James E. Kragel
Curriculum Vitae
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Education

Vanderbilt University **Nashville, TN**
Ph.D. in Neuroscience *August 2010 – August 2015*
Dissertation: *The functional neuroanatomy of episodic retrieval: using neuroimaging to understand the computational processes underlying human memory.*
Advisor: Sean M. Polyn

Duke University **Durham, NC**
BSE in Biomedical Engineering *August 2002 – December 2005*

Academic Appointments

Department of Neurology, University of Chicago **Chicago, IL**
Research Assistant Professor *September 2022 – current*

Center NOIR, University of Chicago **Chicago, IL**
Postdoctoral Scholar *September 2021 – 2022*
Advisor: Joel L. Voss

Laboratory for Human Neuroscience, Northwestern University **Chicago, IL**
Postdoctoral Research Fellow *June 2018 – September 2021*
Advisors: Joel L. Voss, Donna J. Bridge

Computational Memory Lab, University of Pennsylvania **Philadelphia, PA**
Postdoctoral Research Fellow *May 2015 – May 2018*
Advisor: Michael J. Kahana

Center for Cognitive Neuroscience, Duke University **Durham, NC**
Associate in Research *July 2006 – July 2010*
Advisor: Roberto Cabeza

Publications

Refereed Publications

[1] **J. E. Kragel** and J. L. Voss. Looking for the neural basis of memory. *Trends in Cognitive Sciences*, 26(1):53–65, 2022.

[2] **J. E. Kragel** and J. L. Voss. Temporal context guides visual exploration during scene

recognition. *Journal of Experimental Psychology: General*, 150(5):873–889, 2021.

[3] **J. E. Kragel**, S. Schuele, S. VanHaerents, J. M. Rosenow, and J. L. Voss. Rapid coordination of effective learning by the human hippocampus. *Science Advances*, 7(25):eabf7144, 2021.

[4] **J. E. Kragel**, Y. Ezzyat, B. C. Lega, M. R. Sperling, G. A. Worrell, R. E. Gross, B. C. Jobst, S. A. Sheth, K. A. Zaghloul, J. M. Stein, and M. J. Kahana. Distinct cortical systems reinstate the content and context of episodic memories. *Nature Communications*, 12(1):1–10, 2021.

[5] M. Hebscher, **J. E. Kragel**, T. Kahnt, and J. L. Voss. Enhanced reinstatement of naturalistic event memories due to hippocampal-network-targeted stimulation. *Current Biology*, 2021.

[6] **J. E. Kragel**, S. VanHaerents, J. W. Templer, S. Schuele, J. M. Rosenow, A. S. Nilakantan, and D. J. Bridge. Hippocampal theta coordinates memory processing during visual exploration. *eLife*, 9:e52108, 2020.

[7] G. Chaitanya, W. Hinds, **J. Kragel**, X. He, N. Sideman, Y. Ezzyat, M. R. Sperling, A. Sharan, and J. I. Tracy. Tonic resting state hubness supports high gamma activity defined verbal memory encoding network in epilepsy. *Neuroscience*, 425:194–216, 2020.

[8] C. T. Weidemann*, **J. E. Kragel***, B. C. Lega, G. A. Worrell, M. R. Sperling, A. D. Sharan, B. C. Jobst, F. Khadjevand, K. A. Davis, P. A. Wanda, A. Kadel, D. S. Rizzuto, and M. J. Kahana. Neural activity reveals interactions between episodic and semantic memory systems during retrieval. *Journal of Experimental Psychology: General*, 148(1):1, 2019. ***equal contribution**.

[9] E. A. Solomon, **J. E. Kragel**, R. Gross, B. Lega, M. R. Sperling, G. Worrell, S. A. Sheth, K. A. Zaghloul, B. C. Jobst, J. M. Stein, S. R. Das, R. Gorniak, C. S. Inman, S. Seger, D. S. Rizzuto, and M. J. Kahana. Medial temporal lobe functional connectivity predicts stimulation-induced theta power. *Nature Communications*, 9(1):4437, 2018.

[10] E. A. Solomon, **J. E. Kragel**, M. R. Sperling, A. Sharan, G. Worrell, M. Kucewicz, C. S. Inman, B. Lega, K. A. Davis, J. M. Stein, B. C. Jobst, K. A. Zaghloul, S. A. Sheth, D. S. Rizzuto, and M. J. Kahana. Widespread theta synchrony and high-frequency desynchronization underlies enhanced cognition. *Nature Communications*, 8(1):1704, 2017.

