

# Brandon Forys

PhD Student, Motivated Cognition Lab and Brain, Attention, and Reality Lab, University of British Columbia  
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## Education and training

*University of British Columbia, Vancouver, BC, Canada*, PhD in Psychology 2022-  
Supervisors: Dr. Rebecca Todd & Dr. Alan Kingstone

*University of British Columbia, Vancouver, BC, Canada*, M.A. in Psychology 2020-2022  
Supervisors: Dr. Rebecca Todd & Dr. Alan Kingstone  
Masters' thesis: *Gender moderates the relationship between mood disorder symptoms and effortful avoidance performance.*

*University of British Columbia, Vancouver, BC, Canada*, B.A. Honours in Psychology 2016-2020  
Supervisors: Dr. Rebecca Todd (Honours), Dr. Kiran Soma (Honours), & Dr. Timothy Murphy  
Honours theses: *Modulating effort cost in human avoidance behaviours.; A novel steroidogenic model for reward-seeking behaviour.*

## Honours and Awards

Faculty of Arts Graduate Award, UBC	2023
Stanley Coren Prize in Psychology, UBC	2023
Four Year Fellowships (4YF) For PhD Students, UBC	2022-2026
President's Academic Excellence Initiative PhD Award, UBC	2022-2026
Canada Graduate Scholarship – Doctoral, NSERC	2022-2025
Faculty of Arts Graduate Award, UBC	2021 (deferred from 2020)
Canada Graduate Scholarship – Master's, NSERC	2020
NSERC Undergraduate Student Research Award, NSERC/UBC	2020
Faculty of Arts Graduate Award, UBC	2020
Trek Excellence Scholarship for Continuing Students, UBC	2019
ARTA Scholarship, Alberta Retired Teachers' Association	2019
Wesbrook Scholar, UBC	2019
HSBC Emerging Leader Scholarship, UBC	2019
Suedfeld Scholar Award, UBC Psi Chi	2019
PSYC 217 Poster Award, 1st Place, UBC Psychology	2018
Student Scholarship in Arts, UBC Faculty of Arts	2018
Trek Excellence Scholarship for Continuing Students, UBC	2017
Stephen Straker Arts One Prize, UBC Arts One Program	2017
University of BC Sopron Memorial Scholarship, UBC	2016
Dean's List, UBC Faculty of Arts	2016-17, 2017-18, 2018-19, 2019-20

## Publications and presentations

### JOURNAL ARTICLES

1. **Forys, B. J.**, Winstanley, C. A., Kingstone, A., & Todd, R. M. (2024). Short-term memory capacity predicts willingness to expend cognitive effort for reward. *bioRxiv*. <https://doi.org/10.1101/2024.02.12.579951>
2. Kryklywy, J. H., **Forys, B. J.**, Vieira, J. B., Quinlan, D. J., Culham, J. C., & Mitchell, D. G. V. (2023). Dissociating representation of affect and motion in visual cortices. *Cognitive, Affective, & Behavioural Neuroscience*, 1-24. <https://doi.org/10.3758/s13415-023-01115-2>
3. **Forys, B. J.**, Tomm, R. J., Stamboliyska, D.\*\*\*, Terpstra, A. R., Clark, L., Chakrabarty, T., Floresco, S. B., & Todd, R. M. (2023). Gender impacts the relationship between mood disorder symptoms and effortful avoidance performance. *eNeuro*, 10(2). <https://doi.org/10.1523/ENEURO.0239-22.2023>
4. Ehlers, M. R., Kryklywy, J. H., Beukers, A. O., Moore, S. R., Forys, B. J., Anderson, A. K., & Todd, R. M. (2021). Reactivation of hedonic but not sensory representations in human emotional learning. *bioRxiv*. <https://doi.org/10.1101/2021.11.25.469891>
5. Xiao, D., **Forys, B. J.**, Vanni, M. P., & Murphy, T. H. (2021). MesoNet: automated scaling and segmentation of mouse mesoscale cortical maps using machine learning. *Nature Communications*, 12(1), 5992. <https://doi.org/10.1038/s41467-021-26255-2>
6. Hamden, J.E., Salehzadeh, M., Gray, K. M., **Forys, B. J.**, & Soma, K. K. (2021). Isoflurane stress induces glucocorticoid production in mouse lymphoid organs. *Journal of Endocrinology*, 251(2), 1-13. <https://doi.org/10.1530/JOE-21-0154>
7. Hamden, J. E.\*, Gray, K. M.\*, Salehzadeh, M., Kachkovski, G. V., **Forys, B. J.**, Ma, C., ... Soma, K. K. (2021). Steroid profiling of glucocorticoids in microdissected mouse brain across development. *Developmental Neurobiology*, 81(2), 189–206. <https://doi.org/10.1002/dneu.22808>
8. **Forys, B. J.\***, Xiao, D.\*, Gupta, P., & Murphy, T. H. (2020). Real-time selective markerless tracking of forepaws of head-fixed mice using deep neural networks. *eNeuro*, 7(3). <https://doi.org/10.1523/ENEURO.0096-20.2020>

