

University of Virginia
Department of Psychology
E-mail: niclong@virginia.edu

ACADEMIC POSITIONS

2019 - present Assistant Professor
Department of Psychology
University of Virginia

EDUCATION AND TRAINING

2015 - 2018 Post-doctoral Research Associate
University of Oregon, Department of Psychology
Advisor: Brice Kuhl

2010 - 2015 University of Pennsylvania, Philadelphia
Ph.D., Psychology
Advisor: Michael Kahana

2008 - 2010 Research Assistant/Lab Manager
Brown University, Department of Cognitive & Linguistic Sciences
Advisor: David Badre

2005 - 2008 New York University, New York
B.A., Psychology (Summa Cum Laude, High Honors)
Advisor: Lila Davachi

RESEARCH FUNDING

Current

Title: "Multivariate Decoding of the Retrieval Brain State Across Cognition"

Funding Agency: NIH-NINDS

Award Number: R01NS132872

Period: 6/1/2023 – 5/31/2028

Amount: \$1,250,000 Direct Costs awarded

Role: PI

Title: "Executive control deficits and memory brain state engagement in healthy aging"

Funding Agency: UVA Brain Institute

Period: 11/15/2023 – 12/31/2024

Amount: \$35,000 Direct Costs awarded

Role: PI

Completed

Title: "Mnemonic brain states and selective memory deficits in healthy aging"

Funding Agency: NIH-NCATS

Award Number: KL2TR003016

Period: July 2020 – June 2022

Amount: \$249,317

Role: iTHRIV KL2 Scholar Investigator

HONORS AND AWARDS

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| 2023 | Elected to the Memory Disorders Research Society |
| 2020 | Selected as an Invited Scholar in the integrated Translational Research Institute of Virginia (iTHRIV) Scholar Program |
| 2019 | APS Rising Star Award |
| 2018 | Early Career Award, Society for Experimental Psychology and Cognitive Science (Div 3) |
| 2017 | SfN Trainee Professional Development Award |
| 2010 | NIH Computational Neuroscience Training Grant Trainee |
| 2008 | NYU Undergraduate Research Conference poster winner |

TEACHING EXPERIENCE

Cognitive Neuroscience (PSYC-2160), Role: Instructor, University of Virginia (Spring 2019, Fall 2019, Fall 2020)
 Cognitive Neuroscience (PSYC-3160), Role: Instructor, University of Virginia (Fall 2021, Fall 2022, Fall 2023)
 Research Methods in Electroencephalography (PSYC-5500), Role: Instructor, University of Virginia (Spring 2020, Spring 2024)

PROFESSIONAL MEMBERSHIPS

Memory Disorders Research Society
 Society for Neuroscience

PUBLICATIONS

Work in progress

Smith, D. E., Wheelock, J. R. and **Long, N. M.** Response-locked theta dissociations reveal potential feedback signal following successful retrieval. Preprint. DOI: <https://doi.org/10.1101/2024.01.11.575166>

Smith, D. E. and **Long, N. M.** Top-down task goals induce the retrieval state. Preprint. DOI: <https://doi.org/10.1101/2024.03.04.583353>

Wheelock, J. R. and **Long, N. M.** The persistence of memory: prior memory responses modulate behavior and brain state engagement. Preprint. DOI: <https://doi.org/10.1101/2024.04.05.588245>

