

ARIELLE S. KELLER

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EDUCATION

Stanford University, Stanford, CA
Neurosciences PhD Candidate

Sep 2016 - Present

Brandeis University, Waltham, MA

May 2016

Master of Science, Bachelor of Science, Summa Cum Laude

Majors: Neuroscience, Psychology; Minor: English

Overall GPA: 3.95, Dean's List

Masters Thesis in Neuroscience: *Characterizing the roles of alpha and theta oscillations in multisensory attention*

HONORS AND AWARDS

- Society of Biological Psychiatry (SOBP) Travel Award, 2020
- Phi Beta Kappa, 2016
- Reis and Sowul Family Prize in Neuroscience, 2016
- Ricardo Morant Award in Psychology, 2016
- Goldwater Scholarship for Excellence in Research, 2015
- Psi Chi: International Honor Society in Psychology, 2015
- Sustaining the Mind Scholarship, 2015
- Brandeis Office of the Provost Conference Travel Funding, 2014

GRANTS

National Defense Science & Engineering Graduate Fellowship (NDSEG)

Sep 2017 - Sep 2021

Stanford Center for Mind, Brain, Computation and Technology (MBCT)

Sep 2017 - Sep 2021

Stanford Center for Neurological Imaging Innovation Grant

Feb 2018 - Aug 2018

NIH Computational Neuroscience Traineeship

May 2014 - May 2016

Honorable Mention: NSF Graduate Research Fellow Program

Apr 2017

Honorable Mention: NSF Graduate Research Fellow Program

Apr 2016

RESEARCH EXPERIENCE

Stanford PANLAB, Stanford University, Stanford, CA

Feb 2017 - present

Graduate Student, PI: Dr. Leanne Williams

Laboratory of Behavioral and Cognitive Neuroscience, Stanford, CA

Jan 2017 - Feb 2017

Rotation Student, PI: Dr. Josef Parvizi

Stanford FIND Lab, Stanford University, Stanford, CA

Sep 2016 - Dec 2016

Rotation Student, PI: Dr. Michael Greicius

Biosciences ADVANCE Summer Institute, Stanford University, Stanford, CA

Jul 2016 - Aug 2016

Rotation Student: PI: Dr. Anthony Wagner, Stanford Memory Laboratory

Sekuler Lab, Brandeis University, Waltham, MA

Nov 2012 - Jun 2016

Researcher, Computational Neuroscience Trainee

Vasilyeva Lab, Waltham, MA
Researcher

Jan 2014 - May 2016

Morris Lab, Waltham, MA
Project Laboratory in Genetics and Genomics

Sep 2014 - Dec 2014

PUBLICATIONS

- Goldstein-Piekarski, A. N.^{*}, Ball, T. M.^{*}, Samara, Z.[†], Staveland, B. R.[†], **Keller, A. S.[†]**, Fleming, S. L., Grisanzio, K. A., Holt-Gosselin, B., Williams, L. M. (2020). Deriving biotypes for depression and anxiety using clinic-ready brain circuit metrics. *Biological Psychiatry (Under Review)*.
- Keller, A. S.**, Davidesco, I., Tanner, K. D. (2020). Attention Matters: How orchestrating attention relates to classroom learning. *Cell Biology Education - Life Sciences Ed.* 19(3):fe5.
- Chilver, M. R., **Keller, A. S.**, Park, H., Jamshidi, J., Montalto, A., Schofield, P. R., Clark, C. R., Harmon-Jones, E., Williams, L. M.^{*}, Gatt, J. M.^{*} (2020). Electroencephalography profiles as a biomarker of wellbeing: A twin study. *Journal of Psychiatric Research*, 126, 114-121.
- Rajpurkar, P., Dass D., Yang J., Vale, V., **Keller, A. S.**, Irvin, J., Taylor, Z., Basu, S., Ng, A. & Williams, L. M. (2020). Machine Learning Prediction of Treatment Response to Antidepressant Medication Using Pre-Treatment EEG: Development and Validation of the ElecTreeScore Algorithm, *JAMA Network Open*, 3(6):e206653.
- Keller, A. S.**, Ball, T. M. & Williams, L. M. (2019). Deep phenotyping of attention impairments and the “Inattention Biotype” in Major Depressive Disorder. *Psychological Medicine*. 1-10.
<https://doi.org/10.1017/S0033291719002290>.
- Keller, A. S.**, Leikauf, J. E., Holt-Gosselin, B., Staveland, B. R. & Williams, L. M. (2019). Paying Attention To Attention in Depression *Translational Psychiatry*. 9, 279. doi:10.1038/s41398-019-0616-1
- Keller, A. S.**, Qiu, H.^{*}, Li, J.^{*} & Williams, L. M. (2019). Modeling attention impairments in Major Depression. *Proceedings of the Computational Cognitive Neuroscience Conference*.
<https://doi.org/10.32470/CCN.2019.1325-0>
- Keller, A. S.** & Christopher, L. (2017). Distinct Phases of Tau, Amyloid, and Functional Connectivity in Healthy Older Adults. *The Journal of Neuroscience*. 37(37):8857-8859.
- Keller, A. S.**, Payne, L. & Sekuler, R. (2017) Characterizing the roles of alpha and theta oscillations in multisensory attention. *Neuropsychologia*. 99:48-63.
- Keller, A. S.** & Sekuler, R. (2015). Memory and learning with rapid audiovisual sequences. *Journal of Vision*. 15(15):7. doi: 10.1167/15.15.7.

