Sharon Ferguson

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ACADEMIC APPOINTMENTS

2025– University of Waterloo
Assistant Professor, Department of Management Science and Engineering

EDUCATION

PhD. **Mechanical and Industrial Engineering**, University of Toronto, Toronto, ON
2020-2024.
Advisor: Dr. Alison Olechowski
Relevant Courses: *CSC2515*: Introduction to Machine Learning, *MIE1517*: Deep Learning, *ETH1000*: Ethics of AI in Context, *CSC2552*: Topics in Computational Social Science, *TEP1203:* Teaching Engineering in Higher Education

BASc. **Industrial Engineering**, *Honours, 3.84/4.0*, University of Toronto, Toronto, ON, 2020
Minor in Engineering Business
Relevant Courses in Machine Learning and Human Factors
Undergraduate Thesis: *Experiential User-Experience Sessions for Healthy Aging Technology.*
Supervised by Dr. Mark Chignell

PUBLICATIONS

Journal Article Manuscripts

2024 **Ferguson, S.***, Aoyagui, PA., Rizvi, R., Kim, Y-H., Kuzminykh, A. The Explanation That Hits Home: The Characteristics of Verbal Explanations That Affect Human Perception in Subjective Decision-Making. *Proceedings of the ACM on Human-Computer Interaction (CSCW)*. **This work was presented at the Computer Supported Cooperative Work and Social Computing 2024 Conference.** View here.

2023 **Ferguson, S.***, Olechowski, A. Are We Equal Online?: An Investigation of Gendered Language Patterns and Message Engagement on Enterprise Communication Platforms *Proceedings of the ACM on Human-Computer Interaction, Volume 7, Issue CSCW2*, 2023. **This work was presented at the Computer Supported Cooperative Work and Social Computing 2023 Conference.** View here.

2023 **Ferguson, S.**, van Velzen, E., Olechowski, A. Team and Communication Impacts of Remote Work for Complex Aerospace System Development. *Systems Engineering*, 2023. View here.

2022 **Ferguson, S. A.**, Cheng, K., Adolphe, L., Van de Zande, G., Wallace, D., and Olechowski, A. Communication patterns in engineering enterprise social networks: an exploratory analysis using short text topic modelling. *Design Science 8* (2022), e18 . View here.

* represents proceedings accompanied by an oral presentation at the conference

2022 **Ferguson, S.**, Lai, K., Chen, J., Faidi, S., Leonardo, K., and Olechowski, A. "Why couldn't we do this more often?": exploring the feasibility of virtual and distributed work in product design engineering. *Research in Engineering Design* (2022) . View here.

Revision **Ferguson, S.**, Ozceylan, M., Chiu, K., Alexander, R., Kuzminykh, A. Open for interpretation: Comparing Human and AI explanations of sexism assessment. *Under the second round of revisions at ACM Transactions on Interactive Intelligent Systems*.

Peer-Reviewed Conference Proceedings

2024 Naghshbandi, M., **Ferguson, S.**, Olechowski, A. Social Capital and Persistence in Computer Science of Google's Computer Science Summer Institute (CSSI) Students *American Society of Engineering Education Annual Conference*, 2024.

2024 **Ferguson, S.***, Massimi, M. Circle Back Next Week: The Effect of Meeting-Free Weeks on Remote Workers' Unstructured Time and Asynchronous Collaboration. *ACM Conference on Human Factors in Computing Systems (CHI)*, 2024. View here. **This conference is viewed as equivalent to a journal publication in my field.**

2024 **Ferguson, S.,** Van de Zande, G., Olechowski, A. No Risk, No Reward: Towards An Automated Measure of Psychological Safety from Online Communication. *ACM Conference on Human Factors in Computing Systems (CHI), Late Breaking Work,* 2024. View here.

2023 Mao, K.,**Ferguson, S.***, Magarian, J., Olechowski, A. 'Just a little bit on the outside for the whole time': Social belonging confidence and the persistence of Machine Learning and Artificial Intelligence students *American Society of Engineering Education Annual Conference*, 2023. View here.

2023 Flus, M.*, **Ferguson, S.**, Olechowski, A. Let's take this offline: a thematic analysis of virtual conflict in hybrid collaborative design teams *International Conference on Engineering Design*, 2023. **Awarded Reviewers' Favourite award.** View here.

