

# Martin Ondrus

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Scientist developing statistical and machine learning methods for neuroimaging

## Education

|             |  |
|-------------|--|
| Sep. 2024 – | <b>Doctor of Medicine, (MD)</b><br><i>Faculty of Medicine and Dentistry, University of Alberta</i>   |
| Jan. 2021 – | <b>Doctor of Philosophy, (PhD)</b><br><i>Neuroscience and Mental Health Institute, University of Alberta</i><br>Computational Neuroscience<br>Advisor: Dr. Ivor Cribben, Committee: Dr. Russ Greiner, Dr. Bo Cao |
| 2018 – 2020 | <b>Bachelor's of Commerce, After Degree</b><br><i>Alberta School of Business, University of Alberta</i><br>Operations Management Major<br>GPA: 3.97  |
| 2014 – 2018 | <b>Bachelor's of Science</b><br><i>Faculty of Science, University of Alberta</i><br>Biological Science Major, Economics Minor<br>With Distinction, GPA: 3.73   |

## Affiliations

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|-------------|--|
| Apr. 2023 – | <b>Alberta Machine Intelligence Institute (Amii)</b><br><i>Early Career Accelerator Program</i>            |
| Apr. 2023 – | <b>Department of Biostatistics, New York University (NYU)</b><br><i>Visiting Research Scientist</i>        |
| Jan. 2021 – | <b>Neuroscience and Mental Health Institute (NMHI), University of Alberta</b><br><i>Research Scientist</i> |

## Work Experience

### North Edmonton Kia | Sep. 2021 – Mar. 2023

*Data Engineer, Sales and Service*

- Created a recurrently updating dashboard for one of Western Canada's largest automotive dealership groups to empower executives and marketing departments to data-informed decision making in their advertising strategy
- Designed and developed a SQL, Python, and Google Cloud based data transformation and visualization pipeline for over 60,000 semi-structured data points which unified key customer information across 4 different databases
- Presented final pipeline in an understandable manner to a non-technical audience, successfully onboarded clients, and reduced process lead time by more than 50% resulting in 10+ hours saved during marketing campaigns
- Optimized back-end computations and delivered final data product at less than 10% of original budget

### Volkswagen Canada | Jan. – Apr. 2020

*Data Scientist, National Dealers Advisory Council*

- Led a team of 3 student data scientists in modelling 2022-2025 Canadian sales of Volkswagen's most important vehicle release in the past decade, the fully electric VW ID.4

- Built an intuitive Excel-based simulation tool and visualization interface using solver and VBA for back-end computations which optimized allocations to maximize profitability and product turnover of the launch
- Presented deliverable and forecasts to Volkswagen Canada senior leadership and advised on regional allocation of over 6,000 new and highly valuable ID.4 vehicles

#### Teaching Assistant | Jan. – Dec. 2019

*MGTSC 312, Alberta School of Business*

- Led students in hands-on statistical analysis exercises using Excel, covering topics such as simple and multiple linear regression, hypothesis testing, dummy variable encoding, and feature selection
- Communicated complex concepts clearly and concisely to approximately 80 students in weekly lab lectures, ensuring effective understanding and engagement
- Facilitated student success by clarifying complex concepts, promptly addressing inquiries, and maintaining up-to-date knowledge of course material

## Publications

1. (Manuscript in Preparation) **M. Ondrus**, et al. Towards Modelling Complex, Interdependent Systems: A Latent Multilayer Graphical Model, 2024.
2. (Manuscript in Preparation) **M. Ondrus**, et al. SLICE: A direct method for the estimation of the sparse and latent variable components of a Gaussian graphical model, 2024.
3. (Manuscript in Preparation) **M. Ondrus**, et al. Early Mild Cognitive Impairment Classification using Dynamic, Multi-Scale Networks, 2023.
4. **M. Ondrus** and I. Cribben. fabisearch: A package for change point detection in and visualization of the network structure of multivariate high-dimensional time series in r. *Neurocomputing*, 578:127321, 2024
5. (Preprint) **M. Ondrus**, E. Olds, and I. Cribben. Factorized Binary Search: change point detection in the network structure of multivariate high-dimensional time series, 2021. arXiv:2103.06347 [stat.ME]
6. S. Hatami, C. W. White, X. Qi, M. Buchko, **M. Ondrus**, A. Kinnear, S. Himmat, C. Sergi, J. Nagendran, and D. H. Freed. Immunity and Stress Responses Are Induced during Ex Situ Heart Perfusion. *Circulation: Heart Failure*, 2020
7. S. Hatami, C. White, S. Shan, A. Haromy, X. Qi, **M. Ondrus**, A. Kinnear, S. Himmat, E. Michelakis, J. Nagendran, and D. Freed. Myocardial Functional Decline During Prolonged Ex Situ Heart Perfusion. *Annals of Thoracic Surgery*, 108(2), 2019
8. S. Hatami, C. W. White, **M. Ondrus**, X. Qi, M. Buchko, S. Himmat, L. Lin, K. Cameron, D. Nobes, H. J. Chung, J. Nagendran, and D. H. Freed. Normothermic ex situ heart perfusion in working mode: Assessment of cardiac function and metabolism. *Journal of Visualized Experiments*, 2019