Refereed Journal Articles

1. Moore, I. L. and **Long, N. M.** (2024) Semantic associations restore neural encoding mechanisms. *Learning & Memory*. 31(3)
2. Kahana, M. J., Lohnas, L. J., Healey, M. K., Aka, A., Broitman, A. W., Crutchley, P., Crutchley, E. Alm, K. H., Katerman, B. S., Miller, N. E., Kuhn, J. R., Li, Y., **Long, N. M.**, Miller, J., Paron, M. D., Pazdera, J. K., Pedisich, I., Weidemann, C. T. The Penn Electrophysiology of Encoding and Retrieval Study. *Journal of Experimental Psychology: Learning, Memory, & Cognition*. In press.
3. **Long, N. M.** (2023) The intersection of the retrieval state and internal attention. *Nature Communications*. 14:3861
4. Hong, Y., Smith, D. E., Moore, I. L. and **Long, N. M.** (2023) Spatiotemporal dynamics of memory encoding and memory retrieval states. *Journal of Cognitive Neuroscience*. 35:9
5. Smith, D. E., Moore, I. L. and **Long, N. M.** (2022) Temporal context modulates encoding and retrieval of overlapping events. *Journal of Neuroscience*, 42 (14), 3000–3010

6. Long, N. M. & Kuhl, B. A. (2021) Cortical representations of visual stimuli shift locations with changes in memory states. *Current Biology*, 31 (5), 1119–1126
7. Long, N. M. and Kuhl, B. A. (2019) Decoding the tradeoff between encoding and retrieval to predict memory for overlapping events. *NeuroImage*, 201
8. Healey, M. K., Long, N. M., and Kahana, M. J. (2019) Contiguity in Episodic Memory. *Psychonomic Bulletin and Review*. 26, 699–720
9. Long, N. M. and Kuhl, B. A. (2018) Bottom-up and top-down factors differentially influence stimulus representations across large-scale brain networks. *Journal of Neuroscience*, 38 (10), 2495–2504
10. Long, N. M., Sperling, M. R., Worrell, G. A., Davis, K. A., Lucas, T. H., Lega, B. C., Jobst, B. C., Sheth, S. A., Zaghoul, K., Stein, J. M., Das., S. R., Gorniak, R., and Kahana, M. J. (2017) Contextually mediated spontaneous retrieval is specific to the hippocampus. *Current Biology*, 27 (7), 1074–1079
11. Long, N. M. and Kahana, M. J. (2017) Modulation of task demands suggests that semantic processing interferes with the formation of episodic associations. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 43, 167–176
12. Long, N. M., Lee, H. and Kuhl, B. A. (2016) Hippocampal mismatch signals are modulated by the strength of neural predictions and their similarity to outcomes. *Journal of Neuroscience*, 36 (50), 12677–12687
13. Long, N. M. and Kahana, M. J. (2015) Successful memory formation is driven by contextual encoding in the core memory network. *NeuroImage*, 119, 332–337, doi:10.1016/j.neuroimage.2015.06.073
14. Long, N. M., Danoff, M. S., and Kahana, M. J. (2015) Recall dynamics reveal the retrieval of emotional context. *Psychonomic Bulletin and Review*, 22(5), 1328–1333.
15. Badre, D., Lebrecht, S., Pagliaccio, D., Long, N. M., and Scimeca, J. M. (2014). Ventral striatum and the evaluation of memory retrieval strategies. *Journal of Cognitive Neuroscience*, 26 (9), 1928–1948, doi:10.1162/jocn.a.00596
16. Long, N. M., John F. Burke, and Michael J. Kahana (2014). Subsequent memory effect in intracranial and scalp EEG. *NeuroImage*, 84, 488–494, doi:10.1016/j.neuroimage.2013.08.052
17. Burke, J. F., Long, N. M., Zaghoul, K. A., Sharan, A. D., Sperling, M. R., and Kahana, M. J. (2013). Human intracranial high-frequency activity maps episodic memory formation in space and time. *NeuroImage*, 85 Pt. 2, 834–843. doi: 10.1016/j.neuroimage.2013.06.067
18. Badre, D., Doll, B. B., Long, N. M., and Frank, M. J. (2012). Rostrolateral prefrontal cortex and individual differences in uncertainty-driven exploration. *Neuron*, 73, 595–607.
19. Kang, H., Ombao, H., Linkletter, C., Long, N.M., and Badre, D. (2012). Spatiospectral mixed effects model for functional Magnetic Resonance Imaging data. *Journal of the American Statistical Association*, 107(498), 568–577.
20. Long, N.M., Öztekin, I., and Badre, D. (2010) Separable prefrontal cortex contributions to free recall. *Journal of Neuroscience*, 30, 10967–10976.
21. Öztekin, I., Long, N.M., and Badre, D. (2010) Optimizing design efficiency of free recall events for fMRI. *Journal of Cognitive Neuroscience*, 22, 2238–2250.

