

# HENRY L. HALLOCK, PH.D.

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Program in Neuroscience | Lafayette College

Oecshle Hall, Easton, PA 18042

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I am a behavioral neuroscientist interested in how the brain encodes memory, attention, and decision-making. My long-term research goal is to identify circuits (groups of connected neurons) in the brain that regulate these processes, and to understand how these circuits function at the molecular and systems levels. I believe that a fundamental understanding of how memory, attention, and decision-making circuits function will be critical for precision medicine approaches to treating cognitive symptoms in neuropsychiatric disorders, including schizophrenia, post-traumatic stress disorder, major depressive disorder, and attention-deficit hyperactivity disorder.

## EDUCATION

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**Ph.D. – University of Delaware, Psychology (Behavioral Neuroscience Concentration)** 2016

**B.A. – Millersville University of Pennsylvania, Psychology (Biology Minor)**  
*Magna cum laude* 2010

## POSITIONS & EMPLOYMENT

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**Assistant Professor** 2021-Present  
Neuroscience Program  
Lafayette College

**Postdoctoral Associate/Fellow** 2016-2021  
The Lieber Institute for Brain Development | The Johns Hopkins School of Medicine  
Advisor: Keri Martinowich, Ph.D.

**Graduate Student (Ph.D.)** 2010-2016  
Department of Psychological and Brain Sciences  
University of Delaware  
Advisor: Amy Griffin, Ph.D.  
Thesis Title: "Prefrontal-thalamo-hippocampal contributions to spatial working memory"

Undergraduate Research Assistant	2008-2010
Department of Psychology	
Millersville University of Pennsylvania	
Advisors: Shaun Cook, Ph.D. & Shawn Gallagher, Ph.D.	

## FUNDING AS PRINCIPAL INVESTIGATOR

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### CURRENT

NARSAD Young Investigator Award, Brain and Behavior Research Foundation	2021-2023
<i>'Neural correlates of sustained attention during touchscreen-based cognitive testing'</i>	
Award total: \$70,000	
Lafayette College Faculty Research Grant	2022-2024
Award total: \$4,000	

### PAST

NIH Ruth L. Kirschstein National Research Service Award (NRSA) for Individual Postdoctoral Fellows (F32), National Institute of Mental Health	2019-2022
<i>'Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections'</i>	
Award total: \$206,000	
Mission Forward Award, Lieber Institute for Brain Development	2018-2019
<i>'Molecular signatures of prefrontal-projecting hippocampal neurons'</i>	
Award total: \$100,000	

### PENDING

NIH Exploratory/Developmental Research Grant Program (R21)
National Institutes of Health
<i>'Molecular, cellular and physiological correlates of sustained attention in the locus coeruleus to anterior cingulate cortex circuit'</i> (impact score: 21, 5 <sup>th</sup> percentile)

## AWARDS/HONORS

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Society of Biological Psychiatry Travel Award (\$2,000)	2020
Society of Biological Psychiatry "Rising Star"	2019
Gordon Research Seminar "Amydala" Meeting Poster Prize (\$300)	2019
Johns Hopkins Postdoctoral Retreat Best Poster (\$1,000 Travel Award)	2018
Society for Neuroscience, Delaware Chapter Best Poster	2014

University of Delaware Graduate Student Travel Award (\$1,500)	2013
University of Delaware Graduate Research Fellowship	2013
University of Delaware Graduate Student Travel Award (\$1,500)	2012
NSF Graduate Research Fellowship Honorable Mention	2012
University of Delaware Graduate Student Travel Award (\$1,500)	2011
Society for Neuroscience, Delaware Chapter Best Poster	2011
Millersville University Intramural Grant for Undergraduate Research (\$300)	2009
Psi Chi National Honor Society in Psychology	2009
Dean's List, Millersville University of Pennsylvania	2007-2010

## TEACHING: COURSES TAUGHT

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### **Lafayette College (Instructor of Record)**