## Abstracts, Oral Presentations, and Posters

1. **M. Ondrus**, I. Cribben, Y. Feng. Revisiting latent variable Gaussian graphical models with applications in Neuroimaging. *Joint Statistical Meeting*, August 2024
2. **M. Ondrus**, and I. Cribben. Change point detection of high-dimensional graphs for early MCI classification in fMRI. *Organization for Human Brain Mapping*, June 2024
3. **M. Ondrus**, and I. Cribben. Early Mild Cognitive Impairment Classification using Dynamic, Multi-Scale Networks. *Upper Bound, Alberta Machine Intelligence Institute*, May 2023
4. **M. Ondrus**, E. Olds, and I. Cribben. Factorized Binary Search: change point detection in the network structure of multivariate high-dimensional time series. *Neuroscience Research Day, University of Alberta*, Mar. 2022

5. **M. Ondrus**, E. Olds, and I. Cribben. FaBiSearch: A new statistical method for understanding brain dynamics through networks. *University of Alberta's Inaugural Digital Innovation Showcase*, May 2021
6. X. Qi, S. Hatami, C. White, S. Himmat, N. Aboelnazer, **M. Ondrus**, Y. Wu, A. Kinnear, J. Nagendran, and D. Freed. Inflammation and innate immune activation during ex vivo heart perfusion. *The Journal of Heart and Lung Transplantation*, 37(4):S220, Apr. 2018
7. **M. Ondrus**, S. Hatami, and D. Freed. Functional Decline of the Ex Vivo Perfused Heart is Not Due to Cell Death. *50th Annual Summer Students' Research Day, Faculty of Medicine and Dentistry, University of Alberta*, Nov. 2017
8. **M. Ondrus**, S. Hatami, and D. Freed. Seeking the optimal EVHP protocol: Does the work matter? *49th Annual Summer Students' Research Day, Faculty of Medicine and Dentistry, University of Alberta*, Oct. 2016

## Software

1. fabisearch: Change Point Detection in High-Dimensional Time Series Networks  
<https://cran.r-project.org/package=fabisearch>

## Scholarships and Awards

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|------------|--|
| 2024       | J Gordin Kaplan Graduate Student Scholarship (\$2,000)   |
| 2023       | Alberta Graduate Excellence Scholarship (\$12,000)   |
| 2022       | Michael Smith Foreign Study Supplements (\$6,000)  |
| 2021       | Alberta Innovates Graduate Student Scholarship (AI GSS) (\$1,000/month)  |
| 2021       | Natural Sciences and Engineering Research Council of Canada (NSERC) Canada Graduate Scholarships – Master's (CGS M) (\$17,500) |
| 2021       | Walter H Johns Graduate Fellowship (\$5,800)   |
| 2021       | Richard B. Stein Neuroscience Graduate Studentship (\$4,000)   |
| 2019       | Peter Loughheed Scholarship (\$10,000)   |
| 2017/18/19 | Jason Lang Scholarship (\$1,000)   |
| 2018       | University of Alberta Alumni Advantage Scholarship (\$2,500)   |
| 2016/17/18 | University of Alberta Academic Excellence Scholarship (\$2,000/\$1,500/\$2,000)  |
| 2017       | Alberta Transplant Institute (ATI) Undergraduate Summer Studentship Award (\$1,500/month)                                      |
| 2017       | Summer Students' Research Day Poster Presentation Award (\$300)  |
| 2016       | Motyl Endowment Cardiac Sciences Summer Studentship (\$1,300/month)  |
| 2014       | Alexander Rutherford Scholarship (\$2,500)   |
| 2014       | University of Alberta Entrance Scholarship (\$1,000)   |

## Technical Skills

**Programming:** Python (*pandas*, *numpy*, *matplotlib*, *seaborn*, *scikit-learn*, *pytorch*), R (*tidyverse*, *ggplot2*, *caret*, *e1071*, *randomForest*, *glmnet*, *parallel*), SQL, Matlab

**Quantitative:** Data wrangling & pre-processing, visualization, database querying, experimental design, statistical inference and hypothesis testing, algorithm design, optimization, machine learning and prediction

**Other:** Jupyter/Jupyter Notebook, Markdown, L<sup>A</sup>T<sub>E</sub>X, Git/Github, Distributed Computing, Unix Shell, SLURM