Invited Reviews and Chapters

1. Long, N. M. and Kuhl, B. A. (2020) When the memory system gets ahead of itself. *Trends in Cognitive Sciences (Spotlight)*.
2. Long, N. M. and Kahana, M. J. (2019) Hippocampal contributions to serial-order memory. *Hippocampus*, 29, 252–259

3. **Long, N. M.**, Kuhl, B. A., and Chun, M. M. (2018). Memory and Attention. In J. T. Wixted, E. Phelps & L. Davachi (Eds), *The Stevens' Handbook of Experimental Psychology and Cognitive Neuroscience* (4th Edition, Volume 1: Learning & Memory). New York: Wiley.
4. Kuhl, B. A. and **Long, N. M.** (2017) Sampling memory to make profitable choices. *Nature Neuroscience (News and Views)*, 20 (7), 903–904.

INVITED TALKS

1. **Long, N. M.** (March, 2024) *How top-down demands modulate memory brain state engagement*. Talk given at the North Carolina Cognition Conference.
2. **Long, N. M.** (February, 2023) *The intersection of memory brain states and the attention system*. Talk given at the Department of Ergonomics at the Leibniz Research Centre for Working Environment and Human Factors Virtual Colloquium Series.
3. **Long, N. M.** (November, 2021) *Memory encoding and memory retrieval: Global brain states with distinct neural correlates that are driven by top-down and bottom-up factors*. Talk given at the Cognitive Forum hosted by the Department of Psychology at Michigan State University.
4. **Long, N. M.** (November, 2020) *"I'm in an encoding state of mind": Neural mechanisms of memory formation*. Talk given at the Cognition Workshop hosted by the Department of Psychology at the University of Chicago.

CONFERENCE PRESENTATIONS

1. Moore, I. L. and **Long, N. M.** (November, 2023) Age effects on the encoding and retrieval of overlapping events. Poster presented at the 52nd Society for Neuroscience meeting.
2. Smith, D. E. and **Long, N. M.** (November, 2023) Response-locked theta power tracks successful retrieval independent of memory goals. Poster presented at the 52nd Society for Neuroscience meeting.
3. Wheelock, J. R. and **Long, N. M.** (November, 2023) Memory decisions modulate ongoing performance and brain state engagement. Poster presented at the 52nd Society for Neuroscience meeting.
4. **Long, N. M.** (September, 2023) The role of the retrieval brain state in cognition. Talk given at the Memory Disorders Research Society meeting.
5. Moore, I. L. and **Long, N. M.** (April, 2023) Effects of aging on the encoding and retrieval of overlapping events. Talk given at the Central Virginia Chapter of the Society for Neuroscience meeting.
6. Smith, D. E. and **Long, N. M.** (April, 2023) Theta power dissociations in episodic memory retrieval independent of memory goals. Talk given at the Central Virginia Chapter of the Society for Neuroscience meeting.
7. Wheelock, J. R. and **Long, N. M.** (April, 2023) The sustained effects of episodic memory decisions. Talk given at the Central Virginia Chapter of the Society for Neuroscience meeting.
8. Wheelock, J. R. and **Long, N. M.** (April, 2023) The lingering effects of memory decisions on ongoing behavior. Talk given at the University of Virginia Undergraduate Research Symposium.
9. Moore, I. L. & **Long, N. M.** (February, 2023) Memory brain state engagement differs across the lifespan. Poster presented at the Dallas Aging and Cognition Conference.
10. **Long, N. M.** (May, 2022) To encode or retrieve, that is the question: How memory states tradeoff and what it means for you. Talk given at the Context and Episodic Memory Symposium.
11. Moore, I. L. & **Long, N. M.** (May, 2022) Memory brain state engagement differs across the lifespan. Poster presented at the Context and Episodic Memory Symposium.

