

Academic Appointments

- 2026 – Present **Queen’s University** — *Centre for Neuroscience Studies*
Connected Minds Postdoctoral Fellow
Visiting Postdoctoral Fellow at Rotman Research Institute, Baycrest Hospital
Advisor: Dr. Gunnar Blohm
- 2022 – 2026 **Princeton University** — *Princeton Neuroscience Institute*
C.V. Starr Postdoctoral Fellow
Advisors: Drs. Jonathan D. Cohen & Nathaniel D. Daw

Education

- 2016 – 2022 **Brown University** — *Dept. of Cognitive, Linguistic & Psychological Sciences*
Ph.D. in Psychology
Advisors: Drs. Amitai Shenhav & Michael J. Frank
- 2014 – 2016 **University of Western Ontario** — *Brain and Mind Institute*
M.Sc. in Psychology (Cognitive and Behavioral Neuroscience Specialization)
Advisor: Dr. Ingrid Johnsrude
- 2010 – 2014 **Queen’s University** — *Dept. of Psychology*
B.Sc. in Psychology (Honors, Distinction)
Honors Thesis Advisor: Dr. Ingrid Johnsrude

Awards and Fellowships

- 2026 – 2028 *Connected Minds Fellowship*, Queen’s University (Salary & Research Funds)
- 2022 – 2026 *C.V. Starr Postdoctoral Fellowship*, Princeton University (Salary & Research Funds)
- 2019 – 2020 *Carney Graduate Award in Brain Science*, Brown University (Salary & Research Funds)
- 2019 *Cognitive Science Society Travel Award*
- 2018 – 2019 *Eimas Graduate Research Award*, Brown University (Research Funds)
- 2014 *Certificate of Academic Excellence*, Canadian Psychological Association
(Honours Thesis Award)
- 2011 *Summer Work Experience Program*, Queen’s University
- 2010 – 2014 *Dean’s Honor List*, Queen’s University
- 2010 – 2014 *Foresters Competitive Scholarship*
- 2010 *Queen’s University Excellence Scholarship*

Peer-Reviewed Publications [^{*} shared authorship; # trainee]

Ritz, H., Jha, A., Daw, N.D., & Cohen, J.D. (In Press). Inter-trial convergence of neural task states supports cognitive flexibility. *Current Biology*. Preprint: doi.org/10.1101/2024.09.29.615736.

Bridgeford, E., Campbell, I.D., Chen, Z., Lin, Z., **Ritz, H.**, Vandekerckhove, J., Poldrack, R.A. (In Press). Twelve quick tips for AI-assisted coding in science. *PLOS Computational Biology*, 22(7), e1014428.

