Povilas Karvelis, PhD

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Research Interests

I work on the development of computational models with the aim to re-conceptualize mental disorders and their treatment. I'm guided by a vision of a multidisciplinary and personalized model of psychiatry that is in harmony with the deepest understanding of human nature.

Employment History

2020-present **Postdoctoral Research Fellow**
Krembil Centre for Neuroinformatics (KCNI), The Centre for Addiction and Mental Health (CAMH), affiliated with University of Toronto, Canada
Mentor: Dr. Andreea Diaconescu

Education

2016-2020 **PhD in Machine Learning, Computational Neuroscience, Computational Biology**
University of Edinburgh, UK
Thesis title: Perceptual Bayesian Inference in Autism and Schizophrenia
Supervisor: Prof. Peggy Seriès

2015-2016 **MSc with Distinction in Computational Cognitive Science**
University of Edinburgh, UK
Dissertation title: Probabilistic Inference in Schizotypy and Autistic Traits
Supervisor: Prof. Peggy Seriès

2011-2015 **MSci First-Class Honours in Physics and Astrophysics (International study)**
University of Birmingham, UK
Dissertation title: Asteroseismology with Kepler: Constraining mass-loss rate of RGB stars in open clusters NGC6791 and NGC681
Supervisor: Prof. Andrea Miglio

2013-2014 **Exchange year - 3rd year BSc Physics courses**
University of Melbourne, Australia

Additional Training & Courses

2023/11 Deep learning specialization, an online course by DeepLearning.ai, Coursera

2018/10	Structural Parametric Mapping for fMRI/VBM, University College London, UK
2018/07	Computational Psychiatry course, University College London, UK
2016/09	Computational Psychiatry course, University & ETH Zurich, Switzerland
2016-2019	Training for Teaching Support Providers in the School of Informatics, University of Edinburgh, UK

Fellowships, Scholarships, & Awards

2022-2024	**Postdoctoral Fellowship**, Canadian Institute of Health Research (CIHR), Canada 90,000 CAD
2016-2020	**Doctoral Scholarship**, Engineering and Physical Sciences Research Council (EPSRC), UK 50,500 GBP
2018	**Travel Award**, European Behavioural Pharmacology Society (EBPS), Cambridge, UK 1,000 USD
2016	**Best Poster Award**, The Scottish Mental Health Research Network (SMHRN) Annual Scientific Meeting, Edinburgh, UK 100 GBP
2011	**Physics Entry Achievement Scholarship**, University of Birmingham, UK 1,000 GBP

Publications

1. Diaconescu, A. O., **Karvelis, P.**, & Hauke, D. J. (2024). Rethinking interpersonal judgments: dopamine antagonists impact attributional dynamics. Trends in Cognitive Sciences.

2. Hauke, D. J., Wobmann, M., Andreou, C., Mackintosh, A. J., de Bock, R., **Karvelis, P.**, ... & Diaconescu, A. O. (2024). Altered perception of environmental volatility during social learning in emerging psychosis. Computational Psychiatry, 8(1), 1.

3. **Karvelis, P.**, Paulus, M. P., & Diaconescu, A. O. (2023). Individual differences in computational psychiatry: a review of current challenges. Neuroscience & Biobehavioral Reviews, 105137.

4. Charlton, C. E., **Karvelis, P.**, McIntyre, R. S., & Diaconescu, A. O. (2023). Suicide prevention and ketamine: insights from computational modeling. Frontiers in psychiatry, 14.

5. **Karvelis, P.***, Charlton, C. E.*, Allohverdi, S. G., Bedford, P., Hauke, D. J., & Diaconescu, A. O. (2022). Computational Approaches to Treatment Response Prediction in Major Depression Using Brain Activity and Behavioral Data: A Systematic Review. Network Neuroscience, 1-52.

6. Hauke, D. J., Roth, V., **Karvelis, P**., Adams, R. A., Moritz, S., Borgwardt, S., Diaconescu, A. O., & Andreou, C. (2022). Increased Belief Instability in Psychotic Disorders Predicts Treatment Response to Metacognitive Training. Schizophrenia Bulletin.

7. **Karvelis, P**., & Diaconescu, A. O. (2022). A Computational Model of Hopelessness and Active-Escape Bias in Suicidality. Computational Psychiatry, 6(1)

8. Richards, K. L.*, **Karvelis, P.***, Lawrie, S. M., & Seriès, P. (2020). Visual statistical learning and integration of perceptual priors are intact in attention deficit hyperactivity disorder. PloS one, 15(12), e0243100.

