

# Curriculum Vitae

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**Chad C. Williams** PhD

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🌐 [www.chadcwilliams.com](http://www.chadcwilliams.com)

Neuroscientist | Software Developer |  
Statistician | Educator | Data Scientist |

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**Current Position:**

Senior Scientist  
*Psychiatry, Embodiment and Computation Laboratory*  
*Brown University*

**Education:**

PhD in Neuroscience  
Certificate in Learning and Teaching in Higher Education  
MSc in Neuroscience  
BSc in Psychology

**Contact Information:**

**Website:**

[www.chadcwilliams.com](http://www.chadcwilliams.com)

**Additional Links:**

[Google Scholar](#)

[LinkedIn](#)

[Research Gate](#)

[GitHub](#)

[OSF](#)

[YouTube](#)

**Career Highlights:**

|                        |                                      |
|------------------------|--------------------------------------|
| Published Papers:      | 24 (9 first author, 1 senior author) |
| Published Development: | 3                                    |
| H Index:               | 11                                   |
| i10 Index:             | 11                                   |
| Citations:             | 783                                  |
| Awards & Distinctions: | \$214,213                            |
| Research Grants:       | \$60,000                             |

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## **EDUCATION**

- University of Victoria, Victoria** 2022  
***PhD – Neuroscience***  
*Dissertation:* Prediction Errors of Decision Demands Influence Cost-Benefit Computations in Reasoning  
*Supervisor:* Dr. Olav Krigolson  
*Committee Members:* Dr. Michael Inzlicht  
Dr. Bruce Wright
- University of Victoria, Victoria** 2022  
***Certificate in Learning and Teaching in Higher Education***
- University of Victoria, Victoria** 2018  
***M.Sc. – Neuroscience***  
*Thesis:* Neurocognitive Mechanisms of Type 1 and Type 2 Decision Making Processes  
*Supervisor:* Dr. Olav Krigolson  
*Committee Members:* Dr. Bruce Wright
- University of Victoria, Victoria** 2016  
***B.Sc. – Psychology (Honours with distinction)***  
*Thesis:* Reward Processing when Evaluating Goals: Insight into Hierarchical Reinforcement Learning  
*Supervisors:* Dr. Clay Holroyd  
Dr. Olav Krigolson
- Coursera** 2020  
***Certificate of Diversity and Inclusion in the Workplace***

**AWARDS AND DISTINCTIONS (Total: 19, \$214,713)**

|   |             |
|---|-------------|
| Canada Graduate Scholarship – Doctoral (CGS D), NSERC - <b>\$105,000</b>              | 2018        |
| Research Scholarship (x2), Neuroeducation Network - <b>\$40,000 total</b>             | 2015 & 2017 |
| Canada Graduate Scholarship – Master’s (CGS M), NSERC - <b>\$17,500</b>               | 2016        |
| President's Research Scholarship (x6), University of Victoria - <b>\$12,000 total</b> | 2016-2021   |
| Research Scholarship, Howard E. Petch - <b>\$7,500</b>                                | 2018        |
| Undergraduate Student Research Award (x2), NSERC - <b>\$9,000 total</b>               | 2015 & 2016 |
| Graduate Scholarship, Jarmila Vlasta Von Drak Thouvenelle - <b>\$4,000</b>            | 2019        |
| Memorial Award, Jean Downie Dey - <b>\$2,175</b>                                      | 2020        |
| Cameron Memorial Trust Scholarship - <b>\$1,138</b>                                   | 2021        |
| Community & Scholarship Fund, University of Victoria - <b>\$1,000</b>                 | 2016        |
| BRAINSTORM Challenge Runner-Up - <b>\$500</b>   | 2023        |
| Poster Award, Society for Psychophysiological Research - <b>\$400</b>                 | 2018        |
| Certificate of Academic Excellence, Canadian Psychological Association                | 2016        |