- Huang, B., **Ritz, H.**, & Jiang, J. (2026). Adaptive behavior is guided by integrated representations of controlled and non-controlled information. *eLife*, 14:RP108673.
- Ritz, H.**, Frömer, R., & Shenhav, A. (2026). Phantom controllers: Misspecified models create the false appearance of adaptive control during value-based choice. *Communications Psychology*, 4(1) 11.
- Ritz, H.**, & Shenhav, A. (2024). Orthogonal neural encoding of targets and distractors supports multivariate cognitive control. *Nature Human Behaviour*, 8, 945–961.
Dataset: doi.org/10.18112/OPENNEURO.DS004909.V1.1.0
- Ritz, H.**, & Shenhav, A. (2024). Humans reconfigure target and distractor processing to address distinct task demands. *Psychological Review*, 131(2), 349–372.
Dataset: doi.org/10.6084/m9.figshare.16755418.v1
- Rier, L., Michelmann, S., **Ritz, H.**, Shah, V., Hill, R.M., Osborne, J., Doyle, C., Holmes, N., Bowtell, R., Brookes, M.J., Norman, K.A., Hasson, U., Cohen, J.D., Boto, E. (2023). Test-Retest Reliability of the Human Connectome: An OPM-MEG study. *Imaging Neuroscience*, 1, 1–20.
Dataset: doi.org/10.5281/zenodo.7525341
- Ritz, H.**, Wild, C.J., & Johnsrude, I.J. (2022). Parametric Cognitive Load Reveals Hidden Costs in the Neural Processing of Perfectly Intelligible Degraded Speech. *Journal of Neuroscience* 42(23), 4619–4628.
- Rmus, M.[#], **Ritz, H.**, Hunter, L.E., Bornstein, A.M., & Shenhav, A. (2022). Humans can navigate complex graph structures acquired during latent learning. *Cognition*, 225, 105103.
- Ritz, H.**, Leng, X., & Shenhav, A. (2022). Cognitive Control as a Multivariate Optimization Problem. *Journal of Cognitive Neuroscience*, 1–23.
- Leng, X., Yee, D., **Ritz, H.**, & Shenhav, A. (2021). Dissociable influences of reward and punishment on adaptive cognitive control. *PLoS Computational Biology*, 17(12), e1009737.
- Ritz, H.**, Frömer, R., & Shenhav, A. (2020). Bridging motor and cognitive control: It's about time! (Spotlight). *Trends in Cognitive Sciences*. 24(1), 6–8.
- Nassar, M.R., McGuire, J.T., **Ritz, H.**, & Kable, J. (2019). Dissociable forms of uncertainty-driven representational change across the human brain. *Journal of Neuroscience*, 39(9), 1688–1698.
- Ritz, H.**, Nassar, M.R., Frank, M.J., & Shenhav, A. (2018). A control theoretic model of adaptive behavior in dynamic environments. *Journal of Cognitive Neuroscience*, 30(10), 1405–1421.

Peer-Reviewed Conference Proceedings [* shared authorship; # trainee]

- Ritz, H.**, (2026). Bayesian calibration for conference reviews. *Cognitive Computational Neuroscience*. [2 pg., Poster Spotlight].
- Liu, X.[#], Nystrom, L., Mark P., DePinto N., Wolf W.A., Daw N., Kastner, S., Cohen J.D.^{*}, **Ritz, H.**^{*} (2026). Orthogonal Task Representation Enables Flexible Task Switching in Human OPM-MEG and Neural Networks. *Cognitive Computational Neuroscience*. [2 pg., Contributed Talk, Poster Spotlight].
- Geadah, V., Arbelaiz, J., **Ritz, H.**, Daw, N., Cohen, J.D., Pillow J. (2024). Inferring System and Optimal Control Parameters of Closed-Loop Systems from Partial Observations. *IEEE Decision and Control*. [8 pg., **Talk**].
- Ritz, H.**, Jha, A., Pillow, J., Daw, N., & Cohen J.D. (2024). Dynamic neural control of task representations in humans and neural networks. *Cognitive Computational Neuroscience*. [2 pg., Poster].
- Ritz, H.**, Jha, A., Pillow, J., & Cohen J.D. (2023). Task preparation is reflected in neural state space dynamics. *Cognitive Computational Neuroscience*. [2 pg., Poster].

- Ritz, H.**, Wolf, W., & Cohen J.D. (2023). Continuous and Discrete Transitions during Task-Switching. *Cognitive Science Society*. [4 pg., Poster].
- Ritz, H.** & Shenhav, A. (2022). Orthogonal neural encoding of targets and distractors supports cognitive control. *Cognitive Computational Neuroscience*. [2 pg., Poster].
- Ritz, H.**, DeGutis, J., Frank M.J., Esterman, M., & Shenhav, A. (2020). An evidence accumulation model of motivational and developmental influences over sustained attention. *Cognitive Science Society*. [4 pg., Poster].
- Leng, X., **Ritz, H.**, Yee, D., & Shenhav, A. (2020). Dissociable influences of reward and punishment on adaptive cognitive control. *Cognitive Science Society*. [4 pg., Poster].
- Ritz, H.** & Shenhav, A. (2019). Parametric control of distractor-oriented attention. *Cognitive Science Society*. [4 pg., **Talk**].
- Ritz, H.**, Nassar, M.R., Frank, M.J., & Shenhav, A. (2019). Decisions about reward and effort for the learning and control of dynamical systems. *Reinforcement Learning and Decision Making* [4 pg., Poster].
- Ritz, H.**, Nassar, M.R., Frank, M.J., & Shenhav, A. (2017). Behavioral evidence for PID-like feedback control. *Reinforcement Learning and Decision Making*. [4 pg., **Poster Spotlight**].