[11] **J. E. Kragel**, Y. Ezzyat, M. R. Sperling, R. Gorniak, G. A. Worrell, B. M. Berry, C. Inman, J.-J. Lin, K. A. Davis, S. R. Das, J. M. Stein, B. C. Jobst, K. A. Zaghloul, S. A. Sheth, D. S. Rizzuto, and M. J. Kahana. Similar patterns of neural activity predict memory function during encoding and retrieval. *NeuroImage*, 155:60–71, 2017.

[12] Y. Ezzyat, **J. E. Kragel**, J. F. Burke, D. F. Levy, A. Lyalenko, P. Wanda, L. O'Sullivan, K. B. Hurley, S. Busygin, I. Pedisich, M. R. Sperling, G. A. Worrell, M. T. Kucewicz, K. A. Davis, T. H. Lucas, C. S. Inman, B. C. Lega, B. C. Jobst, S. A. Sheth, K. Zaghloul, M. J. Jutras, J. M. Stein, S. R. Das, R. Gorniak, D. S. Rizzuto, and M. J. Kahana. Direct brain stimulation modulates encoding states and memory performance in humans. *Current Biology*, 27(9):1251–1258, 2017.

[13] M. Moore, A. Iordan, Y. Hu, **J. Kragel**, S. Dolcos, and F. Dolcos. Localized or diffuse: the link between prefrontal cortex volume and cognitive reappraisal. *Social Cognitive and Affective Neuroscience*, 11(8):1317–1325, 2016.

[14] **J. E. Kragel** and S. M. Polyn. Decoding episodic retrieval processes: Frontoparietal and medial temporal lobe contributions to free recall. *Journal of Cognitive Neuroscience*, 28(1):125–139, 2016.

[15] **J. E. Kragel**, N. W. Morton, and S. M. Polyn. Neural activity in the medial temporal lobe reveals the fidelity of mental time travel. *Journal of Neuroscience*, 35(7):2914–2926, 2015.

[16] **J. E. Kragel** and S. M. Polyn. Functional interactions between large-scale networks during memory search. *Cerebral Cortex*, 25(3):667–679, 2013.

[17] F. Dolcos, A. D. Iordan, **J. Kragel**, J. Stokes, R. Campbell, G. McCarthy, and R. Cabeza. Neural correlates of opposing effects of emotional distraction on working memory and episodic memory: an event-related fmri investigation. *Frontiers in Psychology*, 4:293, 2013.

[18] S. M. Polyn, **J. E. Kragel**, N. W. Morton, J. D. McCluey, and Z. D. Cohen. The neural dynamics of task context in free recall. *Neuropsychologia*, 50(4):447–457, 2012.

[19] S. M. Hayes, N. Buchler, J. Stokes, **J. Kragel**, and R. Cabeza. Neural correlates of confidence during item recognition and source memory retrieval: evidence for both dual-process and strength memory theories. *Journal of Cognitive Neuroscience*, 23(12):3959–3971, 2011.

[20] S. W. Davis, **J. E. Kragel**, D. J. Madden, and R. Cabeza. The architecture of cross-hemispheric communication in the aging brain: linking behavior to functional and structural connectivity. *Cerebral Cortex*, 22(1):232–242, 2011.

[21] R. Cabeza, Y. S. Mazuz, J. Stokes, **J. E. Kragel**, M. G. Woldorff, E. Ciaramelli, I. R. Olson, and M. Moscovitch. Overlapping parietal activity in memory and perception: evidence for the attention to memory model. *Journal of Cognitive Neuroscience*, 23(11):3209–3217, 2011.

[22] N. A. Dennis, A. C. Need, K. S. LaBar, S. Waters-Metenier, E. T. Cirulli, **J. Kragel**, D. B. Goldstein, and R. Cabeza. Comt val108/158 met genotype affects neural but not cognitive processing in healthy individuals. *Cerebral Cortex*, 20(3):672–683, 2009.

Working Papers

[1] Y. Ezzyat, **J. E. Kragel**, E. A. Solomon, B. C. Lega, J. P. Aronson, B. C. Jobst, R. E. Gross, M. R. Sperling, G. A. Worrell, S. A. Sheth, P. A. Wanda, D. S. Rizzuto, and M. J. Kahana. Functional and anatomical connectivity predict brain stimulation's mnemonic effects. *Submitted for publication.*

[2] **J. E. Kragel**, S. M. Lurie, M. J. Schatza, E. B. Blackwood, E. A. Chung, C. Zelano, S. U. Schuele, J. F. Disterhoft, A. S. Widge, and J. L. Voss. Theta synchronized stimulation modulates hippocampal excitability in humans. *In preparation.*

[3] S. M. Lurie, **J. E. Kragel**, S. U. Schuele, and J. L. Voss. Human hippocampal responses to network stimulation vary with theta phase. *bioRxiv*, 2022.