**GRANTS (Total: 1; \$60,000)**

|  |      |
|--|------|
| Alliance Grant, NSERC-Mitacs - <b>\$60,000</b> | 2021 |
| <i>Written with:</i> Dr. Olav Krigolson        |      |

## **RESEARCH EXPERIENCE**

|  |                |
|--|----------------|
| <p><b>Senior Scientist</b><br/> <i>Psychiatry, Embodiment and Computation Laboratory</i><br/> <i>Carney Institute for Brain Science,</i><br/> <i>Brown University</i></p>  | 2024 – Present |
| <p><b>Software Developer</b><br/> <i>Inward VR</i></p>   | 2023 – Present |
| <p><b>Computational Neuroscientist &amp; Post-Doctoral Scholar</b><br/> <i>Autonomous Empirical Research Group</i><br/> <i>Carney Institute for Brain Science,</i><br/> <i>Brown University</i></p>                                | 2022 – 2024    |
| <p><b>Software Developer</b><br/> <i>Canadian Sports Institute Pacific Society</i></p>   | 2022 – 2023    |
| <p><b>Neuroscientist, MSc Student, &amp; PhD Candidate</b><br/> <i>Theoretical and Applied Neuroscience Laboratory, University of Victoria</i><br/> <i>Supervisor: Dr. Olav Krigolson</i></p>                                      | 2015 – 2022    |
| <p><b>Scientist for Industrial Collaborations</b><br/> <i>Divergence Neuro Technologies</i><br/> <i>L3Harris Technologies</i><br/> <i>InteraXon</i><br/> <i>Avertus</i></p>  | 2016 – 2022    |
| <p><b>Research Associate</b><br/> <i>Divergence Neuro Technologies Inc.</i></p>  | 2021 – 2022    |
| <p><b>Laboratory Manager</b><br/> <i>Neuroeconomics Laboratory, University of Victoria</i><br/> <i>Supervisor: Dr. Olav Krigolson</i></p>  | 2015 – 2017    |
| <p><b>Senior Researcher</b><br/> <i>Learning and Cognitive Control Laboratory &amp;</i><br/> <i>Neuroeconomics Laboratory, University of Victoria</i><br/> <i>Supervisors: Dr. Clay Holroyd</i><br/> <i>Dr. Olav Krigolson</i></p> | 2015 – 2016    |
| <p><b>Research Assistant</b><br/> <i>Human Electrophysiology Laboratory, Simon Fraser University</i><br/> <i>Supervisor: Dr. John McDonald</i></p>   | 2012 – 2014    |

## **TEACHING EXPERIENCE**

|   |                |
|---|----------------|
| <p><b>Research Assistant Supervisor</b><br/> <i>Autonomous Empirical Research Group, Brown University</i><br/> <i>Research Assistants: Joshua Hewson (2023)</i></p>   | 2023 – Present |
| <p><b>Academic Writing Seminar Series Instructor</b><br/> <i>Autonomous Empirical Research Group, Brown University</i></p>  | 2023 – Present |
| <p><b>Workshop Instructor</b><br/> <i>Brainstorm Program, Carney Institute for Brain Science, Brown University</i><br/> <b>Workshops:</b><br/> <i>Brainstorm Challenge (2024): Data Reduction with Autoencoders</i><br/> <i>Brainstorm Challenge (2022): Differentiable Architecture Search</i><br/> <i>Co-Instructor: Dr. Sebastian Musslick</i></p>   | 2022 – Present |
| <p><b>Online Educator: Practical Statistics with R</b><br/> <i>Virtual</i><br/> <a href="http://www.youtube.com/chadcwilliams">www.youtube.com/chadcwilliams</a></p>  | 2020 – Present |
| <p><b>Sessional Lecturer</b><br/> <i>University of Victoria, Victoria</i><br/> <b>PSYC 300A – Statistical Methods in Psychology (Summer, 2021)</b><br/>           Median Course Evaluations: 5.0/5.0 on all questions<br/><br/> <b>PSYC 351C – Cognitive Neuroscience (Spring, 2021)</b><br/>           Median Course Evaluations: 5.0/5.0 on all questions<br/><br/> <b>MEDS 487 – Advanced Topics in Cognitive Neuroscience (Spring, 2020)</b><br/>           Median Course Evaluations: None available</p> | 2020 – 2022    |
| <p><b>Honour Student Supervisor</b><br/> <i>Theoretical and Applied Neuroscience Laboratory, University of Victoria</i><br/> <b>Honours Students:</b> Mathew Hammerstrom (2019)<br/>           Marie Schulze (2018)<br/>           Talise Lindenbach (2017)</p>   | 2016 – 2022    |
| <p><b>Guest Lecturer</b><br/> <i>University of Victoria, Victoria</i><br/> <i>Psychometrics (PSYC 401), Design Project (ECE 399), Personal Health, Wellness and Potential (EPHE 142), Foundations of Physical Activity (EPHE 143), Motor Control (EPHE 380), Motor Learning (EPHE 245)</i></p>  | 2016 – 2022    |

