Navona Calarco

Department of Medical Biophysics, Faculty of Medicine, University of Toronto
Krembil Research Institute, Toronto Western Hospital, University Health Network
navona.calarco@mail.utoronto.ca | navonacalarco.ca

EDUCATION

Doctor of Philosophy, Medical Biophysics, University of Toronto — 2022 – present
Supervisor: Dr. Kâmil Uludağ — *(parental leave: 2026/01 - 2027/01)*

Master of Science, Institute of Medical Science, University of Toronto — 2018 – 2021
Supervisor: Dr. Aristotle Voineskos [thesis]

Honours Bachelor of Arts, Philosophy & Cognitive Science, York University — 2012 – 2015
Advisors: Drs. Shayna Rosenbaum and Raymond Mar

RECOGNITIONS [*graduate studies only*]

Research Awards

2023-2026	CIHR Vanier Canada Graduate Scholarship [$150,000]
2023-2026	CIHR Canada Graduate Scholarship - Doctoral (CGS-D) [$105,000] - *declined*
2022-2026	ACM SIGHPC Computational & Data Science Fellowship [$45,000 US]
2025	UofT Massey College Frederick Hudd Scholarship [$1200]
2023	Ontario Graduate Scholarship - PhD Program [$15,000] - *declined*
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	Helmholtz HIDA Visiting Researcher Grant [$4060 EUR]
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

2024-2026	Children's Aid Foundation of Canada Scholarship [$5000]
2022-2026	Massey College Junior Fellow
2023	Finalist, UofT R. Paul Young Fellowship for Interdisciplinary Research

RESEARCH VISITS

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

20 Calarco, Progri, Kashyap, Xie, Lepage, Cabalo, Bernhardt, Evans, Uludağ (2026). *Multiscale characterisation of the human claustrum from histology to MRI*. Proceedings of the National Academy of Sciences.

19 Oliver, Yu, Hawco, Calarco, Tan, Moxon-Emre, Tang, Gold, Foussias, DeRosse, Argyelan, Buchanan, Malhotra, Voineskos (2026). *Multivariate relationships between social cognitive performance and functional connectivity during task and rest across schizophrenia spectrum disorders and healthy controls*. Molecular Psychiatry.

18 Valdés-Cabrera, Calarco, Cassidy, Voineskos, Diniz, Nikolova (2025). *Locus Coeruleus Microstructure and Connectivity as Novel Markers of Depression and Cognitive Dysfunction in Older Adults*. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging.

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]* → select PDFs

Refereed Talks

2025 Bridging scales to map the human claustrum: BigBrain, Julich, and 7-tesla MRI. *BigBrain Workshop: HIBALL Closing Symposium*, Berlin Germany

2025 Submillimeter resolution MRI at ultra-high field resolves the human claustrum in vivo. *Sunnybrook Research Day,* Toronto [in absentia]

2025 Evaluating MRI capture of the claustrum, as part of Symposium: "New insights into the role of the claustrum in acute and chronic pain". *Canadian Pain Society 45th Annual Scientific Meeting,* Toronto.

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 Posters

2025 Structural connectivity mapping of the human claustrum. *BigBrain Workshop: HIBALL Closing Symposium*, Berlin Germany [presenting for Skerdi Progri]

2025 Bridging Scales to Map the Human Claustrum: BigBrain, Julich, and 7-Tesla MRI. *BrainModes 2025,* Toronto

2025 Exploring the Capacity of 7T MRI to Capture the Claustrum In Vivo at Varying Spatial Resolutions. *Organization for Human Brain Mapping (OHBM),* Brisbane, Australia [in absentia]

2025 Submillimeter resolution MRI at ultra-high field resolves the human claustrum in vivo. *UofT Medical Biophysics Symposium,* Toronto
2025 Submillimeter resolution MRI at ultra-high field resolves the human claustrum in vivo. *Krembil Research Day*, Toronto
2024 Cytoarchitectonic mapping and probabilistic atlas of the human claustrum. *Organization for Human Brain Mapping (OHBM),* Seoul, Korea -- **supported by travel award**.
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.
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 -- **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.
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.
2020✢ Association among deep white matter tracts and social cognition in schizophrenia and healthy controls, *Society of Biological Psychiatry (SOBP),* New York-- **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.