12. Smith, D. E. & **Long, N. M.** (May, 2022) Theta power dissociates hits and correct rejections independent of memory goals. Poster presented at the Context and Episodic Memory Symposium.
13. Wheelock, J. R., Smith, D. E. & **Long, N. M.** (May, 2022) Response-locked neural dissociations in a recognition memory task. Poster presented at the Program in Fundamental Neuroscience Retreat.
14. Meyer, William M., Moore, I. L., & **Long, N. M.** (April, 2022) Semantic and episodic contributions to false memory formation. Poster presented at the University of Virginia Undergraduate Research Symposium.
15. Moore, I. L. & **Long, N. M.** (November, 2021) Multivariate decoding of memory brain states across the lifespan. Poster presented at the 50th Society for Neuroscience meeting.
16. Smith, D. E., Moore, I. L., & **Long, N. M.** (November, 2021) Temporal context modulates encoding and retrieval of overlapping events. Poster presented at the 50th Society for Neuroscience meeting.
17. Moore, I. L. & **Long, N. M.** (August, 2021) Study-phase mechanisms of memory organization in free recall. Poster presented at the Context and Episodic Memory Symposium.
18. Hong, Y., Moore, I. L., Smith, D. E., & **Long, N. M.** (August, 2021) Electrophysiological signatures of memory encoding and memory retrieval states. Poster presented at the Context and Episodic Memory Symposium.
19. Moore, I. L. & **Long, N. M.** (August, 2020) Differential processing of semantic associates modulates memory in free recall. Poster presented at the Context and Episodic Memory Symposium.
20. Smith, D. E. & **Long, N. M.** (August, 2020) Semantic associations modulate episodic encoding signals and subsequent recognition memory. Poster presented at the Context and Episodic Memory Symposium.
21. Tremblay-McGaw, A. G. & Kuhl, B. A., & **Long, N. M.** (March, 2019) Decoding biases between memory encoding and retrieval induced by recent experience. Poster presented at the 26th Cognitive Neuroscience Society meeting.
22. **Long, N. M.**, Favila, S. E., & Kuhl, B. A. (November, 2018) The cortical locus of stimulus representations is influenced by the state of the memory system. Poster presented at the 48th Society for Neuroscience meeting.
23. **Long, N. M.** and Kuhl, B. A. (May, 2018) Signatures of successful encoding depend on the state of the memory system. Talk given at the Context and Episodic Memory Symposium.
24. **Long, N. M.**, Drascher, M. L., & Kuhl, B. A. (November, 2017) Spatiotemporal neural activity dissociates encoding and retrieval states. Poster presented at the 47th Society for Neuroscience meeting.
25. **Long, N. M.**, Sperling, M. R., Worrell, G. A., Davis, K. A., Lucas, T. H., Lega, B. C., Jobst, B. C., Sheth, S. A., Zaghoul, K., Stein, J. M., Das., S. R., Gorniak, R., and Kahana, M. J. (May, 2017) Contextually mediated spontaneous retrieval is specific to the hippocampus. Talk given at the Context and Episodic Memory Symposium.
26. **Long, N. M.**, Kuhl, B. A. (November, 2016) Fronto-parietal regions represent both abstract goals and goal-relevant feature information. Poster presented at the 46th Society for Neuroscience meeting.
27. Favila, S. E. **Long, N. M.**, Kuhl, B. A. (November, 2016) Stimulus-specific memory representations in lateral parietal cortex. Poster presented at the 46th Society for Neuroscience meeting.
28. **Long, N. M.**, Lee, H., Chun, M. M., Kuhl, B. A. (May, 2016) Hippocampal mismatch signals are modulated by the similarity between predicted and realized outcomes. Talk given at the Context and Episodic Memory Symposium.
29. Finn, B., Halderman, L., **Long, N. M.**, Lockwood, J. R., Kahana, M. J. (April, 2016) High gamma predicts engagement ratings but not mental effort ratings. Poster presented at the 23rd Cognitive Neuroscience Society meeting.

