

Shreshth Saxena

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Education

Department of Psychology, Neuroscience & Behaviour, McMaster University Department of Music, Max Planck Institute for Empirical Aesthetics

Hamilton, CA

Frankfurt, DE

PH.D. STUDENT, JOINT AFFILIATION

Mar. 2021 - Present

- Developing scalable and accessible eye-tracking methods for online and in-person experimentation.
- Designing and conducting individual and social eye-tracking experiments to study audiovisual attention.

Faculty of Mathematical Sciences, University of Delhi

New Delhi, IN

M.SC. IN COMPUTER SCIENCE (1ST DIVISION)

2017-19

- Thesis Project: Predicting global stock market indices using Recurrent Neural Network architectures. ([Github](#))
- Auxiliary Research Project: Lung cancer detection from CT scan data using Convolutional Neural Networks. ([Github](#))
- Senior Editor and Designer for department's annual technical magazine. ([Webpage](#))

Acharya Narendra Dev College, University of Delhi

New Delhi, IN

B.SC. HONORS IN COMPUTER SCIENCE (1ST DIVISION)

2014-17

- Undergraduate Innovation Project: Online e-Commerce marketing portal for small-scale entrepreneurs.
- Co-convener of the Music and Dance Society.
- Member and facilitator with the [Free and Open Source Software club](#)

Work Experience

Teaching/Research Assistant

Hamilton, CA

MCMASTER UNIVERSITY

Sept. 2022 - Present

- Courses: Perception Laboratory, Human Learning and Cognition, and Descriptive Statistics and Research Methods.
- Responsibilities: Guest lectures (e.g.), leading tutorials, preparing supplementary material for theory and programming, consulting and mentoring students through office hours and emails, and assisting the instructor with grading and invigilation.

Computer Vision Researcher

Boston, MA (Remote)

FITIVITY INC.

Oct. 2019 - Feb. 2021

- Computer Vision lead for innovative [Basketball](#) and Golf sports-training mobile applications aimed at creating a novel interactive training experience and providing real-time feedback based on player-ball dynamics.
- Implemented object detection and tracking, pose estimation, action recognition, edge computing, and depth estimation.
- Trained and deployed deep learning models on native applications for optimized runtime performance.
- Collaborated with domain experts to develop over 30 interactive game drills with informative and engaging scoring metrics.
- Worked with external collaborators to conduct market research and supervised Data Science interns.

Data Science Intern

New Delhi, IN

INSPEKTLABS (FORMERLY CVISION.AI)

Jul. 2019 - Sep. 2019

- Applied Computer Vision and Digital Image Processing to tackle real-world challenges in damaged automobile assessment.
- Developed automated quality check measures to optimize the data annotation outsourcing pipeline, resulting in a **5x** labeling capacity increase and enhanced quality of output.

Publications

Saxena, S., Fink, L.K., & Lange, E.B. (2023). Deep learning models for webcam eye tracking in online experiments. *Behavior Research Methods*. <https://doi.org/10.3758/s13428-023-02190-6>

Saxena, S., Lange, E. B., & Fink, L.K. (2022). Towards efficient calibration for webcam eye-tracking in online experiments. *In Proceedings ACM Symposium on Eye Tracking Research and Applications*. [doi:10.1145/3517031.3529645](https://doi.org/10.1145/3517031.3529645).

Talks & Posters

August 2023	“Cross-modal correspondence between contemporary art and music: from perception to aesthetic evaluation.” 17th International Conference on Music Perception & Cognition (ICMPC17), Tokyo, Japan. (Talk)
August 2023	“Synchronized multi-person eye-tracking in dynamic scenes.” Systems Vision Science Symposium, Max Planck Institute for Intelligent Systems, Tübingen, Germany. (Poster)
April 2023	“Scaling portable eye-tracking to multi-person real world settings using homography estimation.” Grad Research Day, Psychology, Neuroscience & Behavior, McMaster University, Hamilton, Ontario, Canada. (Blitz)
November 2022	“Deep learning for accurate, affordable and accessible eye-tracking.” Coggie Talk, Psychology, Neuroscience & Behavior, McMaster University, Hamilton, Ontario, Canada. (Talk)
August 2022	“An online experiment with deep learning models for tracking eye movements via webcam.” ECEM 2022: 21ST European Conference on Eye Movements, Leicester, UK. (Virtual poster)
June 2022	“Better accuracy and robustness for webcam eye tracking with deep-learning methods.” Computational Cognition Research Training Group, Osnabrück University, Osnabrück, Germany (Invited talk).
May 2022	“Open Science tools and personal experiences.” Max Planck Open Science Group, Berlin, Germany (Talk).
March 2022	“Webcam eye tracking for online experiments.” The Max Planck NYU Center for Language, Music and Emotion, New York, USA (Virtual talk).
September 2021	“Webcam based eye tracking for online experiments.” 4th Summer School on Internet-based Data Collection and Analysis, Konstanz, Germany (Selected talk).

Programming skills

Languages	Python, JavaScript, R, Swift, C, C++, SQL, HTML/CSS, LaTeX, Shell script
Tools Overview	Deep Learning (PyTorch, TensorFlow, Keras), Web Development & Hosting (JsPsych, Node.js, Selenium, JATOS), Data Science (Pandas, Numpy, Matplotlib, Seaborn, NLTK, Scikit-learn, Beautiful Soup), Multimedia Processing (OpenCV, Librosa, FFmpeg), Native iOS (Turicreate, CoreML), Deployment & Testing (Kafka, ONNX, PyTest)

Supervision

Synchronizing multi-person eye-tracking in dynamic real-world environments	<i>Sept. 2023 - Present</i>
Software Eng. Capstone Project Students: Neil Lobo, Zahid Mirza, Mehak Rafi Khan, Biranugan Pirabaharan, & Areez Visram	
Accelerating deep-learning-based webcam eye-tracking in the web browser	<i>Sept. 2023 - Present</i>
Software Eng. Capstone Project Students: Jay Mody, Eshaan Chaudhari, Caitlin Bridel, & Michelle Domagala-Tang	
Open-source development of online eye-tracking experiments	<i>April. 2022 - Present</i>
Psychology Independent Research Student: Jackson Shi	

Professional Development

- [Systems Vision Science Summer School & Symposium](#) (2023), Tübingen, Germany
- [CIFAR Deep Learning + Reinforcement Learning Summer School](#) (2023), Montreal, Canada
- [Telluride Neuromorphic Cognition Engineering Workshop](#) (2023), Telluride, USA
- “[Python Test Driven Development](#)” certificate course (2022), at Coding Academy, Munich, Germany.
- [4th Summer School on Internet-based Data Collection and Analysis](#) (2021), Konstanz, Germany.

Service

- Graduate student committee chair - [McMaster Institute for Music & the Mind \(MIMM\)](#).
- Tech manager - [Neuromusic Conference](#) 2022, 2023, & 2024, Hamilton, Ontario, Canada.
- Virtualisation chair - [Second Conference on Music & Eye-Tracking \(MusicET\)](#) 2022, Frankfurt, Germany.
- Virtualisation co-chair - [ACM Symposium on Eye Tracking Research & Applications](#) 2022, Seattle, Washington, USA.
- Invited reviewer - [16th International Conference of Students of Systematic Musicology](#), Sheffield, United Kingdom.
- Certified guitar trainer with [Furtados School of Music](#) and Computer Science + Maths mentor with [Evelyn Learning](#).