

## Navona Calarco

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### EDUCATION

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Doctor of Philosophy, Medical Biophysics, University of Toronto Supervisor: Dr. Kâmil Uludağ	2022 – present
Master of Science, Institute of Medical Science, University of Toronto Supervisor: Dr. Aristotle Voineskos [ <a href="#">thesis</a> ]	2018 – 2021
Honours Bachelor of Arts, Cognitive Science, York University Advisors: Drs. Shayna Rosenbaum and Raymond Mar	2012 – 2015

### RECOGNITIONS [*graduate studies only*]

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#### Research Awards

2023-2026	CIHR Vanier Canada Graduate Scholarship [\$150,000]
2023-2026	CIHR Canada Graduate Scholarship - Doctoral (CGS-D) [\$105,000] - <i>declined</i>
2022-2026	Intel ACM SIGHPC Computational & Data Science Fellowship [\$45,000 US]
2023	Helmholtz HIDA Visiting Researcher Grant [\$4060 EUR]
2023	Ontario Graduate Scholarship - PhD Program [\$15,000] - <i>declined</i>
2022	UofT Department of Medical Biophysics Excellence Award [\$2000]
2022	UofT Medicine Unilever/Lipton Graduate Fellowship in Neurosciences [\$1700]
2022	UofT Medicine Dr. Jesse Keshin Graduate Student Award [\$2000]
2022	Ontario Graduate Scholarship - PhD Program [\$15,000]
2019	UofT Medicine Cleghorn Studentship Award for Schizophrenia Research [\$27,500]
2019	Ontario Graduate Scholarship - Master's Program (CGS-M) [\$15,000]
2018	CIHR Canada Graduate Scholarships - Master's Program [\$17,500]
2018	CAMH Discovery Fund Talent Development Competition [\$32,500]
2018	UofT Medicine Institute of Medical Science Entrance Award [\$5000]

#### Travel Awards

2024	UofT School of Graduate Studies Conference Grant [\$1230]
2023	Michael Smith Foreign Study Supplement [\$6000]
2022	UHN Research Trainee Conference Participation Award [\$500]
2020	SOBP Predoctoral Scholars Travel Fellowship Award [\$2000 US]
2019	UofT Graduate Studies Conference Grant [\$940]

#### Other

2022-2025	Massey College Junior Fellow
2023	Finalist, UofT R. Paul Young Fellowship for Interdisciplinary Research

### RESEARCH VISITS

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2024, Korea	Visiting Researcher, Centre for Neuroscience Imaging Research, Sungkyunkwan University. Supervised by Dr. Seong-Gi Kim [May 27 - June 28]
2023, Germany	Visiting Researcher, Institute of Science and Medicine, Forschungszentrum Jülich. Supervised by Prof. Dr. med. Katrin Amunts [Oct 16 - Nov 18]

## PUBLICATIONS

[→ GoogleScholar](#)