Chaired Conference Symposia and Workshops

- Aug. 2026 *Putting Dynamics First: State-Space Modelling for Human Neuroscience (Keynote & Tutorial)*. Cognitive Computational Neuroscience. New York City, USA.
Keynote: https://youtu.be/LR1RigGJoXE?si=ftbdaR_zyJ1eHZ4Y&t=4566
Tutorial: <https://www.youtube.com/watch?v=RflaoViz1Og>
- June 2026 *Using Task-Optimized ANNs to Understand Brain & Behaviour*.
Canadian Society for Brain, Behaviour, and Cognitive Science. Toronto, CA.
- Nov. 2022 *Cortical Basis of Cognitive Control Across Species (Nanosymposium Chair)*.
Society for Neuroscience. San Diego, USA.

Invited Talks

- Apr. 2026 *Inzicht & Hutcherson labs*, University of Toronto Scarborough.
- Dec. 2025 *Safavi Lab*, Technische Universität Dresden.
- Nov. 2025 *Sensorimotor SuperLab*, Western University. [Recording](#)
- June 2025 *Dept. of Psychology*, Vrije Universiteit Amsterdam.
- May. 2025 *Duncker Lab*, Columbia University.
- Nov. 2024 *Cognitive Control Seminar*, University of Iowa.
- Nov. 2024 *CRAM Seminar*, McGill University.
- Apr. 2024 *Cog Neuro Seminar*, Yale University.
- Dec. 2023 *ConCat Series*, New York University.
- Nov. 2023 *Cole Lab*, Rutgers University.
- Nov. 2023 *Dept. of Psychology*, University of British Columbia.
- Apr. 2023 *Egner Lab*, Duke University.
- Oct. 2022 *Rotman Research Institute*, Baycrest Hospital.
- Sept. 2022 *Summerfield Lab*, University of Oxford.

June 2022	<i>BLRB Group</i> , University of Chicago.
Feb. 2022	<i>Woolgar Lab</i> , University of Cambridge.
Feb. 2022	<i>Egner Lab</i> , Duke University.
Nov. 2021	<i>Otto Lab</i> , McGill University.
Oct. 2021	<i>Ghent Effort Group</i> , Ghent University.
July 2021	<i>Mars Lab</i> , University of Oxford.
June 2021	<i>CoCoA Lab (Dr. Taraz Lee)</i> , University of Michigan.
May 2021	<i>Verguts Lab</i> , Ghent University.
Apr. 2021	<i>Sensorimotor SuperLab</i> , Western University.
Feb. 2021	<i>Summerfield Lab</i> , University of Oxford.
Nov. 2020	<i>Jazayeri Lab</i> , Massachusetts Institute of Technology.
Oct. 2020	<i>Schultz Lab</i> , Max Planck Institute for Biological Cybernetics.
Sept. 2020	<i>Kool Lab</i> , University of Washington in St. Louis.
Aug. 2020	<i>Collins Lab</i> , University of California Berkeley.
May 2020	<i>McGuire Lab</i> , Boston University.
Apr. 2020	<i>Hayden Lab</i> , University of Minnesota.
Mar. 2020	<i>Donner Lab</i> , Hamburg University.
Feb. 2020	<i>ConCat Series</i> , New York University.
May 2018	<i>CBC Series</i> , Universitat Pompeu Fabra.