9. Valton, V.*, **Karvelis, P.*,** Richards, K. L., Seitz, A. R., Lawrie, S. M., & Seriès, P. (2019). Acquisition of visual priors and induced hallucinations in chronic schizophrenia. Brain, awz171

10. Cohen Hoffing, R. A.*, **Karvelis, P.***, Rupprechter, S., Seriès, P., & Seitz, A. (2018). The Influence of Feedback on Task-Switching Performance: A Drift Diffusion Modeling Account. Frontiers in integrative neuroscience, 12, 1.

11. **Karvelis, P.**, Seitz, A. R., Lawrie, S. M., & Seriès, P. (2018). Autistic traits, but not schizotypy, predict increased weighting of sensory information in Bayesian visual integration. eLife, 7, e34115

Preprints

12. **Karvelis, P.**, Hauke, D.J., Wobmann, M., Andreou, C., Mackintosh, A., de Bock, R., Borgwardt, S. and Diaconescu, A., (2023). Test-retest reliability of behavioral and computational measures of advice taking under volatility. PsyArXiv.

13. **Karvelis, P.**, & Diaconescu, A. O. (2024). Clarifying the reliability paradox: poor test-retest reliability attenuates group differences.

*** Co-first author**

Presentations & Workshops

Oral conference presentations

2020 **Perceptual inference with continuous variables, continuous time and complex priors.** Canadian Computational Neuroscience Spotlight (CCNS), Toronto, Canada

2018 **Is Perceptual Bayesian Inference Impaired in Autism and Schizophrenia?** European Behavioural Pharmacology Society (EBPS) workshop, Cambridge, UK

Poster presentations

2024 **Clarifying the reliability paradox: poor test-retest reliability attenuates group differences.** Organization for Human Brain Mapping (OHBM), Seoul, South Korea

2024 **Clarifying the reliability paradox: poor test-retest reliability attenuates group differences.** Society of Biological Psychiatry (SOBP), Austin, Texas, USA

2023 **The challenges of measuring individual differences in computational psychiatry.** Organization for Human Brain Mapping (OHBM), Montreal, Quebec, Canada

2023 **Test-retest reliability of behavioral and computational measures of advice taking.** Organization for Human Brain Mapping (OHBM), Montreal, Quebec, Canada

2023 **The challenges of measuring individual differences in computational psychiatry.** Computational Psychiatry Conference, Dublin, Ireland

2023 **The challenges of measuring individual differences in computational psychiatry.** Society of Biological Psychiatry (SOBP), San Diego, California, USA

2022 **A Computational Model of Hopelessness and Active-escape Bias in Suicidality.** Computational Psychiatry Course (CPC++), New York City, New York, USA

2016 **Probabilistic Inference in Schizotypy and Autistic Traits**. The Scottish Mental Health Research Network (SMHRN) Annual Scientific Meeting, Edinburgh, UK

Invited scholarly talks

2021/10 **A neurocomputational model of hopelessness and active-escape bias in suicidality.** Alliance of Suicide Prevention and Intervention Researchers and Educators at the University of Toronto (ASPIRE), Toronto, Canada

2021/02 **Suicidality: hopelessness and active-escape bias.** BRAIN-TO workshop, Toronto, Canada

2021/06 **Perceptual Bayesian inference in autism and schizophrenia.** Theoretical & Computational Neuroscience Group, Basel, Switzerland

2020/12 **Suicidality: hopelessness and active-escape bias.** Computational Psychiatry Lab, Institute for Adaptive and Neural Computation, University of Edinburgh, UK

2018/03 **Bayesian inference in schizophrenia and autism**. Brain Game Center for Mental Fitness and Well-Being, University of California, Riverside (UCR), California, USA

Educational talks/workshops

2022/03 **DCM for fMRI.** Cognitive Network Modelling (Cognemo) EduSeries, Toronto, Canada

2021/10 **Schizophrenia: computational frameworks and models.** Cognitive Network Modelling (Cognemo) EduSeries, Toronto, Canada

2021 **Computational and physiological mechanisms of suicide**. Cognitive Network Modelling (Cognemo) EduSeries, Toronto, Canada

2021/07 **Tutorial: Dynamic causal modeling for fMRI.** Krembil Centre for Neuroinformatics (KCNI) Summer School, Toronto, Canada.