## Peer-Reviewed Papers

- 17 [Calarco](#) (2024). *Mapping the claustrum to elucidate consciousness*. *Nature Reviews Psychology*.
- 16 Amunts et al... [\[one of 100+ authors\]](#) (2024). *The coming decade of digital brain research: A vision for neuroscience at the intersection of technology and computing*. *Imaging Neuroscience*.
- 15 Bingham, [Calarco](#), Dickie, Alexopoulos, Butters, Meyers, Marino, Neufeld, Rothschild, Whyte, Mulsant, Flint, Voineskos (2023). *The relationship of white matter microstructure with psychomotor disturbance and relapse in remitted psychotic depression*. *Journal of Affective Disorders*.
- 14 [Calarco](#), Oliver, Joseph, Hawco, Dickie, DeRosse, Gold, Foussias, Argyelan, Malhotra, Buchanan, Voineskos (2023). *Multivariate associations among white matter, neurocognition, and social cognition across individuals with schizophrenia spectrum disorders and healthy controls*. *Schizophrenia Bulletin*.
- 13 Shuster, Miles, Heyland, [Calarco](#), Voineskos, Nikolova, Diniz (2023). *Neuroimaging features of depression-frail phenotype in older adults: A pilot study*. *International Psychogeriatrics*.
- 12 [Calarco](#), Cassidy, Selby, Hawco, Voineskos, Diniz, Nikolova (2022). *Associations between locus coeruleus integrity and diagnosis, age, and cognitive performance in older adults with and without late-life depression: An exploratory study*. *NeuroImage: Clinical*.
- 11 Richie-Halford, Cieslak ... [The Fibr Community Science Consortium](#) [one of 150 consortia co-authors], Satterthwaite, Rokem (2022). *An open, analysis-ready, and quality controlled resource for pediatric brain white-matter research*. *Scientific Data*.
- 10 Schilling ... [\[one of 100+ authors\]](#) ... Descoteaux (2021). *Tractography dissection variability: what happens when 42 groups dissect 14 white matter bundles on the same dataset?* *NeuroImage*.
- 9 Martin-Chang, Kozak, Levesque, [Calarco](#), Mar (2020). *What's your pleasure? Exploring the predictors of leisure reading for fiction and nonfiction in adults*. *Reading and Writing*.
- 8 Marečková, Hawco, Bakht, [Calarco](#), Voineskos, Sibille, Hariri, Nikolova (2020). *Novel polygenic risk score as a translational tool linking depression-related changes in the corticolimbic transcriptome with neural face processing and anhedonic symptoms*. *Translational Psychiatry*.
- 7 Dickie, Anticevic, Smith, Coalson, Manogaran, [Calarco](#), Viviano, Glasser, Van Essen, Voineskos (2019). *ciftify: A framework for surface-based analysis of legacy MR acquisitions*. *NeuroImage*.
- 6 Shahab, Mulsant, Levesque, [Calarco](#), Nazeri, Wheeler, Foussias, Rajji, Voineskos (2019). *Brain structure, cognition, and brain age in schizophrenia, bipolar disorder, and healthy controls*. *Neuropsychopharmacology*.
- 5 Hawco, Buchanan, [Calarco](#), Mulsant, Viviano, Dickie, Argyelan, Gold, Iacoboni, DeRosse, Foussias, Malhotra, Voineskos (2019). *Separable and replicable neural strategies during imitation of emotional faces related to social cognitive and neurocognitive performance*. *American Journal of Psychiatry*.
- 4 Viviano, Buchanan, [Calarco](#), Gold, Foussias, Bhagwat, Stefanik, Hawco, DeRosse, Argyelan, Turner, Chavez, Kochunov, Kingsley, Zhou, Malhotra, Voineskos (2018). *Resting-state connectivity biomarkers of cognitive performance and social function in Schizophrenia Spectrum Disorders and healthy controls*. *Biological Psychiatry*.
- 3 Hawco, Viviano, Chavez, Dickie, [Calarco](#), Kochunov, Argyelan, Turner, Malhotra, Buchanan, Voineskos. (2018). *A longitudinal human phantom reliability study of multi-center T1-weighted, DTI, and resting state fMRI data*. *Psychiatry Research: Neuroimaging*.
- 2 Dickie, Ameis, Shahab, [Calarco](#), Smith, Miranda, Viviano, Voineskos. (2018). *Personalized intrinsic network topography mapping and functional connectivity deficits in Autism Spectrum Disorder*. *Biological Psychiatry*.
- 1 Herdman, [Calarco](#), Moscovitch, Hirshhorn, Rosenbaum. (2015). *Impoverished descriptions of familiar routes in three cases of hippocampal/medial temporal lobe amnesia*. *Cortex*.

**Book Chapters**

- 2 Zacks, Mar, Calarco. (2018). The cognitive neuroscience of discourse: Covered ground and new directions. In Schober, Britt, & Rapp (Eds.), *Handbook of Discourse Processes* (269-294). Routledge.
- 1 Calarco, Fong, Rain, Mar. (2017). Absorption in narrative fiction and its possible impact on social abilities. In Hakemulder, Kuijpers, Bálint, Doicaru, & Tan (Eds.), *Narrative Absorption* (293-313). John Benjamins.

**PRESENTATIONS** [presenting author only, † virtual due to COVID-19 pandemic][→ select PDFs](#)**Refereed Conference Presentations**