**Private Statistics Tutor for Introduction and Advanced Statistics** 2018 – 2022  
*Chad C. Williams Consulting*

**Teaching Assistant** 2016 – 2022  
*University of Victoria, Victoria*  
*Advanced Statistics (PSYC 400A)*  
*Statistics (PSYC 300A & PSYC 300B)*  
*Psychometrics (PSYC 401)*  
*Research Methods (PSYC 201)*  
*Motor Learning (EPHE 245 & 380)*  
*Ergonomics (EPHE 456)*

**Electroencephalography Methods Instructor** 2015 – 2022  
*Theoretical and Applied Neuroscience Laboratory, University of Victoria*

**Neuroeducation Instructor at Elementary Schools** 2016 – 2017  
*Neuroeconomics Laboratory, University of Victoria*

**Life Skills Educator for Individuals with Disabilities** 2007 – 2015  
*Garth Homer Society*  
*Lifetime Networks*  
*Ridge Meadows Association for Community Living*  
*Various Private Practices*

**LEADERSHIP EXPERIENCE**

|  |                |
|--|----------------|
| <b>Brainstorm Challenge Workshop and Hackathon Lead Organizer</b><br><i>Brown University</i>   | 2023 – Present |
| <b>Society Member</b><br><i>Cognitive Science Society</i><br><i>Society for Psychophysiological Research</i><br><i>Cognitive Neuroscience Society</i><br><i>Canadian Psychological Association</i> | 2015 – Present |
| <b>Neuroscience Representative in the Graduate Student Society’s Graduate Representative Council</b><br><i>University of Victoria</i>  | 2017 – 2020    |
| <b>Council Member of Student Affairs Committee</b><br><i>University of Victoria</i>  | 2017 – 2020    |
| <b>EPHE Representative in the Neuroscience Graduate Student Association</b><br><i>University of Victoria</i>   | 2017 – 2020    |



