

SEJAL BHALLA

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RESEARCH INTERESTS

Ubiquitous Computing, Mobile Health, Input and Interactions, Applied Sensing, Acoustic and Speech Analysis

EDUCATION

University of Toronto | Toronto, Canada 2021 - Present
Ph.D., Computer Science | Advisors: Alex Mariakakis, Eyal de Lara

Indraprastha Institute of Information Technology Delhi | Delhi, India 2017 - 2021
BTech, Computer Science & Engineering

EXPERIENCE

Sunnybrook Health Sciences Centre Sep 2024 – Present
Research Trainee | Toronto, Canada
Analysing large-scale data from a study conducted by the Department of Respiriology to evaluate the performance of a new tool for lung function assessment, contributing to its validation for clinical use across diverse populations.

Google May 2024 – Jul 2024
Student Researcher | Remote / Seattle, USA
Built a microgesture recognition system using smartwatch sensor data (IMU and audio).

Google Aug 2023 – Apr 2024
Student Researcher | Remote / Seattle, USA
Explored interaction techniques for AR.

SmaSH Lab, HCII, Carnegie Mellon University Sep 2020 – Aug 2021
Visiting Student Researcher | Remote / Pittsburgh, USA
Built a privacy-preserving activity recognition system by leveraging domain adaptation techniques to train privacy-sensitive sensors using minimal training data.

IBM Research May 2020 – Jul 2020
Research Intern | Remote / Bengaluru, India
Built an AI solution based on the principles of Natural Language Processing to automate the process of business lead generation.

Weave Lab & HMI Lab, IIIT Delhi Dec 2018 – May 2021
Student Researcher | Delhi, India
Designed and developed intelligent systems to enrich human-computer interaction, specifically through (1) unobtrusive detection of facial expressions using earables, and (2) classification of human attention types using EEG data and deep learning.

PEER-REVIEWED PUBLICATIONS

10. Kenneth Christofferson, **Sejal Bhalla**, Michelle Lin, Joseph Cafazzo, Alex Mariakakis. In-ear Acoustic Pulse Wave Analysis for Blood Pressure Estimation. *Under Review*.

9. **Sejal Bhalla**, Cady Xu, Alex Mariakakis, Karan Ahuja, Ishan Chatterjee. Enabling Microgesture Recognition on COTS Smartwatches. *Under Review*.
8. **Sejal Bhalla**, Deshang Kong, Salaar Liaqat, Daniyal Liaqat, Robert Wu, Andrea Gershon, Eyal de Lara, Alex Mariakakis. Speech and Physiology in COPD: Association between Wearable Device Data and Daily Lung Condition. *Under Review*.
7. **Sejal Bhalla**, Tien Han, Andrea Gershon, Robert Wu, Eyal de Lara, Alex Mariakakis. Phoneme-Aware Acoustic Analysis of Natural Speech for Lung Function Assessment. 2025 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP '25). *To Appear*.
- 🏆 6. Kenneth Christofferson, **Sejal Bhalla**, Joseph Cafazzo, Alex Mariakakis. On the Production and Measurement of Cardiac Sounds in the Ear Canal. In Companion of the 2024 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '24). <https://doi.org/10.1145/3675094.3680526>. **Best Paper Award**.
5. **Sejal Bhalla**, Salaar Liaqat, Robert Wu, Andrea Gershon, Eyal de Lara, Alex Mariakakis. PulmoListener: Continuous Acoustic Monitoring of Chronic Obstructive Pulmonary Disease in The Wild. In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '23). <https://doi.org/10.1145/3610889>.
4. **Sejal Bhalla**, Dhruv Verma, S.V. Sai Santosh, Saumya Yadav, Aman Parnami, Jainendra Shukla. AttentioNet: Monitoring Student Attention Type in Learning with EEG-Based Measurement System. In Proceedings of the 11th International Conference on Affective Computing and Intelligent Interaction (ACII '23). <https://doi.org/10.1109/ACII59096.2023.10388212>.
3. **Sejal Bhalla**, Mayank Goel, Rushil Khurana. 2021. IMU2Doppler: Cross-Modal Domain Adaptation for Doppler-based Activity Recognition Using IMU Data. In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '21). <https://doi.org/10.1145/3494994>.
2. **Sejal Bhalla**, Dhruv Verma, Dhruv Sahnan, Jainendra Shukla, Aman Parnami. 2021. ExpressEar: Sensing Fine-Grained Facial Expressions with Earables. In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '21). <https://doi.org/10.1145/3478085>.
1. **Sejal Bhalla**, Dikshant Sagar, Jatin Garg, Prarthana Kansal, Rajiv Ratn Shah, Yi Yu. PAI-BPR: Personalised Outfit Recommendation Scheme with Attribute-wise Interpretability. In IEEE International Conference on Multimedia Big Data (Big MM '20). <https://doi.org/10.1109/BigMM50055.2020.00039>.

INVITED TALKS

Google Product & Engineering, Enabling Microgesture Recognition on COTS Smartwatches	2024
Google AR, Enabling Microgesture Recognition on COTS Smartwatches	2024
AGE-WELL & APPTA Policy Rounds, Remote Patient Monitoring in the Wild	2024

AWARDS AND HONORS

Wolfond Scholarship in Wireless Information Technology (\$5,000 CAD)	2025
University of Toronto Departmental Fellowship (\$1,355 CAD)	2023
Alberta Machine Intelligence Institute AI Week Talent Bursary (\$1,500 CAD)	2022
University of Toronto Program-Level Fellowship (\$1,000 CAD)	2023, 2022, 2021
GHCI Student Scholarship	2020
IBM Blue Scholar	2020

ACADEMIC SERVICE

Reviewer, ACM CHI	2024
Reviewer, ACM IMMUT/ISWC	2024, 2023, 2022
Reviewer, IEEE BSN	2024
Reviewer, ACM ISS	2022
Student Volunteer, ACM UbiComp	2022, 2021
Student Volunteer, ACM IUI	2022

TEACHING EXPERIENCE

Teaching Assistant, University of Toronto Data Science II	2025
Teaching Assistant, University of Toronto Topics in Ubiquitous Computing	2024, 2023
Teaching Assistant, University of Toronto Design of Interactive Computational Media	2023
Teaching Assistant, University of Toronto Introduction to Computer Programming	2022, 2021

VOLUNTEERING AND OUTREACH

Mentor, ML4H Mentorship Program	2024
Mentor, WISE Industry Mentorship Program	2024 - Present
Mentor, Toronto Graduate Application Assistance Program	2023
Mentor, Girls SySTEM Mentorship Program	2023
Speaker and Panellist, Pursue STEM Workshop	2022

STUDENTS ADVISED

Samraj Aneja , Undergraduate, Computer Science University of Toronto	2025 - Present
Maryam Taj , Undergraduate, Computer Science University of Toronto	2024 - Present
Zhizheng Zhang , Ph.D., Computer Science University of Oxford	2024 - Present
Benson Chou , Undergraduate, Computer Science University of Toronto	2024 - Present
Tien Han , Undergraduate, Computer Science University of Toronto	2023 - 2024
Deshang Kong , Undergraduate, Computer Science (Currently Masters at HKUST University of Toronto)	2023 - 2024

REFERENCES

Alex Mariakakis, Assistant Professor, University of Toronto
Eyal de Lara, Professor, University of Toronto
Ishan Chatterjee, Google
Mayank Goel, Assistant Professor, Carnegie Mellon University
Aman Parnami, Assistant Professor, IIIT Delhi
Jainendra Shukla, Assistant Professor, IIIT Delhi