*Introduction to Neuroscience (NEUR 201)*

*Advanced Neuroscience (NEUR 401)*

*Introduction to Neural Data Analysis (NEUR 265; Course I created)*

*Psychopharmacology (NEUR/PSYC 225)*

### **Johns Hopkins University (Instructor of Record)**

*Introduction to Neuroscience (AS.080.15; Virtual with asynchronous components)*

### **California State University – Dominguez Hills (Guest Lecturer)**

*Synaptic Plasticity*

### **Goucher College (Adjunct Instructor)**

*Introductory Biology (BIO 102)*

### **Hampden-Sydney College (Guest Lecturer)**

*Neurobiology (BIOL 333: Virtual)*

### **University of Delaware (Instructor of Record)**

*Measurement and Statistics (PSYC 209)*

### **University of Delaware (Guest Lecturer)**

*Introduction to Neuroscience (NSCI 100)*

*Spatial Cognition (NSCI 636)*

*Advanced Neurophysiology (NSCI 627)*

*Brain and Behavior (PSYC 314)*

*Introduction to Psychology (PSYC 100)*

## TEACHING: PEDAGOGICAL TRAINING

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Johns Hopkins Teaching Academy Certificate of Completion	2020-2021
Johns Hopkins Teaching Academy Collaborative Teaching Fellowship	2021
University of Delaware: Teaching Practicum (PSYC 840)	2014-2015
University of Delaware Teaching Assistant (Brain and Behavior: PSYC 314)	2010-2013

## PUBLICATIONS (\* DENOTES UNDERGRADUATE/POST-BAC MENTEE)

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### RESEARCH PAPERS

14. Rodriguez, L.A., Kim, S., Page, S.C., Nguyen, C.V., Pattie, E.A., Hallock, H.L., \*Valerino, J., Maynard, K.R., Jaffe, A.E., & Martinowich, K. (2022). The basolateral amygdala to lateral septum circuit is critical for regulating social novelty in mice. *Neuropsychopharmacology*, <https://doi.org/10.1038/s41386-022-01487-y>
13. Stout, J.J., Hallock, H.L., George, A.E., Adiraju, S.S., & Griffin, A.L. (2022). The ventral midline thalamus coordinates prefrontal-hippocampal neural synchrony during vicarious trial and error. *Scientific Reports*, **12**: 10940
12. Hallock, H.L., \*Quillian, H.M., Maynard, K.R., \*Mai, Y., Chen, H-Y., Hamersky, G.R., Shin, J.H., Maher, B.J., Jaffe, A.E., & Martinowich, K. (2020). Molecularly-defined hippocampal inputs regulate population dynamics in the prelimbic cortex to suppress context fear memory retrieval. *Biological Psychiatry*, **88**: 554-565
11. Maynard, K.R., Kardian, A., Hill, J.L., \*Mai, Y., Barry, B., Hallock, H.L., Jaffe, A.E., & Martinowich, K. (2020). TrkB signaling influences gene expression in cortistatin-expressing interneurons. *eNeuro*, **7**: 10.1523/ENEURO.0310-19.2019
10. Hallock, H.L., \*Quillian, H.M., \*Mai, Y., Maynard, K.R., & Martinowich, K. (2019). Manipulation of a genetically and spatially defined sub-population of BDNF-expressing neurons potentiates learned fear and decreases hippocampal-prefrontal synchrony in mice. *Neuropsychopharmacology*, **44**: 2239-2246
9. Hill, J.L., Jimenez, D.V., \*Mai, Y., Maynard, K.R., Hardy, N.F., Hallock, H.L., Ren, M., Chen, H-Y., Yang, F., Maher, B.J., Schloesser, R.J., & Martinowich, K. (2018). Cortistatin interneurons require TrkB signaling to prevent brain hyper-excitability. *Brain Structure and Function*, **224**: 471-483
8. Hallock, H.L., Garman, H.D., Cook, S.P., & Gallagher, S.P. (2017). Recognition without words: Using taste to explore survival processing. *The Journal of Undergraduate Neuroscience Education*, **15**: A1-A5