2021/05 **Statistical Parametric Mapping: hierarchical models, empirical Bayes, and variational Bayes.** Cognitive Network Modelling (Cognemo) EduSeries, Toronto, Canada

2021/01 **Statistical Parametric Mapping: fMRI data pre-processing.** Cognitive Network Modelling (Cognemo) EduSeries, Toronto, Canada

2020/02 **Is Perceptual Bayesian Inference Impaired in Autism and Schizophrenia?** Wellcome Trust 4-year PhD Translational Neuroscience programme, University of Edinburgh, UK

2019/02 **Is Perceptual Bayesian Inference Impaired in Autism and Schizophrenia?** Wellcome Trust 4-year PhD Translational Neuroscience programme, University of Edinburgh, UK

2018/02 **Bayesian inference in schizophrenia and autism**. Wellcome Trust 4-year PhD Translational Neuroscience programme, University of Edinburgh, UK

Teaching Experience

2022 Guest Lecturer for **Bayesian Models of Perception and Decision-Making** (PSY3100 S5), Department of Psychology, University of Toronto, Canada

2019-2020 Teaching Support roles at the School of Informatics, University of Edinburgh, UK

- Tutor for **Computational Cognitive Neuroscience** (graduate)
- Tutor for **Computational Cognitive Science** (graduate)
- Tutor & Marker for **Informatics Research Review** (graduate)
- Tutor & Marker for **Informatics Project Proposal** (graduate)
- Demonstrator & Marker for **Informatics 1 - Cognitive Science** (undergraduate)

2018-2019 Teaching Support roles at the School of Informatics, University of Edinburgh, UK

- Tutor for **Computational Cognitive Neuroscience** (graduate)
- Tutor for **Computational Cognitive Science** (graduate)
- Tutor & Marker for **Informatics Research Review** (graduate)
- Tutor & Marker for **Informatics Project Proposal** (graduate)

2017-2018 Teaching Support roles at the School of Informatics, University of Edinburgh, UK

- Tutor for **Computational Cognitive Neuroscience** (graduate)
- Tutor & Marker for **Informatics Research Review** (graduate)
- Tutor for **Informatics Project Proposal** (graduate)
- Demonstrator & Marker for **Informatics 1 - Cognitive Science** (undergraduate)

2016-2017 Teaching Support roles at the School of Informatics, University of Edinburgh, UK

- Teaching Assistant for **Computational Cognitive Science** (graduate)
- Tutor & Marker for **Informatics Research Review** (graduate)
- Tutor for **Informatics Research Proposal** (graduate)
- Demonstrator & Marker for **Informatics 1 - Cognitive Science** (undergraduate)

2015-2016 Teaching Support roles at the School of Informatics, University of Edinburgh, UK

- Demonstrator for **Informatics 1 - Cognitive Science** (undergraduate)

Service

Peer reviewer

Computational Psychiatry (since 2021)
Frontiers in Human Neuroscience (since 2022)

Funding reviewer

2022 Wellcome Trust Early-Career Awards Committee
2023 CIHR Doctoral Research Awards Committee

Editorial contributions

2022-2023 Guest Associate Editor, Frontiers in Psychiatry

Conference organization

2022 Chair at Canadian Computational Neuroscience Spotlight (CCNS)
2024-2025 Hybridization Chair at OHBM Open Science Special Interest group (OSSIG)

Mentoring activities

2020-pres. **Co-mentor**, Krembil Centre for Neuroinformatics (KCNI), The Centre for Addiction and Mental Health (CAMH), affiliated with University of Toronto, Toronto, Canada

- Pamina Laessing, PhD student
- Jason Yang, MSc student
- Daniel Wurgaft, BSc student
- Alex Coutler, BSc student

2017-2019 **Co-mentor**, School of informatics, University of Edinburgh, UK

- Nikitas Chrysaitis, MSc student
- Raffaele Piccini, MSc Student
- Gizem Aras, MSc student

Other skills

Languages: English (fluent), Lithuanian (native), Russian (basic), Spanish (basic)
Coding: Python, R, Matlab, C/C++, JavaScript, GitHub

Community and volunteer activities

2016-2020 Founder and president of Breakdance Society, University of Edinburgh, UK