2023 **Ferguson, S.**, Aoyagui, PA., Kuzminykh, A. Something Borrowed: Exploring the Influence of AI-Generated Explanation Text on the Composition of Human Explanations *ACM Conference on Human Factors in Computing Systems (CHI)*, 2023. View here.

2023 **Ferguson, S.**, Olechowski, A. Measuring Gendered Communication Patterns on Enterprise Communication Platforms. *ACM Conference on Supporting Group Work*, Poster, 2023. View here.

2022 **Ferguson, S.***, Mao, K., Magarian, J., Olechowski, A. Advancing a Model of Students' Intentional Persistence in Machine Learning and Artificial Intelligence. *American Society of Engineering Education Annual Conference*, 2022. View here.

Submitted Aoyagui, PA., Stemmler, K., **Ferguson, S.,** Kim, Y-H., Kuzminykh, A. "They Didn't Mean To": Leveraging The Diversity of Perspectives In LLM-Enhanced Subjective Decision-Making. *Submitted to the ACM Conference on Human Factors in Computing Systems (CHI)*, 2024.

Submitted **Ferguson, S.,** Wong, A., Van de Zande, G., Olechowski, A. SharUn: A Privacy-Preserving Data Collection Mechanism for Measuring Shared Understanding from Enterprise Communication Platform Messages *Submitted to the ACM Conference on Human Factors in Computing Systems (CHI)*, 2024.

Submitted Naghshbandi, M., **Ferguson, S.,** Olechowski, A. "Something in the air… something about being in-person that makes it easier": Investigating Hybrid Design Teams' Perceptions of Psychological Safety and How It Differs on Slack *Submitted to the ACM Conference on Computer Supported Coooperative Work and Social Computing (CSCW)*, 2024.

* represents proceedings accompanied by an oral presentation at the conference

Works in Progress

Progress **Ferguson, S.**, Hu, Y., Chignell, M. Choosing Effective Videos for Exergaming Applications. *In preparation for International Journal of Human-Computer Studies*, 2023.

Progress **Ferguson, S.**, Flus, M., Bussmann, J., Van de Zande, G., Wallace, D., Olechowski, A. Conflict Influencers and Brokers: How Centrality in Design Team Conflict Networks Influences Innovative Outcomes *In preparation for the ACM on Human-Computer Interaction (CSCW)*.

Progress **Ferguson, S.**, Aoyagui, P.A., Alexander, R., Kuzminykh, A. Can You Explain?: A Four-Layer Framework of Human and AI Decision Explanation Strategies *In preparation for the ACM CHI Conference on Human Factors in Computing Systems*.

TALKS

Invited Talks

2024 Massachusetts Institute of Technology 2.009 Product Design Processes: Slack Tutorial. "Using Slack in Design Teams: Evidence from Research" presenter, September 2024.

2024 Institute for Leadership Education in Engineering (ILead) Community of Practice Webinar. "Partners in Progress: Effectively Collaborating with AI in the Workplace" presenter, October 2024.

2024 Waterloo Management Science and Engineering Department Seminar "The Future of Engineering Work: Analyzing Social Dynamics in Novel Workplace Configurations", March, 2024.

2022 Institute for Leadership Education in Engineering (ILead) Community of Practice Conference on the Future of Work. "Engineering Communication in Hybrid Teams" presenter, November 2022.

2022 Massachusetts Institute of Technology 2.009 Product Design Processes: Slack Tutorial. "Using Slack in Design Teams: Evidence from Three Research Projects" presenter, September 2022.

2022 University of Toronto Centre For Ethics: Ethics of AI Emerging Scholars Series: "Advancing a Model of Students' Intentional Persistence in Machine Learning and Artificial Intelligence" presenter, March 2022.

Conference Presentations Without Proceedings

2024 **Ferguson, S.** Aoyagui, PA., Kuzminykh, A. Just Like Me: The Role of Opinions and Personal Experiences in The Perception of Explanations in Subjective Decision-Making. TREW Workshop at CHI 2024, poster paper, 2024. View here.

2024 Aoyagui, PA., **Ferguson, S.**, Kuzminykh, A. Exploring Subjectivity for more Human-Centric Assessment of Social Biases in Large Language Models. HEAL Workshop at CHI 2024, poster paper, 2024. View here.

2024 **Ferguson, S.**, Olechowski, A., AI-Augmented Collaboration Feedback: Interaction Challenges and Considerations., Getting Back Together: HCI and Human Factors Joining Forces to Meet the AI Interaction Challenge Workshop at CHI 2024, presentation, 2024.