^{*,†} denote equal contributions

INVITED TALKS

Keller, A. S. (2020, September). Characterizing impairments of goal-directed attention in mental illness. *Rutgers University Psychology Department Brown Bag*, Piscataway, NJ, USA.

Keller, A. S. (2020, June). “My brain has too many tabs open”: Unpacking concentration difficulties to understand how attention changes in depression and anxiety. *STAR Lab*, Stanford, CA, USA.

Keller, A. S. (2020, May). Beyond “Concentration Difficulties”: Probing Attention Impairments in Depression and Anxiety Across Multiple Units of Analysis. *Society of Biological Psychiatry Annual Meeting*, New York NY, USA.

Keller, A. S. (2020, March). Paying attention to attention in mental illness. *STEM Speaker Series*, Cañada College, Redwood City CA, USA.

Keller, A. S. (2019, June). Slowness of recovery of stress cortisol and severity of early life stress predict changes in corpus callosum diffusivity. *SNAP Lab*, Stanford University, Stanford CA, USA.

Keller, A. S. (2019, May). Implicit Bias and the Leaky Pipeline, *Society of Biological Psychiatry Annual Meeting Women’s Luncheon*, Chicago, IL, USA.

Keller, A. S. (2019, May). Inequality in science: A close look at the data. Invited talk and workshop given for the Graduate Training Program in Cell and Molecular Biology, Stanford, CA, USA.

Keller, A. S. (2019, March). Analyzing dynamics and uncovering brain states. Stanford Mind, Brain, Computation and Technology *Computational Neuroscience Journal Club*, Stanford, CA, USA.

Keller, A. S. (2019, February). Inequality in science: A close look at the data. Invited talk and workshop given at the Fordyce and Hershlag Laboratories, Stanford, CA, USA.

Keller, A. S. (2018, November). Paying attention to attention in depression. Invited talk given at BRAVE Lab, Stanford University VA Hospital, Stanford CA, USA.

Keller, A. S. (2018, October). Data Blitz Presenter: Artificial Intelligence for Precision Mental Health Event, Stanford, CA, USA.

Keller, A. S. (2018, October). Paying attention to attention in the brain. Invited talk given at Leigh High School, San Jose, CA, USA.

Keller, A. S. (2018, July). Stanford BioAIMS: Diversity and Inclusion in Science Workshop, opening lecture, Stanford, CA, USA.

Keller, A. S. (2018, April). Paying attention to attention in the brain. Invited talk given at the *Bay Area Society for Neuroscience Youth* monthly meeting, San Jose, CA, USA.

Keller, A. S. (2018, March). Inequality in science: A close look at the data. Invited talk given at the *Stanford Biochemistry Journal Club*, Stanford, CA, USA.

- Keller, A. S.,** Cocjin, J., & Jagadeesh, A. J. (2017, December). The neural basis of category selective attention. Invited talk given at the *Cognitive Neuroscience Friday Seminar*, Stanford, CA, USA.
- Keller, A. S.** (2015, November). Characterizing Dementias: Lewy Body, Korsakoff's Syndrome, Alzheimer's Disease, and others. Guest lecture given in *Introduction to Cognitive Neuroscience*, Brandeis University, Waltham, MA, USA.
- Keller, A. S.,** Aizenman, A. M. & Sekuler, R. (2014, November). Multisensory interactions: Incidental learning and disruption. Presented at the *Undergraduate Research Colloquium*, Brandeis University, Waltham, MA, USA.
- Keller, A. S.** (2014, November). Alzheimer's Disease, Korsakoff's Syndrome, and other Dementias. Guest lecture given in *Introduction to Cognitive Neuroscience*, Brandeis University, Waltham, MA, USA.
- Aizenman, A., **Keller, A. S.,** Gold, J., & Sekuler, R. (2014, May). Individual differences in short-term memory and multisensory integration: Musicianship matters. Presented at the mini-symposium conducted at the annual meeting of the *Vision Sciences Society*, St. Pete Beach, FL.