\*Co-first authors

### PAPERS IN PREPARATION

1. Ehlers, M. R., Kryklywy, J. H., Beukers, A. O., Moore, S. R., **Forys, B. J.**, Anderson, A. K., & Todd, R. M. (in preparation). Reactivation of hedonic but not sensory representations in human emotional learning.
2. **Forys, B. J.**, Winstanley, C. A., Kingstone, A., & Todd, R.M. (in preparation). Short-term memory capacity predicts willingness to expend cognitive effort for reward.

### POSTER PRESENTATIONS

1. **Forys, B. J.**, Tomm, R. J., Kryklywy, J. H., Clark, L., Chakrabarty, T., Floresco, S. B., & Todd, R. M. (2023). Using a novel form of pattern component modeling with representational

- similarity analysis to model information learned in active and inhibitory avoidance and reward-seeking. Presented at International Conference on Learning and Memory, 2023, Huntington Beach, CA.
2. **Forys, B. J.**, Kryklywy, J. H., Ehlers, M. R., Moore, S. R., Beukers, A. O., Anderson, A. K., & Todd, R. M. (2022). Modelling representations of continuously shifting stimuli: a novel sliding window approach. Presented at Cognitive Neuroscience Society Annual Meeting, 2022, San Francisco, CA.
  3. Zheng, J.\*\*, **Forys, B. J.**, & Todd, R. M. (2022). Maladaptive Transfer of Cognitive Effort in Emotional Situations. Presented at UBC Psychology Undergraduate Research Conference, 2022.
  4. **Forys, B. J.**, Tomm, R. J., Stamboliyska, D.\*\*, Terpstra, A. R., Clark, L., Chakrabarty, T., Floresco, S. B., & Todd, R. M. (2021). Gender selectively moderates relationships between mood disorder symptoms and performance of effort related avoidance and reward-seeking tasks. Presented at Neuroscience 2021.
  5. Tomm, R. J., **Forys, B. J.**, Daly, I. D., Terpstra, A. R., Clark, L., Chakrabarty, T., Floresco, S. B., & Todd, R. M. (2021). Depressive and anxiety symptom clusters in humans are related to distinct avoidance profiles in a cross-species translation of a go/no-go avoidance task. Presented at Neuroscience 2021.
  6. Daly, I. D., Tomm, R. J., **Forys, B. J.**, Terpstra, A. R., Clark, L., Chakrabarty, T., Floresco, S. B., & Todd, R. M. (2021). Levels of depressive and anxiety symptoms in humans predict distinct patterns of reward-seeking: A cross-species translation of an appetitive go/no-go task. Presented at Neuroscience 2021.
  7. Tomm, R. J., Daly, I. D., **Forys, B. J.**, Floresco, S. B., & Todd, R. M. (2021). Anxiety and depressive symptoms in humans are related to distinct avoidance profiles in a cross-species translation of a go/no-go avoidance task. Presented at the International Behavioural Neuroscience Society Meeting, 2021.
  8. Sidarth, A.\*\*, **Forys, B. J.**, & Todd, R. M. (2021). Cognitive control on reward-seeking behavior. Presented at UBC Multidisciplinary Undergraduate Research Conference, 2021, and UBC Parkinson's and Alzheimer's Targeted Hope and Support Conference, 2021.
  9. Xiao, D., Gupta, P., **Forys, B.**, & Murphy, T. H. (2020). Real-time forepaw movement coded auditory feedback promotes motor skill learning in mice. Presented at UBC Psychiatry Virtual Research Day, 2020.
  10. **Forys, B. J.**, Xiao, D., Gupta, P., Boyd, J. D., & Murphy, T. H. (2019). Short latency (~100 ms) markerless video tracking of body parts in mice using deep neural networks. Presented at Neuroscience 2019, Chicago, IL., and UBC Neuroscience Undergraduate Research Conference, 2020.
  11. Xiao, D., **Forys, B. J.**, Tandun, R., & Murphy, T. H. (2019). Automated alignment and segmentation of mouse mesoscale brain images using machine learning. Presented at Neuroscience 2019, Chicago, IL.; UBC Future of Health Research Day; UBC School of Biomedical Engineering Symposium, 2019.
  12. **Forys, B.**, Tobiansky, D. J., & Soma, K. K. (2019). A novel steroidogenic model for reward-seeking behaviour. Presented at UBC Psychology Undergraduate Research Conference,