7. Hallock, H.L., Wang, A., & Griffin, A.L. (2016). Ventral midline thalamus is critical for hippocampal-prefrontal synchrony and spatial working memory. *The Journal of Neuroscience*, **36**: 8372-8389 -- *\*featured article*
6. \*Layfield, D., \*Patel, M.M., Hallock, H.L., & Griffin, A.L. (2015). Inactivation of the nucleus reuniens/rhomboid causes a delay-dependent impairment of spatial working memory. *Neurobiology of Learning and Memory*, **125**: 163-167
5. Hallock, H.L., Wang, A., \*Shaw, C.L., & Griffin, A.L. (2013). Transient inactivation of the thalamic reuniens and rhomboid nuclei produces deficits of a working memory-dependent tactile-visual conditional discrimination T-maze task. *Behavioral Neuroscience*, **127**: 860-866
4. Hallock, H.L., \*Arreola, A.C., \*Shaw, C.L., & Griffin, A.L. (2013). Dissociable roles of the dorsal striatum and dorsal hippocampus in conditional discrimination and spatial alternation T-maze tasks. *Neurobiology of Learning and Memory*, **100**: 108-116
3. \*Shaw, C.L., \*Watson, G.D.R., Hallock, H.L., Cline, K.M., & Griffin, A.L. (2013). The role of the medial prefrontal cortex in the acquisition, retention, and reversal of a tactile visuospatial conditional discrimination task. *Behavioural Brain Research*, **236**: 94-101
2. Hallock, H.L., & Griffin, A.L. (2013). Dynamic coding of dorsal hippocampal neurons between tasks that differ in structure and memory demand. *Hippocampus*, **23**: 169-186
1. Griffin, A.L., & Hallock, H.L. (2013). Hippocampal signatures of episodic memory: Evidence from single-unit recording studies. *Frontiers in Behavioral Neuroscience*, <https://doi.org/10.3389/fnbeh.2013.00054>

## TALKS/SEMINARS

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| <p>"Molecular regulators of attentional circuitry"<br/> <i>Behavioral neuroscience brown bag</i>, University of Delaware<br/>         (invited speaker)</p>                 | 2023 |
| <p>"Decision making and the brain: From circuits to molecules"<br/> <i>Neuroscience seminar</i>, Lafayette College, Virtual<br/>         (invited speaker)</p>              | 2021 |
| <p>"Decision making and the brain: From circuits to molecules"<br/> <i>Psychology department seminar</i>, CSU – Dominguez Hills, Virtual<br/>         (invited speaker)</p> | 2021 |

<p>"From circuits to molecules: How the anterior cingulate cortex regulates cognitive domains affected in mental illness"</p> <p><i>Staying Connected Post-Doc Seminar Series, Virtual</i></p> <p><b>(selected to present).</b></p>	2020
<p>"Decision making and the brain: From circuits to molecules"</p> <p><i>Biology department seminar, Hampden-Sydney College, Virtual</i></p> <p><b>(invited speaker)</b></p>	2020
<p>"Molecularly-defined hippocampal inputs regulate population dynamics in the prelimbic cortex to suppress context fear memory retrieval"</p> <p><i>Pavlovian Society meeting, Virtual.</i></p>	2020
<p>"Molecular targeting in a spatially-localized context fear memory circuit"</p> <p><i>Inscopix seminar, The National Institutes of Health (NIH), Bethesda, MD</i></p> <p><b>(invited speaker).</b></p>	2019
<p>"Molecular targeting in a spatially-localized context fear memory circuit"</p> <p><i>Baltimore Brain Series, University of Maryland Medical School, Baltimore, MD</i></p> <p><b>(selected to present).</b></p>	2019
<p>"Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections"</p> <p><i>Society for Biological Psychiatry (SOBP) Rising Star Symposium, Chicago, IL</i></p> <p><b>(selected to present).</b></p>	2019
<p>"Molecular regulation of prefrontal circuits that control behavior"</p> <p><i>Postdoc Seminar Series, Lieber Institute for Brain Development, Baltimore, MD</i></p>	2019
<p>"The molecular logic of fear extinction circuitry: Implications for psychiatry"</p> <p><i>PaPC conference, Millersville University, Millersville, PA</i></p> <p><b>(invited speaker; keynote talk)</b></p>	2017
<p>"Prefrontal-thalamo-hippocampal circuit contributions to spatial working memory"</p> <p><i>Lieber Institute for Brain Development, Baltimore, MD</i></p>	2016
<p>"Prefrontal-thalamo-hippocampal circuit contributions to spatial working memory"</p> <p><i>Harvey lab, Harvard University, Cambridge, MA</i></p> <p><b>(invited speaker)</b></p>	2015
<p>"Prefrontal-thalamo-hippocampal circuit contributions to spatial working memory"</p> <p><i>Gordon lab, Columbia University, New York City, NY</i></p> <p><b>(invited speaker)</b></p>	2015