POSTERS

- Keller, A.S.,** Holt-Gosselin, B.*, Ling, R.*, Williams, L. M. (2020). Unpacking "Concentration Difficulties": Early life stress mediates the association between anxiety and impairments of selective and divided attention with specific neural circuit and neurophysiological correlates. *Annual Meeting of the American College of Neuro-Psychopharmacology (ACNP)*, Virtual Conference.
- Hack, L. M., **Keller, A.S.,** Warthen, K. G., Whicker, C. L., Williams, L. M. (2020). The effect of selective D3 agonism on anhedonia symptoms and reward neurocircuitry in subjects with MDD and prominent anhedonia. *Annual Meeting of the American College of Neuro-Psychopharmacology (ACNP)*, Virtual Conference.
- Keller, A.S.*,** Hack, L. M.*, Whicker, C. L., Williams, L. M. (2020). Mechanistic trial evaluating the effect of repetitive transcranial magnetic stimulation on RDoC constructs in treatment-resistant depression. *Society for Biological Psychiatry*, 87(9), S412-S413.
- Keller, A.S.,** Ball, T. M., Cocjin, J. B., Jagadeesh, A. V., Bugatus, L., Grill-Spector, K., Williams, L. M. (2019). Mechanisms of goal-directed attention in healthy and unhealthy mental states. Department of Defense National Defense Science and Engineering Graduate (NDSEG) Fellowship Conference, San Diego, CA, USA.
- Keller, A.S.,** Qiu, S.*, Li, J.*. & Williams, L. M. (2019). Modeling attention impairments in Major Depression. Poster presented at Computational Cognitive Neuroscience, Berlin, Germany.
- Keller, A.S.*,** Ling, R.*, Holt-Gosselin, B. & Williams, L. M. (2019). Attention and working memory in mental illness: Experimental design and preliminary results. Poster presented at Stanford Bio-X Symposium, Stanford CA, USA.
- Qiu, S.*, Li, J.*, **Keller, A. S.** & Williams, L. M. (2019). Modeling attention impairments in Major Depression. Poster presented at Stanford Bio-X Symposium, Stanford CA, USA.

- Keller, A. S.,** Ball, T. M., Cocjin, J. B., Jagadeesh, A. V., Bugatus, L., Grill-Spector, K. & Williams, L. M. (2019, June) Residual correlations reveal top-down selective attention mechanisms in healthy and depressed adults. Poster presented at the *Organization for Human Brain Mapping*, Rome, Italy.
- Keller, A. S.,** Ball, T. M. & Williams, L. M. (2019, May) Deep phenotyping of attention impairments and the “Inattention Biotype” in Major Depressive Disorder. Poster presented at the *Society for Biological Psychiatry*, Chicago, IL, USA.
- Tally, S., Holt-Gosselin, B., **Keller, A. S.,** Staveland, B. R., Williams, N., Suppes, P., Ostacher, M. & Williams, L. M. (2019, Feb). Effects of dopamine agonist and TMS treatments on anhedonic depression: Preliminary findings. Poster presented at the *Stanford Bio-X Symposium*, Stanford, CA, USA.
- Keller, A. S.*,** Cocjin, J. C.*, Jagadeesh, A. J.*, Bugatus, L., & Grill-Spector, K. (2018, Nov). Selective attention influences visual object category representations across human cortex. Poster presented at the *Annual Meeting of the Society for Neuroscience (SfN)*, San Diego, CA, USA.
- Keller, A. S.,** Ball, T. M. & Williams, L. M. (2018, Oct). Fronto-parietal hypo-connectivity and reduced alpha oscillations characterize the “Inattention Biotype” in Major Depressive Disorder. Poster presented at the *Stanford Neurosciences Institute Symposium*, Stanford, CA, USA.
- Keller, A. S.,** Korgaonkar, M. & Williams, L. M. (2018, May) Feature-based selective attention as a biomarker for impaired cognition in depression. Poster presented at the *Society for Biological Psychiatry*, New York, NY, USA.
- Keller, A. S.,** Payne, L. & Sekuler, R. (2016, April) Multisensory divided attention: Role of theta oscillations. Poster presented at the *Cognitive Neuroscience Society*, New York, NY, USA.
- Keller, A. S.,** Payne, L. & Sekuler, R. (2015, July) Fronto-central theta oscillations during multisensory divided attention. Poster presented at the *Brandeis Division of Sciences Summer Undergraduate Research Poster Session*, Waltham, MA, USA.
- Keller, A. S.,** Payne, L. & Sekuler, R. (2015, June) When multiple modalities require attention, theta steps up to the plate. Poster presented at the *NSF inter-Science of Learning Center Conference*, San Diego, CA, USA.
- Keller, A. S.,** Payne, L. & Sekuler, R. (2015, March) When multiple modalities require attention, theta steps up to the plate. Poster presented at the *Cognitive Neuroscience Society*, San Francisco, CA, USA.
- Keller, A. S.,** Payne, L. & Sekuler, R. (2014, July). Theta oscillations drive multisensory divided attention. Poster presented at the *Brandeis Division of Sciences Summer Undergraduate Research Poster Session*, Waltham, MA, USA.
- Keller, A. S.,** Aizenman, A. M. & Sekuler, R. (2014, July). Multisensory interactions: Incidental learning and disruption. Poster presented at the *Gordon Research Conference: Neurobiology of Cognition*, Bethel, ME, USA.
- Keller, A. S.** & Sekuler, R. (2014, April). Ignored sounds infiltrate perception of rapid visual sequences. Poster presented at the *Brandeis University Undergraduate Science Symposium*, Waltham, MA, USA.