**ORAL PRESENTATIONS (Total: 19, Presenting: 15)**

- Williams, C. C.** An Open-Source Toolbox to Artificially Increase your Sample Sizes and Reduce the Complexity of Your Data. *Cognition and Brain Sciences Seminar*, Victoria, BC. 2023
- Williams, C. C.** Prediction Errors Influence Cost-Benefit Computations During Reasoning. *Society for Psychophysiological Research Meeting*, Vancouver, BC. 2022
- Williams, C. C.** A Window into the Rational Mind: Partnering Neuroimaging with Classical Reasoning Problems. *Cognition and Brain Sciences Seminar*, Victoria, BC. 2021
- Williams, C. C.** Response Conflict and Uncertainty Demonstrate Unique Neural Patterns When Engaging Cognitive Control. *Cognition and Brain Sciences Seminar*, Victoria, BC. 2020
- Ciechanski P., Kirton A., Wilson B., **Williams C. C.**, Anderson S. J., Cheng A., Lopushinsky S., & Hecker K. G. Transcranial direct-current stimulation enhances surgical skill learning by altering sensorimotor electrical activity. *CITAC Annual General Meeting 2019*, Banff, AB. 2019
- Williams, C. C.** It Takes 21 Lines of Code to Control a Robot with Your Mind: Interdisciplinary Collaborations as the Key to Advancing Science. *Neuroscience Graduate Program Seminar Series*. Victoria, BC. 2019
- Williams, C. C.** The Causes and Consequences for Difficult Decisions in Clinicians. *Neuroscience Kickoff*, Victoria, BC. 2019
- Williams, C. C.** From the Laboratory to the Real-World: The Versatility in Mobile EEG. *Neuroscience Kickoff*, Victoria, BC. 2018
- Williams, C. C.**, Ferguson, T. D., Hammerstrom, M., Colino, F. L., Wright, B., & Krigolson, O. E. Putting the Learning Back into Neural Learning Systems. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Ferguson, T. D., **Williams, C. C.**, Colino, F. L., Wright, B., & Krigolson, O. E. More attention, greater control: Acute and chronic stress correlate with differences in alpha and theta oscillations. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018

- Middleton, J., **Williams, C. C.**, Wright, B., & Krigolson, O. E. Midfrontal Theta: Real World Applications in Medical Education. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Trska, R., **Williams, C. C.**, Hassall, C. D., Holroyd, C., & Krigolson, O. E. Motor Learning: The Effect of Expectancy on Reward Positivity and Readiness Potential. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Williams, C. C.** Thinking, Alpha and Theta: Neural Indicators of System 1 and System 2. *Cognition and Brain Sciences Seminar*, Victoria, BC. 2018
- Krigolson, O. E., **Williams, C. C.**, & Colino, F. L. Using Portable EEG to Assess Human Visual Attention. *Human-Computer Interaction International Conference 2017*, Vancouver, BC. 2017
- Williams, C. C.**, Lindenbach, T., Wright, B., & Krigolson, O. E. Rapid Language Acquisition in a Reinforcement Learning Paradigm. *Northwest Cognition and Memory 2017*, Burnaby, BC. 2017
- Williams, C. C.** Learning Pathology with Reinforcements: A Neural Investigation. *Cognition and Brain Sciences Seminars*, Victoria, BC. 2016
- Williams, C. C.**, Saffer, B. Y., McCulloch, R. B., & Krigolson, O. E. One is the loneliest number, but also the most valuable. *Cognitive Science Association for Interdisciplinary Learning*, Hood River, OR. 2016
- Williams, C. C.**, Paget, M., Coderre, S., Burak, K., Wright, B., & Krigolson, O. E. Indicators of System I and System II Decision Making when Diagnosing Clinical Cases. *Northwest Cognition and Memory 2016*, Vancouver, BC. 2016
- Williams, C. C.**, Paget, M., Coderre, S., Burak, K., Wright, B., & Krigolson, O. E. A Reinforcement Learning Approach to Medical Education. *University of Victoria's Making Waves*, Victoria, BC. 2016