Non-refereed Rounds, Panels, & Outreach Presentations [*selected*]

2026/01	Toronto	University College Cognitive Science Research Symposium| ‘Bridging scales to map the human claustrum’
2025/12	Toronto	UHN Krembil Neuroimaging Rounds	‘Bridging scales to map the human claustrum’
2025/03	Toronto	Massey College Junior Fellow Lecture Series, on ‘The brain, the mind’	‘The Claustrum and Consciousness: From Mystery to Measurement’
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’
2021/02✢	Toronto	UHN Krembil Neuroimaging Rounds	‘Multivariate associations with white matter microstructure in schizophrenia’

Guest lectures [*all University of Toronto courses*]

2025/01 “Structural imaging of the claustrum”, Clinical Neuroimaging (JHA410), undergraduate
2025/02 “Theories of consciousness”, Systems Neuroscience (PSL440/JNS1000), undergraduate/graduate

TEACHING EMPLOYMENT

Course Instructor

2023-winter	Estimation, Testing, and Learning, post-graduate certificate program, Data Science Institute, University of Toronto [21 lecturing hours]

Teaching Assistantships [*all involving tutorials or labs, at the University of Toronto*]

2025-2020 (5x) [fall]	Computational Biostatistics in R (MSC1090), graduate, Medical Science [90h]
2025 [summer]	Coding in R (BTC1855H), graduate, Biotechnology [27h]
2025 [summer]	Data Science in Health I (BTC1859H), graduate, Biotechnology [27h]
2025 [winter]	Seminar in Translational Research (MSC1010), graduate, Medical Science [34h]
2025 [winter]	Learning from Data (MSC1030), graduate, Medical Science [72h]
2022 [fall]	Introduction to Biostatistics (LMP2004), graduate, Laboratory Medicine [70h]
2022 [summer]	Probability, Statistics, and Data Analysis II (STA238), undergraduate, Statistics [75h]
2022 [summer]	Design and Analysis of Experiments (STA305), undergraduate, Statistics [75h]

PREDOCTORAL 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, Slaight 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)

SELECTED ADDITIONAL TRAINING [*all minimum one week intensive*]

2025	Laboratory	CrossTALK: Cross-Training in AI and Lab. Knowledge for Drug Discovery [Toronto]
2021	Teaching	The Carpentries Instructor Training [virtual]
2019	Neuroscience	Diffusion Imaging in Python (DiPy) Workshop [Bloomington]
2018	Clinical	DSM-5 SCID-5 CT (clinical trials) and RV (research version) [Toronto]
2017	Computation	SciNet Summer School: Data Science & High Performance Computing [Toronto]

SERVICE

Reviewing → ORCiD

Ad hoc: Psychiatry Research: Neuroimaging (10); Schizophrenia Research (5); Psychiatry Research (2); Schizophrenia Bulletin (2); Human Brain Mapping (2); Neuroimage: Clinical (2); European Journal of Neuroscience (1); Frontiers in Psychiatry (1); Science Progress (1)

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 [all with Dr. Kâmil Uludağ]

2026-present	Oviya Sathiyanarayanan, Integrated Science (undergraduate), McMaster University *Project:* Data-driven parcellation of the human brain claustrum *Funding:* Data Sciences Institute (DSI) Summer Undergraduate Data Science (SUDS) Research Opportunities Program | $7200, 14 weeks
2024-present	Shuting Xie, Master of Science in Applied Computing (graduate), University of Toronto *Project:* Developing an automated segmentation algorithm for the human claustrum in MRI *Funding:* MITACS Accelerate Internship Program | $30,000, 8 months
2023-present	Skerdi Progri, Biomedical Sciences (undergraduate), University of Toronto *Project:* Creating and validating a 3-dimensional histological model of the human claustrum *Funding:* T-CAIREM AI in Medicine Summer Student Research Program | $7200, 10 weeks
2024	Jack Pitcher, Master of Science in Applied Computing (graduate), University of Toronto *Project:* Developing a machine learning model to subsection the human claustrum *Funding:* MITACS Accelerate Internship Program | $30,000, 8 months