2019.

13. **Forys, B.**, Xiao, D., Gupta, P., Boyd, J. D., & Murphy, T. H. (2018). Real-time markerless video tracking of bodyparts in mice using deep neural networks. Presented at UBC Brain Circuits Cluster 2018; Neuroextravaganza 2018; UBC Undergraduate Neuroscience Conference 2019; UBC School of Biomedical Engineering Symposium 2019.
14. Tobiansky, D. J., Kachkovski, G., Enos, R. T., Schmidt, K. L., Ma. C., **Forys, B.**, Hamden, J. E., Jalabert, C., Floresco, S. B., Murphy, E. A., Soma, K. K. (2018). Perinatal sucrose exposure in rats disrupts hormones, brain, and behavior in adulthood. Presented at Neuroscience 2018, San Diego, CA. (Credited on poster, not on abstract)
15. **Forys, B.**, Phi, J., Shi, L., Yu, V. ZH. (2018). Emojinal perception: Emoji presence and perceived emotional valence. Presented at UBC Psychology Undergraduate Research Conference, 2018 (PSYC 217 Poster Award, 1st place winner).
16. **Forys, B.**, Tandun, R., Cookson, J., & Xiao, D. (2018). Predicting facial and paw movement from cortical mesoscopic calcium activity in mice: A machine learning perspective. Presented at UBC Multidisciplinary Undergraduate Research Conference, 2018.

\*\*Trainee

#### INVITED TALKS

1. **Forys, B. J.** (2023). Exploring the structure of brain activity (and why it matters for neurophenomenology). Delivered at UBC Neurophenomenology Meeting, 2023, Vancouver, BC.
2. **Forys, B. J.** & Todd, R. M. (2023). Using fMRI to model representational content in a translational context. Delivered at UBC MRI Research Centre Annual Retreat, 2023, Vancouver, BC.

#### CONFERENCE TALKS

1. **Forys, B. J.**, Kryklywy, J. H., Ehlers, M. R., Moore, S. R., Beukers, A. O., Anderson, A. K., & Todd, R. M. (2022). Modelling representations of continuously shifting stimuli: a novel sliding window approach. Delivered at Cognitive Neuroscience Society Annual Meeting, 2022, San Francisco, CA.