**POSTER PRESENTATIONS (Total: 34, Presenting: 13)**

- Hewson, J.T.S, Strittmatter, Y., Marinescu, I., **Williams, C.C.**, & Musslick, S. Bayesian Machine Scientist for Model Discovery in Psychology. *Neural Information Processing Systems*. 2023
- Marinescu, I., Strittmatter, Y., **Williams, C.C.**, & Musslick, S. Expression Sampler as a Dynamic Benchmark for Symbolic Regression. *Neural Information Processing Systems*. 2023
- Williams, C.C.**, Weinhardt, D., Wirzberger, M., & Musslick, S. Enhancing EEG Classification Performance through Generative Adversarial Networks: Investigating the Impact of Sample Sizes and Classifier Selection. *SimTech*. 2023
- Williams, C.C.**, Weinhardt, D., Wirzberger, M., & Musslick, S. Augmenting EEG with Generative Adversarial Networks Enhances Brain Decoding Across Classifiers and Sample Sizes. *Cognitive Science*. 2023
- Musslick, S., Hewson, J.T.S., Andrew, B., Strittmatter, Y., **Williams, C.C.**, Dang, G.T., Dubova, M., & Holland, J.G. An Evaluation of Experimental Sampling Strategies for Autonomous Empirical Research in Cognitive Science. *Cognitive Science*. 2023
- Young, P., Ball, K., **Williams, C.C.**, & Nashmi, R. Investigating the Role of the Lateral Substantia Nigra Pars Compacta in Modulating Voluntary Movement. *Canadian Association for Neuroscience*. 2023
- Williams, C. C.**, Van Oorschot, F., & Krigolson, O. E. A Window into the Rational Mind: Frontal Theta Power Reflects Rationality in a Classic Reasoning Task. *Society for Psychophysiology Research Meeting, Virtual*. 2021
- Williams, C. C.**, Ferguson, T. D., Hassall, C. D., Abimbola, W., & Krigolson, O. E. The Reward Positivity, Delta, and Theta in a Sample of 500 Participants. *Society for Psychophysiology Research Meeting, Virtual*. 2020
- Williams, C. C.**, & Krigolson, O. E. The Power Curve of the Brain: Reward Prediction Errors Follow Learning Curves. *Cognitive Neuroscience Society Annual Meeting, San Francisco, CA*. 2019

- Middleton, J., **Williams, C. C.**, Wright, B., & Krigolson, O. E. Tonic Frontal Theta as an Assessment of Medical Decision Making in the Context of Medical Education. *Cognitive Neuroscience Society Annual Meeting*, San Francisco, CA. 2019
- Williams, C. C.**, Kappen, M., Hassall, C. D., Wright, B., & Krigolson, O. E. Cognitive Control and Attention: Neurocognitive Mechanisms of System 1 and System 2 Thinking. *Society for Psychophysiology Research Meeting*, Quebec City, QC. 2018
- Berman, T., **Williams, C. C.**, & Krigolson, O. E. Neural Correlates of Feedback Congruency: Top-Down Modulation of the Reward Positivity. *Canadian Neuroscience Annual Meeting*, Vancouver, BC. 2018
- Hammerstrom, M., **Williams, C. C.**, Ferguson, T. D., Colino, F. L., Wright, B., & Krigolson, O. E. Neural Learning Signals Reflect Task Performance in a Medical Context. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Walther, L., **Williams, C. C.**, & Krigolson, O. E. Early bird vs. night owl: Using EEG to measure your attention fluctuations throughout the day. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Gagliardi, G., **Williams, C. C.**, Abimbola, W., & Krigolson, O. E. Using a Pair of Glasses to See Your Brainwaves. *Northwest Cognition and Memory 2018*, Richmond, BC. 2018
- Walther, L., **Williams, C. C.**, & Krigolson, O. E. Morning person vs. night owl: Using EEG to measure your attention fluctuations throughout the day. *Jamie Cassels Undergraduate Research Awards Research Fair*, Victoria, BC. 2018
- Foster, C., **Williams, C. C.**, Krigolson, O. E., & Fyshe, A. Decoding Word Semantics and Learning in EEG Data via an Artificial Language. *Cognitive Computational Neuroscience*, New York, NY. 2017
- Williams, C.**, Schulze, M., Wright, B., & Krigolson, O. E. Neural correlates of system I and system II judgements when diagnosing diseases. *Society for Psychophysiological Research Meeting*, Vienna, Austria. 2017
- Norton, A., Colino, F., **Williams, C. C.**, Hassall, C., & Krigolson, O. E. Finding a MUSE: Validation of a low-cost, portable system, for EEG research. *Society for Psychophysiological Research Meeting*, Vienna, Austria. 2017

