

Academic Appointments

2022 - Current **C.V. Starr Postdoctoral Fellow**
Princeton Neuroscience Institute (USA)
Lab PIs: Jonathan Cohen & Nathaniel Daw

Education

2016 – 2022 **Doctor of Philosophy** in Psychology
Brown University (USA)
Lab PIs: Amitai Shenhav & Michael J. Frank
Thesis: *Multivariate Cognitive Control*

2014 – 2016 **Master of Science** in Psychology (Cognitive and Behavioral Neuroscience)
University of Western Ontario (Canada)
Lab PI: Ingrid Johnsrude
Thesis: *The effects of concurrent cognitive load on the processing of clear and degraded speech*

2010 – 2014 **Bachelor of Science** in Psychology (Honors, Distinction)
Queen's University (Canada)
Honors Thesis Supervisor: Ingrid Johnsrude
Thesis: *Attention enhances phase-locking in the brainstem frequency-following response*

Accolades & Funding

2022 *C.V. Starr Postdoctoral Fellowship*, Princeton University (Salary & Research Fund)

2019 – 2020 *Carney Graduate Award in Brain Science*, Brown University (Salary & Research Fund)

2019 *Cognitive Science Society Travel Award* (\$500 USD)

2018 – 2019 *Eimas Graduate Research Award*, Brown University (\$1,000 USD)

2014 *Certificate of Academic Excellence* for outstanding honors thesis,
Canadian Psychological Association

2011 *Summer Work Experience Program*, Queen's University (\$2,500 CAD)

2010 – 2014 *Dean's Honor List*, Queen's University

2010 – 2014 *Foresters Competitive Scholarship* (\$8,000 CAD)

2010 *Queen's University Excellence Scholarship* (\$2,000 CAD)

Peer-Reviewed Publications

Ritz, H., & Shenhav, A. (2023) Humans reconfigure target and distractor processing to address distinct task demands. *Psychological Review*. Advanced Online Publication.

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. (Accepted). Test-Retest Reliability of the Human Connectome: An OPM-MEG study. *Imaging Neuroscience*.

- 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.

Manuscripts Under Review or In Revision

- Ritz, H.***, Frömer, R.*, & Shenhav, A. Phantom controllers: Misspecified models create the false appearance of adaptive control during value-based choice. Preprint: <https://doi.org/10.1101/2023.01.18.524640>
- Ritz, H.**, & Shenhav, A. Orthogonal neural encoding of targets and distractors supports multivariate cognitive control. Preprint: <https://doi.org/10.1101/2022.12.01.518771>

Peer-Reviewed Conference Proceedings

- Ritz, H.**, Jha, A., Pillow, J., & Cohen J.D. (2023). Task preparation is reflected in neural state space dynamics. *Cognitive Computational Neuroscience*. Oxford, UK. [2 pg.; Poster].
- Ritz, H.**, Wolf, W., & Cohen J.D. (2023). Continuous and Discrete Transitions during Task-Switching. *Cognitive Science Society*. Sydney, AU. [4 pg.; Poster].
- Ritz, H.** & Shenhav, A. (2022). Orthogonal neural encoding of targets and distractors supports cognitive control. *Cognitive Computational Neuroscience*. San Francisco, USA. [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*. Toronto, CA. [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*. Toronto, CA. [4 pg.; Poster]
- Ritz, H.** & Shenhav, A. (2019). Parametric control of distractor-oriented attention. *Cognitive Science Society*. Montreal, CA. [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*. Montreal, CA. [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*. Ann Arbor, USA. [4 pg.; **Poster Spotlight Talk**].

Chaired Conference Symposia and Workshops

Nov. 2022 *Cortical Basis of Cognitive Control Across Species* (Nanosymposium Chair). Society for Neuroscience. San Diego, USA.

External Department Talks

Nov. 2023 *ConCat Series*, New York University. New York, USA. [upcoming]
Oct. 2022 Rotman Research Institute in Baycrest Hospital. Toronto, CA.
Feb. 2020 *ConCat Series*, New York University. New York, USA.
May 2018 *CBC Series*, Universitat Pompeu Fabra. Barcelona, ES.

