognitive Neuroscience Seminar, The University of Arizona, Tucson, AZ. "The amygdala evaluates and regulates social behavior in monkeys."
16 May 2011	Undergraduate Biology Research Program Orientation, The University of Arizona, Tucson, AZ. "The neural bases of primate emotional and social behavior."
25 Jan. 2011	Neuroscience Community Datablitz, The University of Arizona, Tucson, AZ. "Eye movements during movie viewing attests to social perception in monkeys."
11 May 2009	Cognitive Neuroscience Seminar, The University of Arizona, Tucson, AZ. "Neural activity in the monkey amygdala is paced by the cardiac cycle"
25 Oct. 2008	Undergraduate Research Abroad Datablitz, The University of Arizona, Tucson, AZ. "How does the amygdala participate in emotional memory consolidation during sleep?"

## **TEACHING**

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Sept. – Dec. 2015	Introduction to Biostatistics, MPH 0300, Icahn School of Medicine at Mount Sinai, New York
Aug. – Dec. 2011	Teaching Assistant, MATH 303: Introduction to Statistical Methods, Dr. Joseph Watkins, The University of Arizona. syllabus: <a href="http://math.arizona.edu/~jwatkins/math363f14s.htm">http://math.arizona.edu/~jwatkins/math363f14s.htm</a>

## **PUBLICATIONS**

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### *Journal publications*

1. Reed, C., **Mosher, C.P.**, Chandravadia, N., Chung, J., Mamelak, A., and Rutishauser, U. (2019). "Extent of single-neuron modulation by hippocampal interictal discharges predicts declarative memory disruption in humans." *The Journal of Neuroscience*, .
2. Morrow, J., **Mosher C.P.**, and Gothard, K.M. (2019). "Multisensory neurons in the primate amygdala." *The Journal of Neuroscience*, 3663-3675.
3. Kaminski, J., Mamelak, A.N., Birch, K., **Mosher, C.P.**, Tagliati, M., & Rutishauser, U. (2018). "Novelty-sensitive dopaminergic neurons in the human substantia nigra predict success of declarative memory formation." *Current Biology*, 28: 1-11.
4. Gothard, K.M., **Mosher, C.P.**, Zimmerman, P.E., Putnam, P.T., Morrow, J.K., & Fuglevand, A.J. (2018). "New perspectives on the neurophysiology of primate amygdala emerging from the study of naturalistic social behaviors." *Wiley Interdiscip Rev Cogn Sci*, 9: e1449.
5. Minxha, J., **Mosher, C.P.**, Morrow, J.K., Mamelak, A.N., Adolphs, R., Gothard, K.M., & Rutishauser, U. (2016). "Fixations gate species-specific responses to free viewing of faces in the human and macaque amygdala." *Cell Reports*, 18: 878-891.
6. Ballesta, S., **Mosher, C.P.**, Szep, J., Fischl, K.D., & Gothard, K.M. (2016) "Social determinants of spontaneous eye blinks in adult male macaques." *Scientific Reports*, 6: 38686.
7. **Mosher, C.P.**, Zimmerman, P.E., Fuglevand, A.J., & Gothard, K.M. (2016). "Tactile stimulation of the face and the production of facial expressions activate neurons in the primate amygdala." *eNeuro*, 3(5): 1-9.
8. **Mosher, C.P.** & Rudebeck, P.H. (2015). "The amygdala accountant: new tricks for an old structure." *Nature Neuroscience*, 18: 324-325.

9. **Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2014). "Neurons in the monkey amygdala detect eye-contact during naturalistic social interactions." *Current Biology*, 24: 2459-2464.
10. **Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2011). "Videos of conspecifics elicit interactive looking patterns and facial expressions in monkeys." *Behavioral Neuroscience*, 125: 639-652.
11. **Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2010) "Response characteristics of basolateral and centromedial neurons in the primate amygdala." *J Neurosci*, 30: 16197-207.
12. Laine, C.M., Spitler, K.S., **Mosher, C.P.**, & Gothard, K.M. (2009) "Behavioral triggers of skin conductance responses and their neural correlates in the primate amygdala." *J Neurophysiol*, 101: 1749-1754.

Science editorial writing

1. **Mosher, C.P.** (2015). "How to grow stronger without lifting weights." *Scientific American: Mind Matters*.

Meeting abstracts

- Mosher, C.P.**, Wei, Y., Kaminski, J., Nandi, A., Mamelak, A.N., Anastassiou, C.A., & Rutishauser, U. (2019). "Cellular classes in the human brain revealed by heartbeat-related modulation of the extracellular action potential waveform." Allen Institute Showcase. Seattle, WA.
- Mosher, C.P.**, Wei, Y., Kaminski, J., Nandi, A., Mamelak, A.N., Anastassiou, C.A., & Rutishauser, U. (2019). "Cardiac-related modulation of the extracellular action potential in vivo reveals multiple cells classes in the human hippocampus." The Society for Neuroscience, Neuroscience Meeting Planner, Chicago IL: Society for Neuroscience.
- Mosher, C.P.**, Wei, Y., Kaminski, J., Nandi, A., Mamelak, A.N., Anastassiou, C.A., & Rutishauser, U. (2019). "Cardiac-related modulation of the extracellular action potential in vivo reveals multiple cells classes in the human hippocampus." The Society for Neuroscience, Neuroscience Meeting Planner, Chicago IL: Society for Neuroscience.
- Pouratian, N., Rutishauser, U., Aron, A., Malekmohammadi, M., Choi, J.W., Andersen, R., Christopoulos, V., **Mosher, C.P.** (2018). "Spectral-spatial separation of motor conflict and stopping in the basal ganglia-cortical circuits." The BRAIN Initiative Investigators Meeting. Bethesda, MD.
- Young, M.E., Esannason, K.D., Tamang, S., **Mosher, C.P.**, & Rudebeck, P.H. (2017). "Subcallosal anterior cingulate cortex, ventral striatum, and amygdala encode distinct aspects of reward." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Stoll, F.M., **Mosher, C.P.**, Tamang, S., Murray, E.A., & Rudebeck, P.H. (2017). "Amygdala input differentially influences prefrontal local field potential and single neuron encoding of reward-based decisions." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Morrow, J.K., **Mosher, C.P.**, & Gothard, K.M. (2017). "Tactile stimulation of the face and body elicit neural activity in the monkey amygdala." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Zimmerman, P.E., Morrow, J.K., **Mosher, C.P.**, & Gothard, K.M. (2017). "Neurons in the primate amygdala respond to tactile, auditory, and visual stimuli." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Tamang, S., **Mosher C.P.**, Rudebeck, P.H. (2016). "Neural correlates of positive affect in subcallosal anterior cingulate cortex and amygdala." The Society for Neuroscience, Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience.
- Mosher C.P.**, Tamang, S., Murray, E.A., & Rudebeck, P.H. (2015). "Effects of amygdala lesions on local field potentials in the primate prefrontal cortex during a reward-guided task." The