- Williams, C. C.**, Lindenbach, T., Colino, F., Wright, B., & Krigolson, O. E. 2017  
Learning a Novel Language with Reinforcements: A Preliminary Neural Investigation. *Organization for Human Brain Mapping Meeting*, Vancouver, BC.
- Hassall, C. D., **Williams, C. C.**, & Krigolson, O. E. P300 scaling: Value, average reward, and the framing effect. *Organization of Human Brain Mapping Conference*, Vancouver, BC.
- Norton, A., **Williams, C. C.**, Hassall, C. D., Colino, F. L., Krigolson, O. E. A 2017  
Validation of a Low-Cost Portable EEG System. *Organization for Human Brain Mapping Conference*, Vancouver, BC.
- Schulze, M., **Williams, C. C.**, Wright, B., Krigolson, O. E. System I and System II Decision Making in a Medical Context. *Northwest Cognition and Memory*, Vancouver, BC.
- Fitzpatrick, S., Fisher, S., **Williams, C. C.**, and Krigolson, O. E. 2017  
Neurophysiological Assessment of Concussion: Variability in Reward Positivity. *Jamie Cassels Undergraduate Research Awards Research Fair*, Victoria, BC.
- Williams, C. C.**, Paget, M., Coderre, S., Burak, K., Wright, B., and Krigolson, O. E. The Neural Basis of Clinical Decision Making. *77th Annual Convention for the Canadian Psychological Association (CPA)*, Victoria, BC.
- Hassall, C. D., **Williams, C. C.**, & Krigolson, O. E. Good, better, best: Electroencephalographic responses scale to reward value. *77th Annual Convention for the Canadian Psychological Association (CPA)*, Victoria, BC.
- McCulloch, R. B., **Williams, C. C.**, Saffer, B. Y., & Krigolson, O. E. I lost all of my marbles, but I only care about the white ones. *77th Annual Convention for the Canadian Psychological Association (CPA)*, Victoria, BC.
- Lindenbach, T. N., **Williams, C. C.**, and Krigolson, O. E. Rapid Learning of a Novel Language: An Electroencephalographic Investigation. *Northwest Cognition and Memory 2016*, Vancouver, BC.

- Pluta, A. J., **Williams, C. C.**, and Krigolson, O. E. The Effects of Background Alpha on Baseball Performance. Northwest Cognition and Memory, Vancouver, BC. 2016
- Williams, C. C.**, Paget, M., Coderre, S., Burak, K., Wright, B., and Krigolson, O. E. Neural Systems That Underlie Clinical Decision Making: An Electroencephalographic Investigation. *Cognitive Neuroscience Society Annual Meeting*, New York, NY. 2016
- Williams, C. C.**, Holroyd, C. B., & Krigolson, O. E. Reward Processing when Evaluating Goals: Insight into Hierarchical Reinforcement Learning. *Psychology Students of Vancouver Island Poster Session*, Victoria, BC. 2016
- Williams, C. C.**, Hassall, C. D., & Krigolson, O. E. Reward Expectancy and the Reward Positivity: A Non-Linear Trend. *Society for Psychophysiological Research 55th Annual Meeting*, Seattle, WA. 2015
- Williams, C. C.**, Hassall, C. D., & Krigolson, O. E. Reward Expectancy and the Reward Positivity: A Non-Linear Trend. *Northwest Cognition and Memory 2015*, Bellingham, OR. 2015

