

## **EDUCATION AND TRAINING**

- 2019-2023 (expected) **PhD Candidate**, Psychology - Cognitive Neuroscience, University of Toronto  
**Thesis:** *Does incidental auditory learning facilitate memory-guided attention? A behavioural and electroencephalogram (EEG) study*  
Supervisors: Dr. Morris Moscovitch and Dr. Claude Alain
- Researching the neural correlates of memory-biased attention in hearing. Presented findings at 7 conferences; awarded The Ebbinghaus Award for Best Talk. Published two papers in peer-reviewed journals.
- 2021 **Research intern**, The Virtual Brain, Rotman Research Institute at Baycrest Centre  
Supervisor: Dr. Randy McIntosh
- 2018-2019 **MA Psychology**, University of Toronto
- 2015-2018 **BSc Honours Psychology** [GPA 3.96 - high first-class honours], McGill University  
**Thesis 1:** *The role of timbre in auditory stream segregation: Investigating the critical link between auditory perception and human expression*  
**Thesis 2:** *Timbre saliency and stratification in orchestral musical excerpts*  
Supervisor: Dr. Stephen McAdams
- Summer 2018 **Undergraduate Student Research Award (NSERC)**, McGill University
- Project 1: *Neural encoding of audio-motor sequences in music learning using machine learning multi-pattern voxel analysis*  
Supervisor: Dr. Robert Zatorre
  - Project 2: *Publication preparation (previous two theses)*  
Supervisor: Dr. Stephen McAdams
- Summer 2017 **Undergraduate Student Research Award (NSERC)**, McGill University  
Project: *Perceptual segregation in orchestral musical excerpts*  
Supervisor: Dr. Stephen McAdams

## **PUBLICATIONS**

### Peer-Reviewed

1. **Fischer, M.**, Moscovitch, M., & Alain, C. (2020). Incidental auditory learning and memory-guided attention: Examining the role of attention at the behavioural and neural level using EEG. *Neuropsychologia*, 147, 107586. <https://doi.org/10.1016/j.neuropsychologia.2020.107586>.
2. **Fischer, M.**, Moscovitch, M., & Alain, C. (2020). A systematic review and meta- analysis of memory-guided attention: Frontal and parietal activation suggests involvement of fronto-parietal networks. *WIREs Cognitive Science*, 12(1), e1546. <https://doi.org/10.1002/wcs.1546>.
3. **Fischer, M.**, Soden, K., Thoret, E., Montrey, M., & McAdams, S. (2021). Instrument timbre enhances perceptual segregation in orchestral music. *Music Perception*, 38(5), 473-498. <https://doi.org/10.1525/mp.2021.38.5.473>.

### Manuscripts in preparation & submitted for peer-review

1. **Fischer, M.**, Moscovitch, M., Keisuke, F., & Alain, C. (submitted). Ready for Action: Directed attention at encoding facilitates covert response preparation.
2. **Fischer, M.**, Moscovitch, M., & Alain, C. (in prep). Implicit memory for cued sound location is associated with alpha activity localized in parietal cortices.
3. **Fischer, M.**, Moscovitch, M., & Alain, C. (in prep). An ERP marker for memory-guided attention: Attention at learning modulates implicit memory for real-world soundscapes at retrieval.
4. **Fischer, M.**, Moscovitch, M., & Alain, C. (in prep). Lasting memory-guided attention: Memory representations that are robust to time and frequency changes.
5. **Fischer, M.**, Guastavino, C., & McAdams, S. (in prep). The role of timbre in orchestral stratification: Examining the complex intersection of auditory perception, attention, and art.