2023 **S. Ferguson,** A. Olechowski "Enterprise Communication: A Naturalistic, Non-Intrusive Method for Studying Design Phenomena" ASME International Design Engineering Technical Conferences (IDETC), Lightning Talk, 2023.

2022 J. Chen, **S. Ferguson,** A. Olechowski "Understanding Design Team Conflict on Virtual Communication Platforms" Canadian Design Workshop 2, 2022.

2022 **S. Ferguson,** A. Olechowski "Measuring Gendered Patterns in a Capstone Design Course's Online Communication" Canadian Design Workshop 2, 2022.

2022 **S. Ferguson,** M. Flus, A. Olechowski "A Machine Learning Tool to Classify Design Phases" Canadian Design Workshop 2, 2022.

2022 **S. Ferguson**, P. Aoyagui, A. Kuzminykh "A Thematic Comparison of Human and AI Explanations of Sexism Assessment" NeurIPS Workshop on Human Centered AI, 2022.

2021 **S. Ferguson,** A. Olechowski, ""Why couldn't we do this more often?": exploring the feasibility of virtual and distributed work in product design engineering" ASME International Design Engineering Technical Conferences (IDETC), Lightning Talk, 2021.

2021 **S. Ferguson,** A. Olechowski, "Exploring Short Text Topic Models in the Context of Product Design Enterprise Social Network Messaging" University of Toronto Engineering Research Conference, Oral Presentation, 2021. **Awarded First Place in Data Analytics, AI, and Robotics section**

2020 **S. Ferguson**, A. Olechowski, "Towards the Future of Work from Home via Interviews with Engineering Designers" McMaster Engineering Technology Research and Innovation Conference, 2020.

2020 **S. Ferguson**, S. Dusciuc, M. Vella, Y. Sivaparamanantha, M-C. Tsai, T. Chan, "Jump Detection and Metric Extraction using Machine Learning: A Case Study in Snowboarding" SPort INnovation (SPIN) Summit, 2020.

AFFILIATIONS

Affiliate **Schwartz Reisman Institute for Technology and Society - Faculty Affiliate** University of Toronto, 2024-2025

Affiliate **Schwartz Reisman Institute for Technology and Society - Graduate Affiliate** University of Toronto, 2023-2024

Fellow **Schwartz Reisman Institute for Technology and Society** University of Toronto, 2022-2023
Project: *Understanding and Mitigating Inequality in Enterprise Social Networks*
Responsibilities: Planned the Graduate Workshop at the Absolutely Interdisciplinary Conference 2023.

RA **COoKIE Research Group** Led by Anastasia Kuzminykh, Faculty of Information, University of Toronto, 2021-2023
Project: *Examining Explanation Strategies of Humans and AI*

Fellow **Ethics of AI Graduate Research Fellowship** University of Toronto, 2021-2022
Graduate Research Fellowship at the University of Toronto, Centre for Ethics
Project: *Examining Diversity and Intentional Persistence in Machine Learning and Artificial Intelligence*
Responsibilities: Moderated presentations for the Ethics of AI in Context speaker series

Fellow **Toronto Human-AI Interaction Research School**, University of Toronto, 2021
Research school held by the University of Toronto Faculty of Information.
Project: *Detecting Sexism in Text: Humans vs. Machines*
Advisors: Dr. Anastasia Kuzminykh and Dr. Rohan Alexander

GRANTS AND AWARDS

Grants and Scholarships

2024 University of Toronto School of Graduate Studies Conference Grant ($780)

2024 Co-recipient, Microsoft AI & The New Future of Work Grant. *A Novel AI-Powered System for Building Shared Understanding in Teams* ($68,500)

2023 NSERC Canada Graduate Scholarship - Michael Smith Foreign Study Supplement (CGS-MSFSS) ($6000)

2022 University of Toronto Mechanical and Industrial Engineering Conference Grant ($650)

2022 NSERC Canada Graduate Scholarship - Doctoral ($105,000)

2022 Schwartz Reisman Institute for Technology and Society Graduate Fellowship ($7,500)

2021 Queen Elizabeth II Graduate Scholarship in Science and Technology ($15,000)

2021 Ontario Graduate Scholarship ($15,000) *Declined*

2021 Ethics of AI Graduate Research Fellowship ($2,500)

2021 Toronto Human-AI Interaction Research School Fellow ($500)

2020 University of Toronto Global COVID-19 Student Engagement Grant ($3,000)

2020 NSERC Undergraduate Research Award ($4,800)

2015 University of Toronto Admissions Scholarship ($3,000)

2015 University of Toronto Scholar ($6,000)

Awards and Honors

2023 Mechanical and Industrial Engineering Teaching Assistant Award for the 2022-2023 academic year ($500)

2021 Selected as University of Toronto nominee for Vanier Canada Graduate Scholarship

2021 Best Oral Presentation in Data Analytics, AI, and Robotics Stream at the University of Toronto Engineering Research Conference ($500)