[4] N. Herz, B. Bukala, **J. Kragel**, and M. Kahana. Hippocampal mechanisms of false recall. *Research Square*, 2022.

[5] S. M. Polyn, **J. Kragel**, J. D. McCluey, and J. F. Burke. Altering the flow of mental time: A test of retrieved-context theory. *PsyArXiv*, 2019.

Spoken Presentations

[1] **J. E. Kragel**. Neural coding of episodic memories in medial temporal lobe networks. San Diego, CA, 2022. The Society for Neuroscience Annual Meeting.

[2] **J. E. Kragel**. Hippocampal theta oscillations coordinate effective visual exploration. San Fransisco, CA, 2022. The Cognitive Neuroscience Society Annual Meeting.

[3] **J. E. Kragel**, S. Schuele, S. VanHaerents, J. M. Rosenow, and J. L. Voss. The human hippocampus guides visual sampling based on the recent past to optimize learning. Online, 2021. The Cognitive Neuroscience Society Virtual Meeting.

[4] **J. E. Kragel**, S. Schuele, S. VanHaerents, J. M. Rosenow, and J. L. Voss. Hippocampal theta oscillations rapidly map effective visual exploration. Philadelphia, PA, 2021. Context and Episodic Memory Symposium.

[5] **J. E. Kragel** and J. L. Voss. Temporal context guides visual exploration during scene recognition. Online, 2020. Context and Episodic Memory Symposium.

[6] **J. E. Kragel**, S. VanHaerents, J. W. Templer, S. Schuele, J. M. Rosenow, A. S. Nilakantan, and D. J. Bridge. Hippocampal theta coordinates memory processing during visual exploration. Austin, TX, 2019. Austin Conference on Learning and Memory, ***Invited Poster Talk Award**.

[7] C. T. Weidemann, **J. E. Kragel***, B. C. Lega, G. A. Worrell, M. R. Sperling, A. D. Sharan, B. C. Jobst, F. Khadjevand, K. A. Davis, P. A. Wanda, A. Kadel, D. S. Rizzuto, and M. J. Kahana. Neural activity reveals interactions between episodic and semantic memory systems during retrieval. Philadelphia, PA, 2018. Context and Episodic Memory Symposium, ***presenting author**.

[8] **J. E. Kragel**, G. A. Worrell, M. R. Sperling, G. R. E, B. C. Lega, B. C. Jobst, S. A. Sheth, K. A. Zaghloul, J. M. Stein, and M. J. Kahana. Distinct cortical systems reinstate content and context information during memory search. San Diego, CA, 2018. Society for Neuroscience Abstracts.

[9] S. M. Polyn and **J. E. Kragel***. Dynamics of large-scale cortical networks reveal the cognitive control of episodic memory. Chicago, IL, 2016. Psychonomic Society annual meeting, ***presenting author**.

Selected Posters

[1] **J. E. Kragel**, S. M. Lurie, M. J. Schatza, E. B. Blackwood, E. A. Chung, C. Zelano, S. U. Schuele, J. F. Disterhoft, A. S. Widge, and J. L. Voss. Theta synchronized stimulation increases hippocampal excitability in humans. Online, 2021. Society for Neuroscience Abstracts.

[2] **J. E. Kragel**, S. M. Lurie, M. J. Schatza, E. B. Blackwood, E. A. Chung, C. Zelano, S. U. Schuele, J. F. Disterhoft, A. S. Widge, and J. L. Voss. Theta synchronized closed-loop stimulation increases hippocampal excitability in humans. Charleston, SC, 2021. 4th International Brain Stimulation Conference.

[3] **J. E. Kragel** and J. L. Voss. Reinstated episodic context guides visual exploration during scene recognition. Online, 2020. The Cognitive Neuroscience Society Virtual Meeting.

[4] **J. E. Kragel**, E. A. Solomon, P. A. Wanda, J. M. Stein, M. R. Sperling, A. Sharan, R. E. Gross, C. S. Inman, B. C. Lega, G. A. Worrell, B. C. Jobst, S. A. Sheth, D. S. Rizzuto, and M. J. Kahana. Functional networks constrain stimulation-evoked neural activity. Washington DC, 2017. Society for Neuroscience Abstracts.