<p>"Prefrontal-thalamo-hippocampal circuit contributions to spatial working memory"</p> <p><i>Jacobs lab, Drexel University, Philadelphia, PA</i></p> <p><b>(invited speaker)</b></p>	2014
<p>"Spatial working memory deficits accompany reductions in hippocampal-prefrontal synchrony following inactivation of the ventral midline thalamic reuniens and rhomboid nuclei"</p> <p><i>Nanosymposium, Society for Neuroscience, Washington, D.C.</i></p> <p><b>(selected to present)</b></p>	2014
<p>"Early life adversity and function of the medial prefrontal cortex throughout the lifespan"</p> <p><i>Development Seminar Series, University of Delaware, Newark, DE</i></p> <p><b>(invited speaker)</b></p>	2013
<p>"Memory demand and task structure differentially modulate spatial representations of hippocampal neurons in dorsal CA1"</p> <p><i>Data Blitz, Neurobiology of Learning and Memory Conference, Park City, UT</i></p>	2012
<p>"Charles Bonnet and the clinical significance of insight"</p> <p><i>History of Psychology Symposium, Eastern Psychological Association, Cambridge, MA</i></p>	2011
<p>"Attentional set shifting as an interspecies tool for probing prefrontal cortex function"</p> <p><i>Development Seminar Series, University of Delaware, Newark, DE</i></p> <p><b>(invited speaker)</b></p>	2011

## SERVICE/OUTREACH

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<p><i>Ad hoc reviewer for Cerebral Cortex, Neuroscience, Developmental Cognitive Neuroscience, Molecular Psychiatry, European Journal of Neuropharmacology, Frontiers in Behavioral Neuroscience, Scientific Reports, Hormones and Behavior, Nature Communications</i></p>	
Member, Neuroscience Advisory Committee, Lafayette College	2021-Present
Treasurer, Lieber Institute for Brain Development Postdoctoral Association	2019-2021
Mentor/letter writer, Letters to a Pre-Scientist	2019-2021
University of Delaware Outreach Program (Project BrainLight)	2014-2016
Organizer, Oscillations Journal Club, University of Delaware	2015
Big Brother, Big Brothers/Big Sisters, Newark, DE	2013-2016
Graduate recruitment, University of Delaware	2011-2015

## PROFESSIONAL MEMBERSHIPS

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Society for Neuroscience	2010-Present
Eastern Psychological Association	2009-Present
Society of Biological Psychiatry	2016-Present