Conference Presentations [# trainee; excluding proceedings listed above]

Ritz, H., Jha, A., Pillow, J., & Cohen J.D. Convergent neural dynamical systems for task control in artificial networks and human brains.

- *Canadian Society for Brain, Behavior, and Cognitive Science* (2026). Toronto, CA. [**Symposium Talk**]
- *Society for Neuroscience* (Nov 2025). San Diego, USA. [**Nanosymposium Talk**]
- *Canadian Association of Neuroscience* (2025). Toronto, CA. [Poster]
- *Canadian Society for Brain, Behavior, and Cognitive Science* (2024). Edmonton, CA. [**Talk**]
- *Cognitive Neuroscience Society* (2024). Toronto, CA. [Poster]
- *The New VISTAs in Vision Research* (2023). Toronto, CA. [Poster]
- *Motivational and Cognitive Control* (2023). Lyon, FR. [Poster]

Geadah, V., Arbelaiz, J., **Ritz, H.**, Daw, N., Cohen, J.D., Pillow J. Inferring System and Optimal Control Parameters of Closed-Loop Systems from Partial Observations.

- *Cosyne* (2025). Montreal, CA. [Workshop Talk by V.G.]
- *IEEE Conference on Decision and Control* (2024). Milan, IT. [Contributed Talk by V.G.]

Pulido, J.[#], **Ritz, H.**, Wolf, W., Cohen, J.D. Investigating the Dynamics of Task Switching.

- *Society for Neuroscience* (2023). Washington, USA. [Poster by J.P.]
- *Princeton Neuroscience Institute Poster Day* (2023). Princeton, USA. [Poster by J.P.]
- *Leadership Alliance National Symposium* (2023). Hartford, USA. [Talk by J.P.]

Ritz, H. & Shenhav, A. Orthogonal neural encoding of targets and distractors supports cognitive control.

- *Motivational and Cognitive Control* (2023). Lyon, FR. [**Talk**]
- *Canadian Society for Brain, Behavior, and Cognitive Science* (2023). Guelph, CA. [**Talk**]
- *Society for Neuroscience* (2023). Washington, USA. [**Nanosymposium Talk**]
- *Workshop on Mental Effort* (2022). Providence, USA. [Poster]