[5] **J. E. Kragel**, Y. Ezzyat, M. R. Sperling, R. Gorniak, G. A. Worrell, B. M. Berry, R. E. Gross, B. C. Lega, , K. Davis, S. R. Das, J. M. Stein, B. C. Jobst, K. A. Zaghloul, S. A. Sheth, D. S. Rizzuto, and M. J. Kahana. Intrinsic functional architecture of cortico-hippocampal networks determines episodic memory formation in humans. Philadelphia, PA, 2017. Context and Episodic Memory Symposium.

[6] **J. E. Kragel**, Y. Ezzyat, J. F. Burke, J.-J. Lin, J. M. Stein, S. R. Das, R. Gorniak, R. E. Gross, K. A. Davis, M. R. Sperling, B. C. Jobst, S. A. Sheth, K. A. Zaghloul, G. A. Worrell, D. S. Rizzuto, and M. J. Kahana. Core episodic encoding and retrieval processes revealed by dynamics of oscillatory brain activity. San Diego, CA, 2016. Society for Neuroscience Abstracts.

[7] **J. E. Kragel**, J. F. Burke, and M. J. Kahana. Core episodic encoding and retrieval processes revealed by dynamics of oscillatory brain activity. Philadelphia, PA, 2016. Context and Episodic Memory Symposium.

[8] **J. E. Kragel** and S. M. Polyn. Large-scale network activity predicts the maintenance and retrieval of contextual information in memory. Philadelphia, PA, 2015. Context and Episodic Memory Symposium.

[9] S. M. Polyn, **J. E. Kragel**, and N. W. Morton. Medial temporal lobe activity reflecting the precision of mental time travel. Long Beach, CA, 2014. Psychonomic Society annual meeting.

[10] **J. E. Kragel** and S. M. Polyn. Activity within the default mode network predicts the organization of human memory. Philadelphia, PA, 2014. Context and Episodic Memory Symposium.

[11] S. M. Polyn and **J. E. Kragel**. Incorporating neural signals into computational models of memory search. San Diego, CA, 2013. Society for Neuroscience Abstracts.

Fellowships and Awards

T32 fellowship, National Institute of Neurological Disorders and Stroke *2018 – 2020*

Austin Conference on Learning and Memory, Invited Poster Talk Award *2019*

NSF Graduate Research Fellowships Program, Honorable Mention *2010*

Teaching

PSY249, Special Topics: Guest Lecturer, University of Pennsylvania *Fall 2017*
NSC235, Basis of Mental Disorders: Teaching Assistant, Vanderbilt University *Fall 2014*
PSY253, Human Memory: Teaching Assistant, Vanderbilt University *Fall 2013*
BME83, Biomaterials: Teaching Assistant, Duke University *Spring 2004*

Student Advising

Graduate Students

Sarah Lurie: Northwestern University *2019 – current*
Aneesha Nilakantan: Northwestern University *2018 – 2019*

Undergraduate Students

Esther Chung: Northwestern University *2020 – current*
Franco Bautista: University of Pennsylvania *2017 – 2018*
Jang Lim: University of Pennsylvania *2016 – 2017*
Richard Arriviello: Vanderbilt University *2013 – 2014*

Open Science Contributions

Data and code to reproduce results

Lurie et al. 2022, *bioRxiv*: *[paper] [code] [data]*
Kragel et al. 2021, *Nature Communications*: *[paper] [code] [data]*
Kragel et al. 2021, *Science Advances*: *[paper] [code] [data]*
Kragel et al. 2020, *eLife*: *[paper] [code] [data]*
Kragel and Voss 2020, *JEP:G*: *[paper] [data] [data]*
Weidemann et al. 2019, *JEP:G*: *[paper] [code] [data]*
Solomon et al. 2018, *Nature Communications*: *[paper] [code]*
Solomon et al. 2017, *Nature Communications*: *[paper] [code]*

Open source analysis software

pybeh: `https://github.com/pennmem/pybeh` *Python behavioral toolbox for free-recall analysis*
tcm: `https://github.com/prestonlab/tcm` *Temporal Context Model of free recall*

Ad-Hoc Reviewing

Behavioral Neuroscience
Brain Stimulation
Cerebral Cortex*
Cognition
Cognitive Affective and Behavioral Neuroscience
eLife
Journal of Cognitive Neuroscience
Journal of Experimental Psychology: General
Journal of Neurophysiology*
Journal of Neuroscience
Learning and Memory
NeuroImage
PLoS Biology
PLoS ONE
Psychological Review
Science*

*Assisted with review

Professional Society Memberships

Society for Neuroscience
Psychonomic Society
Cognitive Neuroscience Society