**PUBLICATIONS (Total: 24, First Author: 9, Senior Author: 1)**

†Co-Senior Author

\*Co-First Author

- Young, P. A., Waller, O., Ball, K., **Williams, C. C.**, & Nashmi, R. (2024). Phasic stimulation of dopaminergic neurons of the lateral substantia nigra increases open field exploratory behaviour and reduces habituation over time. *Neuroscience*. [\(PDF\)](#)
- Hewson, J.T.S, Strittmatter, Y., Marinescu, I., **Williams<sup>†</sup>, C.C.**, & Musslick<sup>†</sup>, S. (2023). Bayesian Machine Scientist for Model Discovery in Psychology. *Neural Information Processing Systems*. [\(PDF\)](#)
- Marinescu\*, I., Strittmatter\*, Y., **Williams, C.C.**, & Musslick, S. (2023). Expression Sampler as a Dynamic Benchmark for Symbolic Regression. *Neural Information Processing Systems*. [\(PDF\)](#)
- Williams\*, C.C.**, Weinhardt\*, D., Wirzberger, M., & Musslick, S. (2023). Augmenting EEG with Generative Adversarial Networks Enhances Brain Decoding Across Classifiers and Sample Sizes. *Cognitive Science*. [\(PDF\)](#)
- Musslick, S., Hewson, J.T.S., Andrew, B., Strittmatter, Y., **Williams, C.C.**, Dang, G.T., Dubova, M., & Holland, J.G. (2023). An Evaluation of Experimental Sampling Strategies for Autonomous Empirical Research in Cognitive Science. *Cognitive Science*. [\(PDF\)](#)
- Williams, C. C.**, Hassall, C. D., & Krigolson, O. E. (2023). Stabilizing Expectations when Shifting from Analytical to Intuitive Reasoning: The Role of Prediction Errors in Reasoning. *Cortex*, 161, 145-153. [\(PDF\)](#)
- Williams, C. C.**, Ferguson, T. D., Hassall, C. D., Wright, B., & Krigolson, O. E. (2021). Dissociated Neural Signals of Conflict and Surprise in Effortful Decision Making: Theta Activity Reflects Surprise while Alpha and Beta Activity Reflect Conflict. *Neuropsychologia*, 107793. [\(PDF\)](#)
- Williams, C. C.**, Ferguson, T. D., Hassall, C. D., Abimbola, W., & Krigolson, O. E. (2021). The ERP, Frequency, and Time-Frequency Correlates of Feedback Processing: Insights from a Large Sample Study. *Psychophysiology*, e13722, 1-26. [\(PDF\)](#)

- Redden, R. J., Gagliardi, G. A., **Williams, C. C.**, Hassall, C. D., & Krigolson, O. E. (2021). Champ versus Chump: Viewing an Opponent's Face Engages Attention but Not Reward Systems. *Games*, 12(3): 1-20. [\(PDF\)](#)
- Foster, C. **Williams, C. C.**, Krigolson, O. E., & Fyshe, A. (2021). Using EEG to Decode Semantics During an Artificial Language Learning Task. *Brain and Behavior* 2021, 1-11. <https://doi.org/10.1002/brb3.2234>. [\(PDF\)](#)
- Hammerstrom, M. R., Ferguson, T. D., **Williams, C. C.**, & Krigolson, O. E. (2021). What happens when right means wrong? The impact of conflict arising from competing feedback responses. *Brain Research*, 147393. [\(PDF\)](#)
- Williams, C. C.**, Hassall, C. D., Lindenbach, T., & Krigolson, O. E. (2020). Reward Prediction Errors Reflect an Underlying Learning Process that Parallels Behavioural Adaptations: A Trial-to-Trial Analysis. *Computational Brain and Behaviour*, 3, 189-199. [\(PDF\)](#)
- Colino, F. L., **Williams, C. C.**, Hassall, C. D., Binsted, G., and Krigolson, O. E. (2020). The Impact of Wellness on Neural Learning Systems. *Neuroscience Letters*, 714, 134537. [\(PDF\)](#)
- Williams, C. C.**, Kappen, M., Wright, B., & Krigolson, O. E. (2019). Thinking Theta and Alpha: Mechanisms of Intuitive and Analytical Reasoning. *NeuroImage*, 189: 574-580. [\(PDF\)](#)
- Ciechanski, P., Hecker, K., Wilson, B., **Williams, C. C.**, Anderson, S., Cheng, A., Lopushinsky, S., & Kirton, A. (2019). Electroencephalography correlates of transcranial direct-current stimulation enhanced surgical skill learning: a replication and extension study. *Brain Research*, 146445. [\(PDF\)](#)
- Ferguson, T., **Williams, C. C.**, Skelton, R. W., & Krigolson, O. E. (2019). Passively Learned Spatial Navigation Cues Evoke Reinforcement Learning Reward Signals. *Cognition*, 189: 65-75. [\(PDF\)](#)
- Williams, C. C.**, Hecker, K. G., Paget, M. K., Coderre, S. P., Burak, K. W., Wright, B., & Krigolson, O. E. (2018). The Application of Reward Learning in the Real-World: Changes in the Reward Positivity Amplitude Reflect Learning in a Medical Education Context. *International Journal for Psychophysiology*, 132: 236-242. [\(PDF\)](#)
- Pluta, A., **Williams, C. C.**, Binsted, G., Hecker, K. G., & Krigolson, O. E. (2018). Chasing the zone: Reduced beta power predicts baseball batting performance. *Neuroscience Letters*, 868: 150-154. [\(PDF\)](#)