- 2023 The Human Claustrum in BigBrain and in vivo 7T MRI. *Krembil Research Day*, Toronto -- **best presentation award**.
- 2022 Using BigBrain to establish a histologically-informed MRI reference of the human claustrum. BigBrain Workshop: From microstructure to functional connectomics, Zadar Croatia -- **supported by travel award**.
- 2021 † Multivariate associations among white matter microstructure, neurocognition, and social cognition in people with a schizophrenia spectrum disorder, *UofT Institute of Medical Science Scientific Day*, Toronto.
- 2021 † Exploring multivariate patterns of brain and behaviour with Canonical Correlation Analysis: An application in schizophrenia, *Canadian Computational Neuroscience Spotlight (CCNS)*, Toronto.
- 2021 † Exploring multivariate patterns of brain and behaviour with Canonical Correlation Analysis: An application in schizophrenia, *CANSSI-NISS Health Data Science Workshop*, Toronto -- **top 5 paper**.
- 2021 † Multivariate associations among white matter microstructure, neurocognition, and social cognition in people with a schizophrenia spectrum disorder, *Schizophrenia International Research Society (SIRS)*, Toronto.
- 2019 Case-control differences and scanner variability in white matter microstructure in a multi-centre study of schizophrenia spectrum disorder and healthy control participants, *UofT Department of Psychiatry Research Day*, Toronto.
- 2018 Machine learning using brain imaging and neurocognitive data supports accelerated aging in schizophrenia spectrum, but not bipolar spectrum disorders, *UofT Department of Psychiatry Research Day*, Toronto.

**Refereed Poster Presentations**

- 2024 [UPCOMING] Cytoarchitectonic mapping and probabilistic atlas of the human claustrum. *Organization for Human Brain Mapping (OHBM)*, Seoul, Korea.
- 2024 Cytoarchitectonic mapping and probabilistic atlas of the human claustrum, *UofT Medical Biophysics Symposium*, Toronto -- **best poster award**.
- 2024 Cytoarchitectonic mapping and probabilistic atlas of the human claustrum. *Cognitive Neuroscience Society (CNS)*, Toronto, Canada.
- 2023 Establishing an anatomical gold standard of the human claustrum, *The International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on Current Issues in Brain Function*, Padua, Italy.
- 2023 Establishing a MRI reference for the human claustrum, *Organization for Human Brain Mapping (OHBM)*, Montreal.
- 2023 Establishing a MRI reference for the human claustrum. *UofT Medical Biophysics Symposium*, Toronto.
- 2022 Neuromelanin in the locus coeruleus is associated with neurocognitive performance in older adults with depression and healthy controls, *Society of Biological Psychiatry (SOBP)*, New Orleans, USA -- **supported by travel award**.
- 2021 † Multivariate associations among white matter microstructure, neurocognition, and social cognition in people with a schizophrenia spectrum disorder and healthy control participants, *UofT Department of Psychiatry Research Day*, Toronto.

**PRESENTATIONS CONT'D**

- 2021 † Multivariate associations among white matter microstructure, neurocognition, and social cognition in people with a schizophrenia spectrum disorder and healthy control participants, *Society of Biological Psychiatry (SOBP)*, San Diego, USA.
- 2020 † Association among deep white matter tracts and social cognition in schizophrenia and healthy controls, *Society of Biological Psychiatry (SOBP)*, New York, USA -- **supported by travel award.**
- 2020 † Pilot testing of neuromelanin as a biomarker of late-life depression, *Imaging Network Ontario (ImNO)*, Toronto.
- 2019 A graph signal processing analysis of an emotional fMRI task in a large, multi-centre study of schizophrenia and healthy controls, *XSeed Seeding Innovation*, Toronto.
- 2019 Case-control differences and scanner variability in white matter microstructure in a multi-centre study of schizophrenia spectrum disorder and healthy control participants, *UofT Institute of Medical Science Scientific Day*, Toronto.

**Guest Lectures, Rounds, Panels, & Outreach Presentations**

- 2023/11 Düsseldorf Institute of Neuroscience and Medicine Besprechung | 'Integrating the claustrum into the Jülich Brain Atlas'
- 2023/04 Montreal Feindel Brain Imaging Lecture Series, McConnell Brain Imaging Centre at the MNI (with Kâmil Uludağ) | 'Investigating the claustrum in BigBrain ... and via 7T MRI?'
- 2021/11 † Toronto BrainHack Global Toronto | Panelist, 'Fun and challenges in analyzing MRI data'
- 2021/06 † Toronto CAMH Trainee Seminar Series | 'Multivariate analyses of brain imaging data'
- 2021/03 † Toronto 3 Minute Thesis Competition (3MT), UofT | 'Social cognition is in the connections'
- 2021/02 † Toronto Krembil Neuroimaging Rounds, UHN | 'Multivariate associations with white matter microstructure in schizophrenia'

