

# Sharon Ferguson

PhD Candidate  
Mechanical & Industrial Engineering  
University of Toronto

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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

- 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.
- 2022 **Ferguson, S.**, Lai, K., Chen, J., Faide, 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.

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\* represents proceedings accompanied by an oral presentation at the conference

- Accepted **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. *Accepted to Proceedings of the ACM on Human-Computer Interaction (CSCW)*.
- Submitted **Ferguson, S.**, Ozceylan, M., Chiu, K., Alexander, R., Kuzminykh, A. Open for interpretation: Comparing Human and AI explanations of sexism assessment. *Under review at ACM Transactions on Interactive Intelligent Systems*.

#### Peer-Reviewed Conference Proceedings

- 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 CHI Conference on Human Factors in Computing Systems*, 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.
- Accepted Naghshbandi, M., **Ferguson, S.**, Olechowski, A. Social Capital and Persistence in Computer Science of Google's Computer Science Summer Institute (CSSI) Students *Accepted at the American Society of Engineering Education Annual Conference*, 2024.

#### 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.**, Akemi, P., 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*.

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Progress Aoyagui, PA., **Ferguson, S.**, Ponochevnyi, N., Kim, YO., Kuzminykh, A. The Evolution of Perspectives: Investigating Human and Evolving GPT Argumentation in Subtle Sexism Detection. *In preparation for the ACM Conference on Fairness, Accountability, and Transparency (FAACT)*.

## TALKS

### Invited Talks

- 2024 Waterloo Management Sciences 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.**, 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	<b>Schwartz Reisman Institute for Technology and Society</b> University of Toronto, 2023-2024
Fellow	<b>Schwartz Reisman Institute for Technology and Society</b> University of Toronto, 2022-2023 Project: <i>Understanding and Mitigating Inequality in Enterprise Social Networks</i> Responsibilities: Planned the Graduate Workshop at the Absolutely Interdisciplinary Conference 2023.
RA	<b>COoKIE Research Group</b> Led by Anastasia Kuzminykh, Faculty of Information, University of Toronto, 2021-2023 Project: <i>Examining Explanation Strategies of Humans and AI</i>
Fellow	<b>Ethics of AI Graduate Research Fellowship</b> University of Toronto, 2021-2022 Graduate Research Fellowship at the University of Toronto, Centre for Ethics Project: <i>Examining Diversity and Intentional Persistence in Machine Learning and Artificial Intelligence</i> Responsibilities: Moderated presentations for the Ethics of AI in Context speaker series
Fellow	<b>Toronto Human-AI Interaction Research School</b> , University of Toronto, 2021 Research school held by the University of Toronto Faculty of Information. Project: <i>Detecting Sexism in Text: Humans vs. Machines</i> Advisors: Dr. Anastasia Kuzminykh and Dr. Rohan Alexander

## GRANTS AND AWARDS

### Grants and Scholarships

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) <i>Declined</i>
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<sup>nd</sup> Place Capstone Award - Industrial Engineering class of 2020 (\$600)
- 2018      1<sup>st</sup> 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

- 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. **One special recognition for outstanding reviewer.**
- 2022-24 Reviewer for ACM CHI Conference on Human Factors in Computing Systems. **One special recognition 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*

Updated June 2024