2020 2^{nd} Place Capstone Award - Industrial Engineering class of 2020 ($600)

2018 1^{st} Place - Healthy Aging Technology Hackathon

TEACHING AND MENTORING

Teaching - University of Toronto

2024 **Course Instructor** Mechanical and Industrial Engineering, University of Toronto
Was hired as the sole instructor of MIE459: Organization Design, a fourth-year core course for Industrial Engineering students.

2023 **Workshop Instructor** Ready Lab, Mechanical and Industrial Engineering, University of Toronto
Developed and delivered a workshop (twice) on reading academic papers, note taking, and paper organization for undergraduate summer researchers and thesis students

2023 **Workshop Instructor** COoKIE Lab, Faculty of Information, University of Toronto
Developed and delivered a workshop on using linguistic analysis tools in research

2023 **Guest Lecturer** MIE459: Organization Design
Lecture on the Future of Work, Enterprise Communication, and ChatGPT

2022-23 **Head Teaching Assistant** MIE459: Organization Design
Designed assignments and rubrics, led tutorials, and assisted in the creation of exam materials.
Won Teaching Assistant Award in 2022-2023.

2021 **Guest Lecturer** TEP1502: Leadership in Product Design
Lecture on Project Planning

2021 **Lab Instructor** MIE262: Operations Research 1
Taught synchronous lab sessions using Excel, AMPL, Gurobi and Java to solve linear programs. Advised students throughout the completion of the course project.
Nominated for Teaching Assistant Award.

2020-23 **Teaching Assistant** MIE242: Psychology for Engineers
Prepared lectures to transition course to an online format. Created and led a workshop for 130 students about effectively reading academic papers, in collaboration with the Engineering Communication Program. Updated the course project and delivered a lecture explaining the project.
Won Teaching Assistant Award in 2022-2023.

Mentoring - University of Toronto

2024 **Avelyn Wong**, fourth-year Mechanical Engineering student at the University of Toronto. Advising her summer research project developing a Slack bot that reports and records shared understanding in teams.

2023-24 **Marjan Naghshbandi**, fourth-year Industrial Engineering student at the University of Toronto. Advising her undergraduate thesis on social belonging and technical confidence in computer science students.

2023 **Rimsha Rizvi**, Master of Information thesis student. Advising her involvement in a project investigating the perception of human- and AI-generated explanations of subtle sexism.

2022-23 **Joshua Bussmann**, Mechanical Previous Engineering third year student. Current Professional Experience Student. Advising his participation in multiple projects, including a survey study of student intentional persistence and an analysis of conflict on enterprise communication platforms.

2022 **Jiacheng (Jason) Chen**, Previous Engineering Science undergraduate summer student. Current Professional Experience Year student. Advising on a project using text processing and qualitative analysis to detect conflict in Slack messages.

2021-24 **Paula Akemi Aoyagui**, Previous Master of Information student. Now Director of Research at Versett and Research Assistant. Leading a project where she was a research assistant using qualitative analysis to develop a framework for human and AI explanation strategies.

202-22 **Katherine Mao**, Previous Engineering Science thesis student. Now Software Development Engineer at Amazon Robotics. Co-advised her undergraduate thesis investigating social belonging confidence and identity of Machine Learning/Artificial Intelligence students.

2021 **Prachi Sukhnani**, Previous Engineering Science undergraduate work study student. Now Junior Engineer at RocketLab. Led a project that she assisted in, advancing a survey to study the persistence of Machine Learning/Artificial Intelligence students.

PROFESSIONAL EXPERIENCE

2023 **Future of Work Doctoral Research Intern** *Slack*.
Doctoral research intern on the Future of Work research team at Slack from June-August 2023. Using narrative interviews to investigate how remote workers negotiate interpersonal attention, and when and how meetings are effectively used in attention negotiation.

