

Sarah R. Nicholson

Master of Applied Science Candidate,
Mechanical Engineering, Ryerson University

EDUCATION

- 2018 - 2020 **Ryerson University, Ontario, Canada**
MAsc., Mechanical Engineering,
CGPA 4.25
- 2013 - 2018 **Ryerson University, Ontario, Canada**
B.Eng., Mechanical Engineering, *with Distinction*
CGPA 3.67

RECOGNITIONS & AWARDS

- 2019 - **\$17,500** **NSERC Graduate Scholarship - CGS Master's Program**

Awarded to "high-calibre scholars" for "a high standard of achievement in undergraduate and early graduate studies." Chosen by academic excellence, research potential, and personal characteristics and interpersonal skills.
- 2019 - **\$2,500** **Toronto Hydro Student Award - Centre for Urban Energy**

Financial support for "new, innovative ideas for products, inventions and technologies that are relevant in tackling urban energy challenges," regarding master's thesis project.
- 2018 - **\$5,000** **Faculty of Engineering & Architectural Science Graduate Award - Ryerson University**

Awarded for performance in graduate studies, and for the achievement of being selected for the NSERC CGS-M award.
- 2018 - **\$1,000** **Capstone Presentation Award (shared) - Mechanical Engineering Department**

Awarded to one group in the Mechanical Engineering graduating class that delivers the best thesis project presentation. Recognition for project depth, technical communication and professionalism.
- 2018 - **\$2,000** **Michael Poczo Jr. Memorial Award - Ryerson University**

Recognition for academic achievement, entrepreneurial thought, leadership within the community and professional drive. One of two awards given per year.
- 2018 - **\$1,000** **Canadian Congress of Applied Mechanics, Thermofluids Award - Ryerson University**

For success in overall academics and in the field of thermodynamics and fluid dynamics in undergraduate studies. One thermofluids award given per year.

2016 - **\$10,000** **RBC Students Leading Change Winner** - *RBC Royal Bank*

One of five secondary students in Canada awarded per year for showing a passion to lead and inspire positive change in communities.

2015 - **\$1,500** **Aileen Amber Clark Award** - *Ryerson University*

Recognition for academic performance and notable contribution to women in engineering activities.

2014 - 2018 **Dean's List** - *Ryerson University*

For maintaining a minimum GPA of 3.5 for the overall year and each individual semester, while also maintaining full time course schedule.

2012 **Valedictorian** - *Wellington Heights Secondary School*

Chosen by faculty and peers to give the graduating address for the secondary school graduation.

CURRENT RESEARCH

Status **Master's Student:** *Sept. 1, 2018 - Aug. 31, 2020 (expected)*

Areas **High Performance Computer Modelling of Sustainable Energy Systems** - *Thermodynamics, heat transfer, fluid mechanics, mechanical engineering*

EMPLOYMENT

July 2019 - Sept. 2019 **Engineering Consultant** - *HGS Software & Consulting, Toronto ON*

Utilized technical software to develop simulation models of buildings and HVAC equipment to generate projected performance data and inform the design of new engineering systems. Engaged in team work and technical report writing.

Jan. 2019 - May 2019
Jan. 2018 - May 2018
Jan. 2017 - May 2017 **Teaching Assistant - Engineering Graphical Communications Course**, *Ryerson University*

Taught weekly two-hour labs, with a weekly office hour, also grading assignments and midterms. Educated students on manual technical drawing, and taught the SolidWorks graphical software.

Sept. 2018 - Dec. 2018 **Teaching Assistant - Manufacturing System Control**, *Ryerson University*

Taught three half-sections in my graduate studies. Ran twenty four, one-hour lab sessions. Educated students on how to effectively use programmable logic control software, lab equipment and best practices in manufacturing. Developed a new lab activity, offered support to students and graded assignments.

April 2018 - Aug. 2018 **Research Assistant - Course Evaluation on Equity, Diversity, & Inclusion in Engineering, Ryerson University**

Performed research, redesigned courseware, and rubrics. Generated new training documents, lecture slides and reports. Assisted in drafting grant proposal, and was successful in receiving \$6000 funding.