- Ritz, H.**, Frömer, R. & Shenhav, A. Disentangling stimulus-driven and controlled processes during value-based decision making.
 - *Society for Neuroscience* (2021). Online. [Poster]
 - *Society for Neuroeconomics* (2021). Online. [Poster]
- Vartany S., Allawala A., **Ritz, H.**, Adkinson J. Mathura R., Bijanki K., Shenhav A., Goodman W., Pouratian N., Sheth S., Borton D. Deep Brain Stimulation in Treatment-Resistant Depression Modulates Oscillations Above 1/f Spectral Noise in Cognitive Control Networks.
 - Neuromatch Conference 4.0 (2021). Online. [Talk by V.S.]
- Ritz, H.**, Hayden, B., Shenhav, A., Yoo, S.B., Optimal control of approach-avoidance dynamics.
 - *Neuromatch 3.0* (2020). Online. [Talk]
- Ritz, H.**, Nassar, M.R., Frank, M.J., & Shenhav, A., Optimal decision-making in metric space.
 - *Society for Neuroeconomics* (2020). Online. [Poster Spotlight]
- Ritz, H.**, & Shenhav, A. Humans reconfigure target and distractor processing to address distinct task demands
 - *Workshop on Mental Effort* (2021). Online. [Poster]
 - *Motivational and Cognitive Control* (2019). Berlin, DE. [Poster]
 - *Control Processes* (2019). Providence, USA. [Poster]
 - *Cognitive Neuroscience Society* (2018). Boston, USA. [Poster]
- Rmus, M. #, **Ritz, H.**, Hunter, L., Bornstein, A., & Shenhav, A. Humans can navigate complex graph structures acquired during latent learning.
 - *Reinforcement Learning and Decision Making* (2019). Montreal, CA. [Workshop Talk]
 - *Society for Neuroeconomics* (2018). Philadelphia, USA. [Talk by M.R.]
- Ritz, H.**, DeGutis, J., Frank M.J., Esterman, M., & Shenhav, A. Modeling motivational influences on sustained attention.
 - *Winter Conference on Brain Research* (2019). Snowmass, USA. [Poster]
 - *Society for Neuroeconomics* (2018). Philadelphia, USA. [Poster]
- Ritz, H.**, Dean Wolf, C., Frömer, R., & Shenhav, A. Quantifying the demands of value-based decision-making with short-term memory interference.
 - *Cognitive Neuroscience Society* (2019). San Francisco, USA. [Poster]
- Ritz, H.**, Nassar, M.R., Frank, M.J., & Shenhav, A. Behavioral evidence for PID-like feedback control.
 - *Society for Neuroscience* (2017). Washington, USA. [Nanosymposium Talk]
 - *New England Research in Decision-Making* (2017). Providence, USA. [Talk]
 - *Brown Mind Brain Research Day* (2017). Providence, USA. [Poster]
- Ritz, H.**, Wild, C., & Johnsrude, I.J. The effects of concurrent cognitive load on the processing of clear and degraded speech.
 - *Organization for Human Brain Mapping* (2016). Geneva, CH. [Poster]
- Ritz, H.**, Arbuckle, S., Wild, C., & Johnsrude, I.J. Enhanced recognition memory for acoustically degraded sentences.
 - *Association for Research in Otolaryngology* (2015). San Diego, USA. [Talk by I.J.]
 - *Brain and Mind Institute Symposium* (2015). London, CA. [Poster]
- Ritz, H.** & Johnsrude, I.J. Attention enhances phase-locking in the frequency following response.
 - *Canadian Society of Brain, Behaviour, and Cognitive Science*. (2014). Toronto, CA. [Poster]
 - *McMaster University NeuroXchange Conference* (2014). Hamilton, CA. [Poster]

Research Courses

Summer 2019	<i>Kavli Summer Institute in Cognitive Neuroscience</i> , Santa Barbara, USA.
Summer 2017	<i>Methods in Neuroscience at Dartmouth</i> , Hanover, USA.

Teaching Experience

Spring 2026	<i>PGSA Symposium Poster Judge</i> , University of Toronto
Summer 2025	<i>PNI Summer Internship Guest Lecturer</i> , Princeton University - workshop on scientific poster design and conference presentation skills
Spring 2025	<i>From Molecules to Systems to Behavior</i> , Princeton University, Guest lecturer - lab section on performing OPM-MEG preprocessing
Spring 2025	<i>Junior Thesis Moderator</i> , Princeton University
Summer 2024	<i>ReMatch+ Summer Internship Mentor</i> , Princeton University
Summer 2023	<i>PNI Summer Internship Mentor</i> , Leadership Alliance & Princeton University
Summer 2021	<i>FYRE summer program</i> , Leadership Alliance & Brown University, Guest lecturer - lab section on fitting reinforcement learning models to behaviour
Spring 2019	<i>fMRI: Theory and Practice</i> , Brown University, TA - assisted students with coding, collecting, and analyzing fMRI experiments
Spring 2018	<i>Cognitive Neuropsychology</i> , Brown University, TA
Fall 2017	<i>Social Psychology</i> , Brown University, TA
2015 – 2016	<i>Statistics using Computers (full year)</i> , Western University, TA - two lab sections per week on using SPSS for statistical analysis
2014 – 2015	<i>Sensation and Perception (full year)</i> , Western University, TA
2012 – 2013	<i>Introduction to Psychology (full year)</i> , Queen's University, TA