## **FUNDING**

|                 |   |
|-----------------|---|
| 2020            | Alexander Graham Bell Canada Graduate Scholarship - Doctoral Award (\$105,000, over 36 months), rank: 1, NSERC                        |
| 2020 (declined) | Complex Dynamics Training (CREATE) Grant (\$26,000), NSERC  |
| 2020            | Michael Smith Foreign Study Supplement (\$6,000), NSERC   |
| 2020            | Mitacs Globalink Research Award (\$4,000)   |
| 2019            | Complex Dynamics Training Grant (CREATE) (\$26,000), Natural Sciences and Engineering Research Council of Canada (NSERC)              |
| 2019 (declined) | Canada Graduate Scholarship (CGS-M) (\$17,500), NSERC   |
| Summer 2018     | Supplements of the NSERC Undergraduate Student Research Awards (\$2,000), Fonds de Recherche du Québec Nature et Technologies (FRQNT) |
| Summer 2018     | Undergraduate Student Research Award (\$5,600), NSERC   |
| Summer 2017     | Supplements of the NSERC Undergraduate Student Research Awards (\$2,000), FRQNT   |
| Summer 2017     | Undergraduate Student Research Award (\$5,600), NSERC   |

## **DISTINCTIONS AND AWARDS**

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|-----------|--|
| 2022      | Jack and Rita Catherall Fund (\$500), Rotman Research Institute at Baycrest                                  |
| 2019      | Finkler Graduate Student Fellowship (\$3,000), Rotman Research Institute at Baycrest                         |
| 2019      | The Ebbinghaus Award for Best Talk (\$75 and invited manuscript), Toronto Area Memory Group (TAMEG), Toronto |
| 2018      | Faculty of Arts and Science Admissions Award (\$5,000), University of Toronto                                |
| 2017-2018 | Celia Hendler Scholarship in Psychology (\$3,545), McGill University   |
| 2016-2018 | Dean's Honour List (top 10%), McGill University  |
| 2013-2015 | Dean's Honour Roll (90% average or above); Honour List (85-89% average), Vanier College                      |
| 2013      | Governor General's Academic Medal (highest grade point average); Valedictorian, F.A.C.E. School              |

## **PRESENTATIONS & POSTERS**

### Talks

1. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Mapping 'expectation for perception': Directed attention at encoding facilitates response preparation to high probability events. Invited talk presented at The Society for Psychophysiological Research 2021 – The Faces of the Future Flash Talks.
2. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Mapping 'expectation for perception': Directed attention at encoding facilitates response preparation to high probability events. Talk presented at The Canadian Society for Brain, Behaviour and Cognitive Science 2021 (CSBBCS).
3. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Memory-guided attention: A look at the neural correlates that underly "expectation for perception". Invited talk presented at the Neuroscience Research Group at York University.
4. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Optimizing attention and performance: The role of experience and memory. Talk presented at the Ebbinghaus Empire Data Blitz at the University of Toronto.
5. **Fischer, M.**, Moscovitch, M., & Alain, C. (2020). Directed attention at exposure modulates implicit memory for real-world soundscapes at retrieval. Talk presented at the Auditory Perception, Cognition, & Action Meeting (APCAM) 2020.
6. **Fischer, M.** (2019). Memory-guided attention in hearing. Talk presented at the Rotman Research Institute Trainee December 2019 SpeakEasy, Baycrest Hospital, Toronto, Canada.

7. **Fischer, M.**, Moscovitch, M., & Alain, C. (2019). Incidental Auditory Learning and Memory-guided Attention: A Behavioural and Electroencephalogram (EEG) Study. Talk presented at the Auditory Perception, Cognition, & Action Meeting 2019, Montreal, Canada.
8. **Fischer, M.**, Soden, K., Thoret, E., Montrey, M., & McAdams, S. (2019). The role of timbre in perceptual segregation in orchestral music. Talk presented at the Symposium on Interdisciplinary Studies in Orchestration and Timbre: The ACTOR Project at the Society of Music Perception and Cognition (SMPC), New York, USA.
9. **Fischer, M.**, Moscovitch, M., & Alain, C. (2019). Does everyday auditory experience facilitate memory-guided attention? Talk presented at Toronto Area Memory Group (TAMEG), Toronto, Canada.
10. **Fischer, M.**, Moscovitch, M., & Alain, C. (2019). Incidental auditory learning and memory-guided attention: A behavioural and EEG study. Talk presented at the Toronto Auditory Research Group (TARG), Toronto, Canada
11. **Fischer, M.**, Moscovitch, M., & Alain, C. (2019). Does everyday auditory experience facilitate memory-guided attention? Invited talk presented at the Graduate Speaker Series, University of Toronto, Canada.