May 2016 - Aug. 2018 **Web Developer, Freelance Graphic Design by Sarah Nicholson**

Designed and created original websites, developed graphics, programmed animations, and wrote content for the following organizations: Holland Planning Innovations Inc., BC Canada • Arthur Veterinary Clinic, ON Canada • North Wellington Animal Hospital, ON Canada • Hicks Veterinary Services, ON Canada • Hicks Charolais, ON Canada

May 2016 - Aug. 2018 **Logo Designer, Freelance Graphic Design by Sarah Nicholson**

Developed original professional logos for the following organizations: Boreal Farm & Feed, NT Canada • Forty Seventh & Stone, ON Canada • A Leap of Doubt Podcast, United States • Pineapple Systems, ON Canada • Women Beyond Belief Podcast, ON Canada • Kristi Jani (startup), ON Canada • North Wellington Animal Hospital, ON Canada • Hicks Veterinary Services, ON Canada • Arthur Veterinary Clinic, ON Canada

Sept. 2017 - Dec. 2017 **Teaching Assistant - Introduction to Engineering Design, Ryerson University**

Taught two, weekly, four-hour lab sessions on human factors, engineering design methodology and technical communication and presentation techniques. Graded assignments and midterms.

May 2016 - Dec. 2016 **Marketing Manager, Freelance Graphic Design by Sarah Nicholson**

Developed and printed advertisements in newspapers and directories. Managed community engagement and brand image through the creation and administration of social media profiles and informational documents. Took professional photographs and updated online presence and access to company information. Increased views to company website by an average of 700 visits/month. For the following companies: • North Wellington Animal Hospital, ON Canada • Hicks Veterinary Services, ON Canada • Arthur Veterinary Clinic, ON Canada • Hicks Charolais, ON Canada

June 2012 - Sept. 2013 **Assembly Line Associate, Musashi Auto Parts Canada Inc.**

Assembled vehicle components and performed troubleshooting maintenance on machinery. Gained experience working with robotics, tight quality standards, and a variety of manufacturing processes. Ignited my passion for mechanical engineering and engaged with other departments, including the tool and die makers.

AFFILIATIONS

- Nov. 2018 - Present **Member, Ontario Society of Professional Engineers**
- Jan. 2018 - Jan. 2019 **Communications & Involvement Executive, Canadian Nuclear Society**
- May 2016 - May 2018 **Member, The Canadian Association of Virtual Assistants**

OTHER MEMBERSHIPS

- Oct. 2018 - April 2019 **HVAC Design Team Member, Ryerson Race to Zero Team**
- Working in an interdisciplinary team to develop a net-zero home for the Solar Decathlon 2019 Design Challenge.
- Sept. 2013 - April 2018 **Member & Mechanical Executive, Women in Engineering**
- Served as an executive member from 2014-2015. Attending, and running meetings and events.
- Jan. 2016 - Dec. 2016 **Graphic & Mechanical Design Team Member, Ryerson Formula Racing**
- Developed formula livery designs for the car, using technical and graphical design techniques. Assisted in developing a wheel bearing seal.

COMMUNITY AND VOLUNTEER ACTIVITIES

- Feb. 2015 - April 2015 **Event Coordinator, Women in Engineering De-Stress Exercise Class**
- Organized and coordinated weekly workshops for stress-relief through physical activities for women in engineering. Created the event with the goal of providing networking, and mental health support for students.
- Sept. 2014 - Jan. 2015 **Midterm Tutor, Ryerson University**
- Volunteered with the Student's Residence to deliver weekly 2-hour midterm tutoring for first year engineering students. Reviewed course concepts, and solved problems for all courses to groups of 2 to 20 students.

PRESENTATIONS

- Sept. 2019
Bari, Italy **Modelling & Optimization of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps, Nicholson S R, Mwesigye A, Dworkin S B**
- IAQVEC 2019 International Conference
- Sept. 2019
Bari, Italy **Modelling of a Net-Zero Energy Condo in a Cold Climate Using an Interdisciplinary Design Framework, Nicholson S R, Shoheit R, Fung A S**
- IAQVEC 2019 International Conference

Aug. 2019
Toronto, Canada

New Technology in Geo-Exchange Nicholson S R, Hatefraad P, Nguyen H V, Dworkin S B

Ryerson GRADShowcase 2019 Poster

June 2019
London, Canada

Numerical Modelling of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps, Nicholson S R, Mwesigye A, Dworkin S B