External Laboratory Talks

Apr. 2023 *Egner Lab*, Duke University.
Sept. 2022 *Summerfield Lab*, University of Oxford.
June 2022 *BLRB Group*, University of Chicago. Chicago, USA.
Feb 2022 *Woolgar Lab*, University of Cambridge.
Feb 2022 *Egner Lab*, Duke University.
Nov 2021 *Otto Lab*, McGill University.
Oct. 2021 *Ghent Effort Group*, Ghent University. Ghent, BE.
July 2021 *Mars Lab*, University of Oxford.
June 2021 *CoCoA Lab (Taraz Lee)*, University of Michigan.
May 2021 *Verguts Lab*, Ghent University.
Apr. 2021 *Western Sensorimotor SuperLab*, Western University.
Feb. 2021 *Summerfield Lab*, University of Oxford.
Nov. 2020 *Jazayeri Lab*, Massachusetts Institute of Technology.
Oct. 2020 *Schultz Lab*, Max Planck Institute for Biological Cybernetics.
Sept. 2020 *Kool Lab*, University of Washington in St. Louis.
Aug. 2020 *Collins Lab*, University of California Berkeley.
May 2020 *McGuire Lab*, Boston University.
Apr. 2020 *Hayden Lab*, University of Minnesota.
Mar. 2020 *Donner Lab*, Hamburg University.

Conference Posters and Talks

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

- *Motivational and Cognitive Control* (2023). Lyon, FR. [**Flash Talk**][upcoming]
- *Canadian Society for Brain, Behavior, and Cognitive Science* (2023). Guelph, CA. [**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]
- 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 and **Poster Spotlight Talk**]
- 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. [**Podium 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 *Kavli Summer Institute in Cognitive Neuroscience*, Santa Barbara, USA.

Summer 2017 *Methods in Neuroscience at Dartmouth, Hanover, USA.*

Service Roles

2023 *PNI Summer Internship Program Mentor, Leadership Alliance & Princeton University*
2022 - 2024 *PNI Climate and Inclusion Committee, Princeton University*
2021 *FYRE Teaching Assistant, Leadership Alliance & Brown University*
2020 – 2021 *Departmental Colloquium Committee, Brown University*
2018 – 2019 *Cognition Seminar Series Organiser, Brown University*
2017 – 2018 *Psychology Graduate Student Representative, Brown University*
2017 – 2022 *Optimism Walk Participant, American Parkinson Disease Association*
2017 – 2020 *Brown Brain Week Participant, Brown University*
2015 – 2016 *Psychology Graduate Student Representative, Western University*
2015 – 2016 *Psychology Colloquium Committee, Western University*
2013 – 2014 *Psychology Undergraduate Student Council, Queen's University*

Teaching

Spring 2019 *fMRI: Theory and Practice, Brown University, TA*
Spring 2018 *Cognitive Neuropsychology, Brown University, TA*
Fall 2017 *Social Psychology, Brown University, TA*
2015 – 2016 *Statistics using Computers (full year), Western University, TA*
2014 – 2015 *Sensation and Perception (full year), Western University, TA*
2012 – 2013 *Introduction to Psychology (full year), Queen's University, TA*

Mentorship

2023 Joemari Pulido (PNI summer intern)
2022 – Current William Wolf (staff RA)
2019 – 2022 Christopher Bravo (undergrad RA)
2021 Kyle Chen (undergrad RA)
2019 – 2020 Jennifer Dzul (honors thesis: *Are Distractors really that Distracting? A Closer Look into Target vs Distractor Sensitivity in Older Adults*)
2019 – 2020 Natalie Knowles (undergrad RA)
2019 Savannah Doelfel (undergrad RA)
2017 – 2019 Allison Loynd (undergrad RA)
2017 – 2018 Milena Rmus (honors thesis: *Model-based decision-making is associated with structure inference ability*)
2017 William McNelis (undergrad RA)
2016 – 2017 Kia Sadahiro (undergrad RA)
2015 – 2016 Jessica Uthayakumar (honors thesis: *Consequences of acoustic degradation and semantic context on recognition memory*)

Pre-Graduate Research Experience

2013 – 2014 *Research Assistant, Queen's University. PI: Dr. Ingrid Johnsrude*

2011 – 2012

Research Assistant, Queen's University. PI: Dr. Monica Castelhana

Summer 2010

Research Assistant, Juravinski Cancer Centre. PI: Dr. Jehonathan Pinthus

Ad Hoc Reviewer

eLife; Journal of Neuroscience; Journal of Experimental Psychology (General, HPP); Neuroimage; Cognitive, Affective, & Behavioral Neuroscience; Computational Brain & Behavior