Mentorship

2025 – Present	Xiaoyi Liu, PhD Student
2024	Haley Champion, undergraduate RA (ReMatch+ mentorship program)
2024	Jenna Mullin, summer intern (OURSIP mentorship program)
2022 – 2026	William Wolf, staff RA
2023	Joemari Pulido, summer intern (PNI Summer Internship Program)
2021	Kyle Chen, undergraduate RA
2019 – 2022	Christopher Bravo, undergraduate RA
2019 – 2020	Jennifer Dzul, honors thesis: <i>Are Distractors really that Distracting? A Closer Look into Target vs Distractor Sensitivity in Older Adults</i>
2019 – 2020	Natalie Knowles, undergraduate RA
2019	Savannah Doelfel, undergraduate RA
2017 – 2019	Allison Loynd, undergraduate RA
2017 – 2018	Milena Rmus, honors thesis: <i>Model-based decision-making is associated with structure inference ability</i>
2017	William McNelis, undergraduate RA
2016 – 2017	Kia Sadahiro, undergraduate RA
2015 – 2016	Jessica Uthayakumar, honors thesis: <i>Consequences of acoustic degradation and semantic context on recognition memory</i>

Service Positions

2026 – Present	<i>RRI Rounds Committee [talk series]</i> , Rotman Research Institute
2026 – Present	<i>Data Science and Computing Committee</i> , Rotman Research Institute
2022 – 2026	<i>PNI Climate and Inclusion Committee</i> , Princeton University
2024 – 2025	<i>PNI Colloquium Committee</i> , Princeton University
2020 – 2021	<i>Departmental Colloquium Committee</i> , Brown University
2018 – 2019	<i>Cognition Seminar Series Organiser</i> , Brown University
2017 – 2018	<i>Psychology Graduate Student Representative</i> , Brown University
2017 – 2022	<i>Optimism Walk Participant</i> , American Parkinson Disease Association
2017 – 2020	<i>Brown Brain Week Participant</i> , Brown University
2015 – 2016	<i>Psychology Graduate Student Representative</i> , Western University
2015 – 2016	<i>Psychology Colloquium Committee</i> , Western University
2013 – 2014	<i>Psychology Undergraduate Student Council</i> , Queen's University

Open-Source Software

2025	<i>mne-opm</i> (OPM preprocessing pipeline) DOI: doi.org/10.5281/zenodo.17328631
2025	Authored pull requests for OPM compatibility in MNE (2) and MNE-BIDS-Pipeline (6)
2024	<i>StateSpaceAnalysis.jl</i> . (state space analysis toolbox for neuroimaging) DOI: doi.org/10.5281/ZENODO.14511206 Julia Registry UUID: 8767b432-2e83-436f-aa62-e8e2db78ab85

Scientific Communication

Nov 2024	Bielski, Z. (2024, November 20). <i>Instead of fighting back against our many distractions, these experts say we're better off accepting them</i> . The Globe and Mail. www.theglobeandmail.com/canada/article-digital-distraction-focus-experts/ - Interviewed on QR Calgary 770AM
March 2024	Schrafft, G. (2024, March 8). <i>Lack of focus doesn't equal lack of intelligence — it's proof of an intricate brain</i> . News from Brown. www.brown.edu/news/2024-03-08/focus - Picked up by 32 news outlets (Altmetric) - Interview on KCBS Radio in San Francisco

Ad Hoc Reviewer

eLife; PNAS; Nature Human Behaviour; Trends in Cognitive Science; Nature Communications; Journal of Experimental Psychology (General, HPP); Journal of Neuroscience; Imaging Neuroscience; Neuroimage; Journal of Cognitive Neuroscience; Cognition; Computational Brain & Behavior; Cognitive, Affective, & Behavioral Neuroscience; Acta Psychologica; Wiley Interdisciplinary Reviews

Technical Skills

Programming	Julia, MATLAB, Python, R; Git, high-performance computing (SLURM; Bash scripting)
Data Analysis	PyTorch; SPM, fMRIPrep, FSL; MNE, EEGLab; Psychophysics toolbox, PsychoPy, jsPsych
Data Collection	fMRI operator (Brown University), OPM-MEG operator (Princeton University)