Keller, A. S., Aizenman, A. M. & Sekuler, R. (2013, August). Multisensory learning: Feedback does not matter. Poster presented at the *Brandeis Division of Sciences Summer Undergraduate Research Poster Session*, Waltham, MA, USA.

TEACHING

Stanford Psychology PhD Program Bootcamp Jul 2020 - Sep 2020
Instructor, Course Design

Stanford Preparing Future Professors Program Oct 2019 - Apr 2020
Weekly shadowing Dr. Kimberly Tanner at San Francisco State University

NeuroTech: Experimental Immersion in Neuroscience Sep 2019 - Dec 2019
Teaching Assistant

Stanford Psychology Department Electroencephalography Laboratory Jun 2019 - Jun 2020
Teaching Assistant

Introduction to Perception Sep 2018 - Dec 2018
Teaching Assistant

Stanford Brain Day Feb 2017 - Jan 2020
Instructor

- Teach middle school classes about neuroscience and lead hands-on demos

Stanford SPLASH Dec 2016 - May 2018
Instructor, Volunteer

- Teach high school students about neuroscience, specialty in Cognitive Neuroscience

Stanford Intensive Neurosciences Bootcamp Jul 2017 - Sep 2017
Teaching Assistant

Diversity and Inclusion in Science Course Feb 2017 - Mar 2017
Teaching Assistant

Brandeis University Department of Academic Services, Waltham, MA Sep 2015 - Dec 2015
Brandeis Undergraduate Group Study Tutor – Cognitive Neuroscience

SERVICE

Stanford NeuWrite West Sep 2018 - present
Co-President, Writer, Editor

Stanford Science Penpals Jun 2017 - present
Vice President, School Coordinator, Neuroscience Liaison

Neuroscience Student Network Sep 2018 - present

Stanford Neurosciences Program Committee Jun 2017 - Oct 2019

Stanford Neuroscience Communications Representative

Jun 2017 - Jun 2018

Brandeis Students to End Alzheimer's Disease

Feb 2015 - May 2016

Ad-Hoc Reviewer: Biological Psychiatry, Psychological Medicine, Cortex, JAMA Psychiatry, Scientific Reports, Neuropsychopharmacology

Professional Societies (Active and Past): Society of Biological Psychiatry, Society for Neuroscience, Cognitive Neuroscience Society, Organization for Human Brain Mapping

MENTORSHIP

Ruth Ling (Research Assistant)

Jan 2019 – present

Bailey Holt-Gosselin (Research Assistant)

Jan 2019 - present

Jason Li (Artificial Intelligence for Mental Health Project)

Oct 2018 - present

Helen Qiu (Artificial Intelligence for Mental Health Project)

Oct 2018 – present