#### SOFTWARE

1. Xiao, D., **Forys, B. J.**, Vanni, M. P. & Murphy, T. H. (2021). MesoNet: automated scaling and segmentation of mouse mesoscale cortical maps using machine learning. Code Ocean. <https://doi.org/10.24433/CO.1919930.V1>
2. Kryklywy, J.H., **Forys, B. J.**, & Todd, R.M. (2021). Pattern Component Modelling for R (PCM-R), R package, pre-release. <https://github.com/bf777/PCMforR>

#### Teaching and mentoring

## TEACHING

Teaching Assistant and Guest Lecturer, UBC fMRI Brain Camp, 2023.

Helped design and conceptualize the course structure. Taught five sessions on fMRI preprocessing and open data practices, including how to use the BIDS format, conduct quality control, run representational similarity analysis, use fMRIPrep, and run analyses on high-performance computing platforms. Provided technical support to students at all stages of preprocessing.

Teaching Assistant with Dr. Rebecca Todd, PSYC 365, Cognitive Neuroscience, UBC	2024
Teaching Fellow with Dr. Catherine Rawn, PSYC 217, Research Methods in Psychology, UBC	2023
Teaching Assistant with Dr. Rebecca Todd, PSYC 365, Cognitive Neuroscience, UBC	2023
Teaching Fellow with Dr. Andrew Rivers, PSYC 217, Research Methods in Psychology, UBC	2022
Teaching Assistant with Dr. Rebecca Todd, PSYC 365, Cognitive Neuroscience, UBC	2022
Teaching Fellow with Dr. Catherine Rawn, PSYC 217, Research Methods in Psychology, UBC	2021
Teaching Assistant with Dr. Rebecca Todd, PSYC 365, Cognitive Neuroscience, UBC	2021
Teaching Fellow with Dr. Catherine Rawn, PSYC 217, Research Methods in Psychology, UBC	2020
Teaching Fellow with Dr. Catherine Rawn, PSYC 218, Analysis of Behavioural Data, UBC	2020
Teaching Assistant with Dr. David King, PSYC 305A, Personality Psychology, UBC	2019

## MENTORING

### Undergraduate honours students

Michelle Gitaari, University of British Columbia	2023-
Honours thesis: <i>High vs. low effort: How perception of cognitive effort ability impacts effort deployment choices.</i>	
Skye Zheng, University of British Columbia	2022-2023
Honours thesis: <i>Maladaptive transfer of cognitive effort in emotional situations.</i>	

### Undergraduate directed studies students

Dayana Stamboliyska, University of British Columbia	2021-2022
Paper: <i>Self-Efficacy in modern computational theories of motivated action.</i>	

### Undergraduate research assistants

Rita Jin, University of British Columbia	2023-
Emily Qi, University of British Columbia	2023-
Niharika Dwivedi, University of British Columbia	2023
Paul Kee, University of British Columbia	2022
Aanandi Sidarth, University of British Columbia	2021-2022

### Mentorship positions

Diversity Mentor, UBC Psychology Diversity Mentorship Program	2021-
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Mentors students interested in applying to graduate school in Psychology, guiding them through the mentor selection and school application process and meeting with them on a regular basis.

## **Skills**

*Programming Languages:* Python, bash, R, JavaScript, MATLAB, C#, HTML/CSS, Swift, Java

*Machine Learning and Computer Vision:* TensorFlow, Keras, OpenCV

*Experimentation Technology:* PsychoPy, PsychToolbox, fMRIPrep, AFNI, FSL, CONN, fMRI-CPCA, BioSemi EEG, EEGLAB, LabChart/PowerLab

*Web Frameworks:* Django, Flask, npm, Bootstrap, Wordpress, Squarespace

*Infrastructure:* Docker, VirtualBox, QEMU, Azure, High performance computing (SLURM, PBS)

*Visualization:* Photoshop, Illustrator, Inkscape, Unity, Blender, AutoCAD, 3DSMax, Revit, Inventor

## **Professional affiliations**

Member, Society for Neuroscience 2019-

Member, Psi Chi International Honor Society in Psychology 2019-

## **Languages**

English – native; French – fluent