- Society for Neuroscience, Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience.
- Mosher, C.P.**, Zimmerman, P.E., Gothard, Fuglevand, A.J., & Gothard, K.M. (2013). "Single unit activity in the monkey amygdala during the production of facial expressions." Gordon Research Conference: Amygdala in Health and Disease. Easton, MA.
- Gothard, K.M., Zimmerman, P.E., & **Mosher, C.P.** (2013). "Neurons in the monkey amygdala detect eye-contact during naturalistic social interactions." Gordon Research Conference: Amygdala in Health and Disease. Easton, MA.
- Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2012). "Eye contact, a fundamental building block of social behavior, engages single unit activity in the monkey amygdala." Organization for Computational Neurosciences. Decatur, GA.
- Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2012). "Tactile stimulation of the face activates single units in the monkey amygdala." Organization for Computational Neurosciences. Decatur, GA.
- Zimmerman, P.E., **Mosher, C.P.**, & Gothard, K.M. (2012). "Looking at the eyes engages single unit activity in the primate amygdala during naturalistic social interactions." The Society for Neuroscience, Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience.
- Gothard, K.M., Zimmerman, P.E., & **Mosher, C.P.** (2012). "Single unit activity in the primate amygdala discriminates social stimuli in a complex scene." The Society for Neuroscience, Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience.
- Fuglevand, A.J., Zimmerman, P.E., **Mosher, C.P.**, & Gothard, K.M. (2012). "Single unit activity in the primate amygdala during the production of facial expressions." The Society for Neuroscience, Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience.
- Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2010). "Dissociation of attention and emotion-related neural activity in the nuclei of the primate amygdala." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Gothard, K.M., Zimmerman, P.E., Stib, M.T., Farshad, K.M., & **Mosher, C.P.** "Gaze following and anticipation of monkeys viewing videos with social content." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Zimmerman, P.E., **Mosher, C.P.**, Farshad, K.M., Stib, M.T., & Gothard, K.M. "Individual differences in habituation of visual exploration and facial expression reciprocation in monkeys looking at videos with social content." The Society for Neuroscience, Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Mosher, C.P.**, Zimmerman, P.E., & Gothard, K.M. (2008). "State-dependent modulation of neural activity in the monkey amygdala; single unit and EEG activity during social stimulation and sleep." Neuroscience Meeting Planner. Washington DC: Society for Neuroscience.
- Mosher, C.P.**, Brooks, K.N., Spittler, K.M., Zimmerman, P.E., Wilder, T., & Gothard, K.M. (2006). "Enhanced skin conductance responses elicited by facial expressions with averted gaze in Rhesus macaques." Neuroscience Meeting Planner. Atlanta, GA: Society for Neuroscience.

*Non-scientific publications:*

- Mosher, C.P.** (2008). "Ammachi." *Persona Magazine of Art and Literature: Celebrating 30 Years of Excellence*. Sacha Meschkow (Editor), 30: 72-78.

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**ADVISORS and COLLABORATORS**

18<sup>th</sup> November, 2019

Ueli Rutishauser, Caltech and Cedars-Sinai Medical Center, Los Angeles, CA  
Adam Mamelak, Cedars-Sinai Medical Center, Los Angeles, CA  
Chrystal Reed, Cedars-Sinai Medical Center, Los Angeles, CA  
Nader Pouratian, The University of California Los Angeles, CA  
Peter Rudebeck, Mount Sinai Hospital, New York, NY  
Costas Anastassiou, The Allen Institute for Brain Science, Seattle, WA  
Katalin Gothard, The University of Arizona, Tucson, AZ  
Andrew Fuglevand, The University of Arizona, Tucson, AZ

## **RELATED SKILLS**

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### **Software Proficiencies**

MatLab, Psychtoolbox, Qualtrics, Neurobehavioral Systems Presentation, MonkeyLogic, iMotions, CED Spike 2, Plexon, AlphaOmega Neuro Omega, Neuralynx, CorelDraw, Adobe Illustrator, Adobe Premiere

### **Hardware Proficiencies**

EyeTracking (ISCAN, Arrington), Acute Single Unit Recording (Thomas Eckhorn Drive, NAN), Data Acquisition (CED 1401, Neuralynx), Skin Conductance (PsychLab, BioPac, Shimmer, CED Skin Conductance Unit), EKG Photoplethysmography and Electromyography (Grass Amplifier, BioPac), Local Field Potential (Neuralynx)

### **Certifications**

Facial Action Coding System, Certified by Paul Ekman Group  
Graduate Certificate in Statistics