CSME International Congress 2019

June 2019
Ottawa, Canada,
May 2019
Toronto, Canada

Addressing Diversity & Gender Issues in a Cornerstone Design Course, Nicholson S R, Neumann W P, Stewart M F, Salustri F A

CEEA/ACEG 2019 National Conference, & Ryerson Learning & Teaching Conference 2019

April 2018
Toronto, Canada

Omni-directional Robotic CNC Design & Prototype Demonstration, Bhatt P, Nicholson S, Nizami M H, Izraitel F

2018 Capstone Design Student Symposium

BROADCAST INTERVIEWS

July 25, 2018

Empathy, Feminism, and Mechanical Engineering, *A Leap of Doubt Podcast* - Dickey, N

Interview discussing sexism in STEM fields, challenges in sustainable energy, and the importance of focusing on inclusive design in engineering.

REPORTS

1. **Analysis of a Geo-exchange System for the Planet Traveler Building at 357 College St, Toronto, ON and the Potential for Use with an Adjacent Expansion**, Dworkin S, Nicholson S, Nguyen H, (2019), *HGS Software and Consulting*

Contributed visual and written simulation results and data to inform the design of a geo-exchange system.

2. **Diversity & Inclusion in an Engineering Design Course**, Nicholson S, Salustri F, Stewart F, Neumann P. (2018), *Ryerson University*

Author and researcher for grant reflection and recommendation report on a course evaluation and research project. Identifies research strategy and initial results, interdisciplinary collaborations, recommendations to achieve goals, and an outline of course deliverables generated from grant.

MANUALS & TEACHING DOCUMENTS

1. **A Guide to Creating and Using Effective Focus Groups**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :25.

Lecture slides created to accompany rubric and courseware changes in an engineering design course. Focusing on using personas without negative bias and utilizing more socio-politically aware technical communication when describing focus groups.

2. **Who Do We Design For: A Guide to Personas**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :23.

Slides developed to explain the importance of creating realistic personas in engineering design philosophy. Using case studies and course research to teach students how to better describe the diversity of users.

3. **Designing For Women**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :30.

Lecture slides discussing gender and sex issues in engineering design. Using human factors and inclusive design strategies to improve students' abilities to create for women.

4. **Engineering & Society**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :21.

Lecture presentation slides discussing engineer's roles in society, and strategies to design with greater awareness and inclusion.

5. **Accessible Design**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :23.

Highlighting diverse accessibility issues and examples of failures to address them in engineering design. Lecture slides created for a human factors and ergonomics course, with student-relevant examples.

6. **Teaching Inclusive Design: Addressing Diversity, Accessibility, and Inclusion**, Nicholson S. (2018), *Ryerson University Online Course Shells*, :25.

Developed to train Teaching Assistants in the Introduction to Engineering Design Course at Ryerson University. Explaining results from research on previous course work, case studies, and steps for teaching with greater accessibility and inclusion.

ONLINE RESOURCES

1. **Inclusive Design Resource Database**, Nicholson S. (2018).

A public collection of resources for inclusive design in engineering, including research on diversity and accessibility issues, and a list of inclusive product examples and toolkits for designers.

2. **SolidWorks Drawing Tips**, Salustri F, Nicholson S. (2017), *Ryerson University Course Website*

Online tutorials and descriptions for using the SolidWorks software, and applying engineering graphical communication rules.

CONFERENCE PAPERS WITH ORAL PRESENTATIONS

1. **Numerical Modelling of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps**, Nicholson S R, Mwesigye A, Dworkin S B., *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019, *Published*.
2. **Modelling and Optimization of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps**, Nicholson S R, Dworkin S B., *10th International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings*, Bari, Italy, September 5-7, 2019, *Published*.
3. **Design of a Net-Zero Condo in a Cold Climate Using Interdisciplinary Strategies**, Nicholson S R, Shohet R, Fung A., *10th International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings*, Bari, Italy, September 5-7, 2019, *Published*.
4. **Addressing Diversity and Gender Issues in a Cornerstone Design Course**, Nicholson S R, Neumann W P, Stewart M F, Salustri F A., *CEEA Conference 2019*, Ottawa, Ontario, Canada, June 9-12, 2019, *Published*.
5. **Robotic CNC Router**, Bhatt P, Nicholson S, Nizami M H, Izraitel F., *Ryerson University CDSS Proceedings*, Capstone Design Student Symposium, Toronto, Canada, 2018, 120-124.