30. **Long, N. M.**, Kahana, M. J. (October, 2015) Modulation of task demands suggests that semantic processing interferes with the formation of episodic associations. Poster presented at the 45th Society for Neuroscience meeting.
31. **Long, N. M.**, Kahana, M. J. (May, 2015) Contextual encoding mechanisms in hippocampus and left lateral cortex support successful memory formation. Data blitz talk given at the Context and Episodic Memory Symposium.
32. Halderman, L., Finn, B., **Long, N. M.**, Pedisich, I., Crutchley, P., Kahana, M. J. (March, 2015) EEG correlates of engagement in an assessment context. Poster presented at the 22nd Cognitive Neuroscience Society meeting.
33. **Long, N. M.**, Kahana, M. J. (November, 2014) Spectral correlates of contextual processing during memory encoding. Poster presented at the 44th Society for Neuroscience meeting.
34. **Long, N. M.**, Kahana, M. J. (November, 2013) Neural correlates of memory encoding as a function of practice. Poster presented at the 43rd Society for Neuroscience meeting.
35. **Long, N. M.**, Kahana, M. J. (October, 2012) The neural correlates of temporal and semantic clustering during retrieval. Poster presented at the 42nd Society for Neuroscience meeting.
36. **Long, N. M.**, Kahana, M. J. (April, 2012) The encoding and retrieval neural mechanisms supporting temporal and semantic clustering in free recall. Poster presented at the 19th Cognitive Neuroscience Society meeting.
37. **Long, N. M.**, Miller, J. F., Sederberg, P. B., Kahana, M. J. (November, 2011) Neural correlates of temporal and semantic clustering in free recall. Poster presented at the 41st Society for Neuroscience meeting.
38. **Long, N. M.**, Miller, J. F., Sederberg, P. B., Kahana, M. J. (May, 2011) Neural correlates of temporal and semantic clustering in free recall. Poster presented at the Context and Episodic Memory Symposium.
39. **Long, N. M.**, Doll, B. B., Frank, M. J., Badre, D. (March, 2010). The neurocomputational mechanisms of exploratory and exploitative behavior. Poster presented at the 17th Cognitive Neuroscience Society meeting.
40. **Long, N. M.**, Öztekin, I., Badre, D. (October, 2009). An fMRI investigation of the neural mechanisms that support free recall. Poster presented at the 39th Society for Neuroscience meeting.
41. Lebrecht, S.F., Pagliaccio, D., **Long, N. M.**, Badre, D. (October, 2009). Ventrolateral prefrontal cortex contributions to rule-guided memory retrieval. Poster presented at the 39th Society for Neuroscience meeting.
42. Öztekin, I., **Long, N. M.**, and Badre, D. (March, 2009). Distinguishing events during free recall with fMRI. Poster presented at the 16th Cognitive Neuroscience Society meeting.
43. **Long, N. M.**, and Badre, D. (March, 2009). Testing hierarchical interactions in frontal cortex during cognitive control. Poster presented at the 16th Cognitive Neuroscience Society meeting.

SERVICE

Extramural

Conference Organization

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| 2023 - | Central Virginia Chapter, Society for Neuroscience | Officer |
| 2021 - | Context and Episodic Memory Symposium | Committee Member |

Adhoc referee - Journals

Brain, Brain Communications, Brain Research, Cerebral Cortex, Cognition, Cognition and Emotion, Cognitive Research: Principles and Implications, Communications Psychology, eLife, eNeuro, Human Brain Mapping, Journal of Cognitive Neuroscience, Journal of Memory and Language, Journal of Neuroscience, Journal of Experimental Psychology: Learning, Memory & Cognition, Learning and Memory, Memory, Nature Communications, Nature Human Behavior, NeuroImage, Neuropsychologia, npj Science of Learning, Proceedings of the National Academy

of Sciences, Psychological Review, Psychonomic Bulletin & Review, Psychophysiology, Trends in Cognitive Sciences