## CONFERENCE ABSTRACTS (\* DENOTES UNDERGRADUATE/POST-BAC MENTEE)

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- 2023** \*Essig, S.R., \*Ramos, L., \*Kempskie, G.J., & Hallock, H.L. *Effects of Apoe over-expression on a touchscreen-based sustained attention task in mice.* Eastern Psychological Association, Boston, MA.
- 2022** Adiraju, S.S., Miranda-Barrientos, J., Hallock, H.L., Oh, S., Valerino, J., DeBrosse, A.C., Carr, G.V., & Martinowich, K. *Neural activity of the locus coeruleus-medial prefrontal cortex circuit during sustained attention.* Society for Neuroscience, San Diego, CA.
- 2022** Hallock, H.L., Miranda-Barrientos, J., Adiraju, S.S., Valerino, J. DeBrosse, A., Noback, M., Quillian, H.M., Barrow, J., Carr, G.V., & Martinowich, K. *Communication between the locus coeruleus and frontal cortex regulates sustained attention in mice.* Society of Biological Psychiatry, New Orleans, LA.
- 2021** Hallock, H.L., \*Valerino, J., DeBrosse, A.C., Noback, M., \*Quillian, H.M., Barrow, J.C., Jaffe, A.E., Carr, G.V., & Martinowich, K. *Molecular and circuit-specific analysis of locus coeruleus-prefrontal networks during a touchscreen rodent continuous performance test.* Society of Biological Psychiatry, Virtual.
- 2021** Stout, J.C., Hallock, H.L., Adiraju, S., & Griffin, A.L. *Role of the ventral midline thalamus in vicarious trial-and-error events.* Neurobiology of Learning and Memory, Virtual.
- 2020** Rodriguez, L., Kim, S.H., Page, S.C., Hallock, H.L., Maynard, K.R., & Martinowich, K. *Brain-derived neurotrophic factor from basolateral amygdala inputs to lateral septum are necessary for social recognition in mice.* American College of Neuropsychopharmacology, Virtual
- 2020** Hallock, H.L., \*Valerino, J., DeBrosse, A.C., Noback, M., \*Quillian, H.M., Barrow, J.C., Jaffe, A.E., Carr, G.V., & Martinowich, K. *Molecular and circuit-specific analysis of locus coeruleus-prefrontal networks during a touchscreen rodent continuous performance test.* American College of Neuropsychopharmacology, Virtual.
- 2020** Hallock, H.L., \*Quillian, H.M., Maynard, K.R., \*Mai, Y., Chen, H.Y., Hamersky, G.R., Shin, J.H., Maher, B.J., Jaffe, A.E., & Martinowich, K. *Molecularly-defined hippocampal inputs regulate population dynamics in the prelimbic cortex to suppress context fear memory retrieval.* Pavlovian Society, Virtual.



- 2019 Hallock, H.L., DeBrosse, A.C., Noback, M., \*Quillian, H.M., Barrow, J.C., Carr, G.V., & Martinowich, K. *Involvement of a locus coeruleus-to-prefrontal (LC-mPFC) circuit in a touchscreen variant of the continuous performance test (CPT) in mice*. Society for Neuroscience, Chicago, IL.
- 2019 Hallock, H.L., \*Quillian, H.M., \*Mai, Y., Chen, H-Y., Hamersky, G.R., Maher, B.J., Jaffe, A.E., & Martinowich, K. *A molecularly and anatomically-defined hippocampal-prelimbic circuit for the regulation of context fear suppression*, GRC Amygdala, Easton, MA
- 2019 Hallock, H.L., \*Quillian, H.M., \*Mai, Y., Chen, H-Y., Hamersky, G.R., Maher, B.J., Jaffe, A.E., & Martinowich, K. *Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections*. Society of Biological Psychiatry, Chicago, IL.
- 2018 Hallock, H.L., \*Mai, Y., Hill, J.L., Chen, H-Y., Hamersky, G.R., Maher, B.J., & Martinowich, K. *Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections*. American College of Neuropsychopharmacology, Hollywood, FL.
- 2018 \*Quillian, H.M., Hallock, H.L., \*Mai, Y., Hill, J.L., Maynard, K.R., & Martinowich, K. *Selective manipulation of Bdnf promoter IV-expressing cells in the hippocampus modulates fear expression and hippocampal-prefrontal synchrony in mice*. Society for Neuroscience, San Diego, CA.
- 2018 Hallock, H.L., \*Mai, Y., \*Quillian, H.M., Hill, J.L., Chen, H-Y., Hamersky, G.R., Maher, B.J., & Martinowich, K. *Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections*. Society for Neuroscience, San Diego, CA.
- 2018 Hallock, H.L., \*Mai, Y., Hill, J.L., Chen, H-Y., Hamersky, G.R., Maher, B.J., & Martinowich, K. *Regulation of fear expression by activity-dependent BDNF in direct hippocampal-to-prelimbic projections*. Johns Hopkins Postdoctoral Retreat, Baltimore, MD.
- 2017 Hallock, H.L., \*Mai, Y., Hill, J.L., & Martinowich, K. *Fear extinction deficits are associated with altered hippocampal-prefrontal function in mice with impaired activity-dependent BDNF signaling*. American College of Neuropsychopharmacology, Palm Springs, CA.
- 2015 Maisson, D.J., \*Emanuel, B., Hallock, H.L., Gemzik, Z., Donahue, M., & Griffin, A.L. *Distinct contributions of hippocampal and prefrontal afferents to nucleus reuniens during spatial working memory*. Society for Neuroscience, San Diego, CA.
- 2014 Hallock, H.L., & Griffin, A.L. *Spatial working memory deficits accompany reductions in hippocampal-prefrontal synchrony following inactivation of the ventral midline thalamic reuniens and rhomboid nuclei*. Society for Neuroscience, Washington, D.C.