**EMPLOYMENT**

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**Course Instructor**

- 2023-winter Estimation, Testing, and Learning, post-graduate certificate program, Data Science Institute, University of Toronto

**Teaching Assistantships** [all at the University of Toronto]

- 2023,22,21,20-fall Computational Biostatistics in R (MSC1090), graduate, Medical Science
- 2022-fall Introduction to Biostatistics (LMP2004), graduate, Laboratory Medicine
- 2022-summer Probability, Statistics, and Data Analysis II (STA238), undergraduate, Statistics
- 2022-summer Design and Analysis of Experiments (STA305), undergraduate, Statistics

**Research Employment**

- 2018/9 - 2022/9 Research Analyst, Neurobiology of Depression & Aging Lab, CAMH (part-time)
- 2016/8 - 2018/8 Research Analyst II, Imaging-Genetics Lab, Research Imaging Centre, CAMH (full-time)
- 2015/8 - 2016/8 Research Analyst I, Slight Centre for Youth in Transition, CAMH (full-time)
- 2014/9 - 2015/8 Lab Manager, Cognitive Neuroscience Lab, York University (part-time)
- 2013/9 - 2014/8 Research Assistant, Cognitive Neuroscience Lab, York University (part-time)

**ADDITIONAL TRAINING**

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- 2021 Teaching The Carpentries Instructor Training [virtual]
- 2019 Scientific Diffusion Imaging in Python (DiPy) Workshop [Bloomington]
- 2019 Scientific ABCD Neurocognitive Prediction Challenge, satellite of MICCAI 2019 [virtual]
- 2017 Computational SciNet Compute Ontario Summer School: Data Science [Toronto]
- 2016 Computational SciNet Compute Ontario Summer School: High Performance Computing [Toronto]

**SOFTWARE PROFICIENCY**[→ GitHub | RPubS](#)

Statistics Strong: R (incl. tidyverse), Python (SciPy, scikit-learn, matplotlib); Familiar: MatLab, SPSS.  
 Imaging Strong: FSL, FreeSurfer, AFNI, Slicer; Familiar: DiPy, BIDS, popular pipelines (e.g., fMRIPrep), etc.  
 Coding Strong: bash, git; Familiar: containers, compute clusters, etc.

**SERVICE****Reviewing**[→ ORCID](#)

*Ad hoc:* Psychiatry Research (2); Psychiatry Research: Neuroimaging (6); Schizophrenia Bulletin (2); Schizophrenia Research (2)  
*Mentored:* Nature Communications (with Dr. Kâmil Uludag, 1); Nature Neuroscience (with Dr. Kâmil Uludag, 1); Human Brain Mapping (with Dr. Yuliya Nikolova, 2); Biological Psychiatry (with Dr. Aristotle Voineskos, 2)

**Student Co-Supervision**

2024 Shuting Xie, Master of Science in Applied Computing (graduate), University of Toronto [MITACS-funded internship, with Kâmil Uludağ, UHN; 8 months]  
 2024 Jack Pitcher, Master of Science in Applied Computing (graduate), University of Toronto [MITACS-funded internship, with Kâmil Uludağ, UHN; 8 months]  
 2023 Skerdi Proгри, Biomedical Sciences (undergraduate), Toronto Metropolitan University [UHN Summer Research Program and RAship; 12 months]

**Student Mentorship**

2022 Lindsay Heyland, Neuroscience (undergraduate), Mount Saint Vincent University [Amgen Scholar Program, with Yuliya Nikolova, CAMH; 4 months]  
 2018 Priya Patel, Engineering (undergraduate), University of Waterloo [Waterloo-CAMH co-op program, with Yuliya Nikolova, CAMH; 4 months]

**Conference Volunteerism**

2021 Volunteer, The 24th Annual Conference on Artificial Intelligence and Statistics (AISTATS)  
 2020 Reviewer, NeurIPS Workshop: Algorithmic Fairness (AFCI2020)  
 2020 Reviewer, Black in Neuro Conference 2020

**COMMUNITY**

2021/12 - present Carpentries Instructor, Software Carpentry and Data Carpentry [Teach R, Python, and Bash to students and scientists over full-day workshops]  
 2020/9 - 2023/12 Advisory Board, Child Welfare Political Action Committee [Advocacy for former Crown Wards re: post-secondary education support]  
 2018/9 - 2022/12 Programming Instructor, Yonge Street Mission [Teach HTML & CSS and Python to 'at-risk' youth; 2020 Volunteer of the Year]