Adhoc referee - Grants

- Feb 2024 Temporary Member, Human Complex Mental Function (HCMF) Study Section, NIH
- Dec 2023 Special Emphasis Panel, BP-N(02), NIH
- July 2023 Special Emphasis Panel, ZRG1-BP-Y02, NIH
- Feb 2022 Templeton World Charity Foundation
- June 2021 Temporary Member, Human Complex Mental Function (HCMF) Study Section, NIH (Early Career Reviewer Program)

University

- 2023 - NESC Major Executive Committee
- 2023 - Colloquium Committee
- 2022 - Steering Committee
- 2022 - 2023 Graduate Recruitment Committee
- 2020 - 2021 Colloquium Committee

ACADEMIC ADVISING

Graduate students

Isabelle Moore (2019 -) Psychology Ph.D. student

Awarded an NIH-NIA F31 for the proposal, "The contribution of semantic bias to false memory in healthy aging" (2023)

Selected as a fellow in the LIFE Academy (2022)

With William Meyer, received a DoubleHoo Award (2021) for the project, "Semantic and episodic contributions to false memory formation"

Devyn Smith (2019 -) Psychology Ph.D. student

Subin Han (2023 -) Psychology Ph.D. student

Research Coordinator

Hannah Buras (2023 -)

Undergraduate students

Emma Blau (2022 -) Cognitive Science B.A. student

Lola Fuentes Brock (2023 -) Neuroscience B.A. student

Leah Cassidy (2023 -) Neuroscience B.A. student

Amanda Smith (2023 -) Neuroscience B.A. student

Previous Trainees

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|-----------------|---------------|---------------------------|---|
| Yuju Hong | (2019 - 2022) | Research Coordinator | <i>Graduate student at University of Wisconsin Milwaukee</i> |
| Justin Wheelock | (2020 - 2023) | Neuroscience B.A. student | <i>Postgraduate Research Associate, Divisions of Stroke and Neurocritical Care & Emergency Neurology, Department of Neurology, Yale University School of Medicine</i> |

Received the Harrison Undergraduate Research Award (2022) for the project, "Identifying the impact of sustained brain states on memory judgments."

Awarded a Summer Research Fellowship (2021) by the UVA Brain Institute for the project, "Assessing the neurophysiological correlates of forgetting during a recognition task"

Distinguished majors program thesis committees

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| 2023 | Justin Wheelock | Primary Advisor |
| 2022 | Lauren Kelso | Second Reader |
| 2020 | John Hissong | Second Reader |
| 2020 | Luke Cavanah | Second Reader |

Pre-dissertation committees

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|------|-------------------|------------------|
| 2022 | Cabell Williams | Committee Member |
| 2021 | Devyn Smith | Chair |
| 2021 | Isabelle Moore | Chair |
| 2020 | Jessica Gettleman | Committee Member |

Comprehensive exam committees

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|------|-------------------|------------------|
| 2022 | Samantha Brindley | Committee Member |
| 2022 | Devyn Smith | Chair |
| 2022 | Isabelle Moore | Chair |
| 2021 | Jessica Gettleman | Committee Member |
| 2021 | Adam Fenton | Committee Member |
| 2020 | Brandon Jacques | Committee Member |

Dissertation committees

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|------|------------------|------------------|
| 2023 | Devyn Smith | Chair |
| 2023 | Adam Fenton | Committee Member |
| 2022 | Brandon Jacques | Committee Member |
| 2021 | Ryan Kirkpatrick | Committee Member |
| 2020 | Emily Weichart | Committee Member |

PRESS

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| 2020 | Memory in the Time of a Pandemic UVA Lifetime Learning <i>Thoughts From the Lawn</i> |
| 2020 | 'The Way We Were': Why Covid-19 is making us nostalgic for simpler times UVA Today |