#### Posters

1. **Fischer, M.**, Moscovitch, M., & Alain, C. (2022). Implicit memory for target location and parietal source-localized alpha-band power facilitate memory-guided attention in real-world sound-clips. Poster accepted at The Cognitive Neuroscience Society Meeting 2022 (CNS).
2. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Implicit memory for target location facilitates memory-guided attention in real-world sound-clips. Poster presented at The Society for Neuroscience 2021 (SfN).
3. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Memory-guided attention: Lateralized event-related potentials (ERPs) index location of lateralized targets embedded in learned soundscapes. Poster presented at The Psychonomic Society 2021.
4. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Mapping 'expectation for perception': Directed attention at encoding facilitates response preparation to high probability events. Poster presented at The Society for Psychophysiological Research 2021.
5. **Fischer, M.**, Moscovitch, M., & Alain, C. (2021). Directed attention at encoding facilitates response preparation to high probability events. Flash presentation and poster presented at the Nonlinear Dynamics of Brain and Behaviour Symposium.
6. **Fischer, M.**, Moscovitch, M., & Alain, C. (2020). Long-term memory-guided Attention and theta-band oscillations. Flash presentation and poster presented at the Nonlinear Dynamics of Brain and Behaviour Symposium.
7. **Fischer, M.**, Moscovitch, M., & Alain, C. (2020). Long-term memory-guided attention and alpha-band oscillations: Implicit access to spatial information. Poster presented at the Cognitive Neuroscience Society Annual Meeting.
8. **Fischer, M.**, Soden, K., & McAdams, S. (2017). Orchestral timbre in perceptual segregation. Invited poster (competitive) presented at the Faculty of Science Undergraduate Research Conference, McGill University, Canada.

#### TEACHING EXPERIENCE

##### **Advised and trained** | Rotman Research Institute at Baycrest Hospital

- Undergraduate mini-thesis student (4 months expected) | S. Mo (2022)
- Undergraduate volunteer student (7 months) | S. Mo (2021)
- Undergraduate thesis co-op student (8 months) | J.M. Soto (2021)
- Two undergraduate research students | K. Ramdeo (4 months) and S. Paracha (8 months) (2019)

##### **Tutorial leader** | University of Toronto (2019- present)

- PSY202H (Statistics II)
- PSY201F (Statistics I)

- PSY100S (Introduction to Psychology)

**Invited Guest Lecturer** | University of Toronto (April 2019)

- PSY493H1 Cognitive Neuroscience

**Teaching Assistantships** | University of Toronto (2018 - present)

- PSY202 (Statistics II), PSY201 (Statistics I); 6 sessions, PSY203 (Psychological Research), PSY230 (Personality Psychology), PSY220 (Introduction to Social Psychology), PSY100 (Introduction to Psychology)

## **TECHNICAL SKILLS**

### **Hardware and brain imaging experience**

- EEG experimentation and analyses, 76-channel system and audiometer
  - Neurobehavioral Systems Presentation and MATLAB
  - BESA Research, BESA Statistics, and Brainstorm
- fMRI analyses and visualization
  - Preprocessed fMRI data and applied machine learning multi-pattern voxel analysis techniques to audio-motor cello training data set
  - Python, Shell scripting, FSL, and AFNI

### **Statistical/modelling tools**

- Statistical Analysis Software (SAS) used to create multi-level models
- Meta-analysis performed, using GingerALE
- R used for statistical analysis and visualization (GPA 4.0)

### **Acoustic analyses and sound editing**

- Implemented MATLAB's Timbre Toolbox to extract audio attributes from musical signals. Digital audio workstation and MIDI sequencer software (Logic Pro X) used to edit and render sound stimuli.