- 2014 Hallock, H.L., & Griffin, A.L. *Spatial working memory deficits accompany reductions in hippocampal-prefrontal synchrony following inactivation of the ventral midline thalamic reuniens and rhomboid nuclei*. Pavlovian Society, Seattle, WA.
- 2013 \*Patel, M.M., Hallock, H.L., Wang, A., \*Layfield, D.M., \*Shaw, C.L., & Griffin, A.L. *Transient inactivation of the thalamic nucleus reuniens and rhomboid nucleus produces deficits of a working memory-dependent tactile-visual conditional discrimination task*. Society for Neuroscience, San Diego, CA.
- 2013 Hallock, H.L., & Griffin, A.L. *Different modes of communication in the hippocampal-prefrontal micro-circuit during memory-guided decision making*. Spring Hippocampus Conference, Taormina, Sicily.
- 2013 Hallock, H.L., & Griffin, A.L. *Working memory modulates hippocampal-prefrontal synchrony across mnemonically distinct T-maze tasks*. Neurobiology of Learning and Memory, Park City, UT.
- 2012 \*Arreola, A.C., Hallock, H.L., \*Shaw, C.L., \*Patel, M.M., Amos, S.M., Chandrasekhar, V., \*Watson, G.D.R., & Griffin, A.L. *Dissociable roles of the dorsal striatum and dorsal hippocampus in the performance of mnemonically distinct T-maze tasks*. Society for Neuroscience, New Orleans, LA.
- 2012 Hallock, H.L., & Griffin, A.L. *The effect of delay-dependent working memory demand on hippocampal-prefrontal synchrony during awake behavior and sleep*. Society for Neuroscience, New Orleans, LA.
- 2012 Hallock, H.L., & Griffin, A.L. *Memory demand and task structure differentially modulate spatial representations of hippocampal neurons in dorsal CA1*. Neurobiology of Learning and Memory, Park City, UT.
- 2011 Hallock, H.L., Cline, K.M., & Griffin, A.L. *Dynamic coding of dorsal hippocampal neurons between tasks that differ in structure and memory demand*. Society for Neuroscience, Washington, D.C.
- 2011 \*Shaw, C.L., \*Watson, G.D.R., Hallock, H.L., Cline, K.M., & Griffin, A.L. *Effects of mPFC inactivation on acquisition, performance, and reversal of a tactile visuospatial conditional discrimination task*. Society for Neuroscience, Washington, D.C.
- 2011 Cook, S.P., Gallagher, S.P., Hallock, H.L., & Garman, H. *Survival processing in flavor memory*. Eastern Psychological Association, Cambridge, MA.