- Howse, A., Hassall, C. D., **Williams, C. C.**, Hajcak, G., & Krigolson, O. E. (2018). Alcohol Hangover Impacts Learning and Reward Processing Within the Medial-Frontal Cortex. *Psychophysiology*, e13081. [\(PDF\)](#)
- Williams, C. C.**, Hassall, C. D., Trska, R., Holroyd, C. B., & Krigolson, O. E. (2017). When Theory and Biology Differ: The Relationship Between Reward Prediction Errors and Expectancy. *Biological Psychology*, 129: 265-272. [\(PDF\)](#)
- Krigolson, O. E., **Williams, C. C.**, & Colino, F. L. (2017). Using Portable EEG to Assess Human Visual Attention. In *International Conference on Augmented Cognition* (pp. 56-65). [\(PDF\)](#)
- Krigolson, O. E., **Williams, C. C.**, Norton, A., Hassall, C. D., & Colino, F. L. (2017). Choosing MUSE: Validation of a Low-Cost, Portable EEG System for ERP Research. *Frontiers in Neuroscience*, 11. [\(PDF\)](#)
- Hassall, C. D., & **Williams, C. C.** (2017). The Role of the Amygdala in Value-Based Learning. *Journal of Neuroscience (Journal Club, non-refereed)*, 37(28): 6601-6602. [\(PDF\)](#)
- Williams, C. C.**, Saffer, B. Y., McCulloch, R. B., & Krigolson, O. E. (2016). The Scarcity Heuristic Impacts Reward Processing Within Medial-Frontal Cortex. *NeuroReport*, 27(7). [\(PDF\)](#)

## **PUBLISHED DEVELOPMENT (Total: 3 open-source packages)**

### **EEG-GAN [\[Documentation\]](#)**

#### **Team Leader**

*Open-source Python package that generates synthetic EEG using AI (generative adversarial networks) to augment training data for classifiers.*

#### **Package in research:**

[Williams, Weinhardt et al., 2023, Yi, et al., 2024](#)

### **Equation-Scraper [\[Documentation\]](#)**

#### **Team Leader**

*Open-source Python package that scrapes Wikipedia for mathematical equations, parses them into components to build detailed priors, and provides tools for equation discovery and broader modeling applications.*

#### **Package in research:**

[Hewson et al., 2023, Marinescu et al., 2023](#)

### **AutoRA (Automated Research Assistant) [\[Documentation\]](#)**

#### **Developer**

*Open-source Python framework for automating multiple stages of the empirical research process, including model discovery, experimental design, data collection, and documentation for open science.*

#### **Package in research:**

[Hewson et al., 2023, Musslick et al., 2023](#)