2018/19 **Power System Data Analyst** *Independent Electricity System Operator*.

Published the 20-year electricity demand forecast to 50+ stakeholder groups, informing 3000 MW of investments. Implemented an automated pipeline to gather generator data from 10+ sources into a relational database used by 8 teams. Designed data-visualization queries in Tableau to automatically update charts used in quarterly publications.

SERVICE

Organizing Committee

2024 Canadian Design Workshop. Waterloo, ON. December 2024.

Workshop Committee

2024 "Transparency and Collaboration: A Workshop on Open Access Design Team Data", Design Computing and Cognition Conference. Montreal, QC. July 2024.

Outreach Activities

2024 **Panel Moderator** *Graduate Society of Women Engineers, University of Toronto*. Moderated a panel on navigating entrepreneurship challenges for International Women's Day.

2023 **Panellist** *Women in Science and Engineering, University of Toronto*. Participated in a panel for the Go Eng Girl event, an outreach event for girls in grades 7-10 interested in engineering.

2023/24 **Advising Past-President** *Graduate Society of Women Engineers, University of Toronto*. Remained part of the team for the year after my presidency as the advising past president.

2023 **Grad Fair Volunteer** *University of Toronto Faculty of Applied Science and Engineering*. Volunteered at the Graduate Fair to represent Mechanical and Industrial Engineering and talk to prospective graduate students about my experience.

2022/23 **President** *Graduate Society of Women Engineers, University of Toronto*. Leading a team of 8 executive members in securing funding for the club, organizing social and professional development events, and coordinating with other University of Toronto groups and the global Society of Women Engineers organization. Doubled the club's funding from the previous year, and organized a successful science communication conference with over 60 attendees.

2022 **Presenter** *University of Toronto Centre for Analytics and Artificial Intelligence*. Presented at the engineering student orientation and networking event. Discussed my experience working on analytics projects at the University of Toronto and explained the fellowship opportunities available for students.

2021/22 **Vice President Finance** *Graduate Society of Women Engineers, University of Toronto*. Responsible for managing and budgeting club funds, applying for external funding opportunities, and organizing events. Tripled club funding from previous year, acquired funding from the global Society of Women Engineers organization, and led the switch to a more efficient banking platform.

2021 **Workshop Co-Lead** *Camp Ooch Teen Conference Skill Building Workshops*. Led a coding workshop to introduce Python to 14-18 year olds.

2020 **Panel Moderator** *'Female Leaders and the Changing Landscape of Engineering' with the Ontario Society of Professional Engineers*. Moderated a panel of four women engineers, guiding a discussion on the challenges and barriers to participation, as well as what allies can do to improve this.

2018 **High School Mentor** *Women in Science and Engineering club at the University of Toronto*. Mentored three high school students interested in engineering through the university application process.

Science Communication

SRI Blog — Guest Contributor for the Schwartz Reisman Institute for Technology and Society at the University of Toronto's Blog.

Medium — Building an online audience (3.6k views, 335 followers) to share accessible summaries of my research and other cutting-edge research in the field of product design, AI, and management science.

Peer-Reviewing

2023 — Reviewer for ACM Conference on Designing Interactive Systems

2022-24 — Reviewer for ACM Conference on Computer-Supported Cooperative Work and Social Computing. **Special recognition (x2) for outstanding reviewer.**

2022-24 — Reviewer for ACM CHI Conference on Human Factors in Computing Systems. **Special recognition (x3) for outstanding reviewer.**

SKILLS

Computing Languages: Python, R, Java, SQL, MATLAB

Python Packages: scikit-learn, Matplotlib, NumPy, SciPy, NLTK, SpaCy, Gensim, Jupyter

Other Computing: Git, LaTeX, Twitter API

Academic Professional Development Courses: Becoming a Better Editor of Your Work, Writing NSERC Proposals, Oral Presentation Skills, University of Toronto Unconscious Bias Education Modules, Canada Research Chair Unconscious Bias Training Module, Department for Women and Gender Equality's Introduction to Gender-Based Analysis+, Workshop for Qualitative Analysis in Human-Computer Interaction, Workshop on using the Twitter API for academic research, Fable Workshop on Accessible Technology User Testing, Teaching Engineering in Higher Education

RESEARCH INTERESTS

Computational Social Science, Human-Computer Interaction, Natural Language Processing, Gender and Diversity, Machine Learning, Explainable Artificial Intelligence, Engineering Design

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