

Education

- 2020/22 **M.A.Sc., Mechanical Engineering**
University of Toronto
4.00/4.00, Canada Graduate Scholarship Recipient
Advisor: Prof. Benjamin Hatton (Materials Science and Engineering)
- 2016/20 **B.A., Architecture, Technology**
University of Toronto
3.95/4.00, High Distinction, Dean's List Scholar, University of Toronto Scholar
Governor General's Silver Medal Nominee
Top Graduate, Faculty of Architecture (Graduating rank: 1 of 250)

Special Circumstance

- 2020 **M.Des., Technology**
Harvard University
Offer accepted, enrolled, did not attend due to circumstances related to COVID-19

Academic Awards, Distinctions, and Honours

- 2021 **NSERC Canada Graduate Scholarship** (\$17 500)
- 2020 **Governor General's Silver Medal Nominee** (among top graduates at the University of Toronto)
- 2020 Top Graduating Student, Faculty of Architecture (graduating rank: 1 of 250)
- 2020 University of Toronto Academic Merit Award (\$500)
- 2020 **NSERC Undergraduate Student Research Award** (Materials Engineering) (\$6500)
- 2020 University of Toronto Dean's List Scholar
- 2019 **Oxford Rhodes Scholarship Finalist** (one of 13 finalists from 100 000 students, two chosen)
- 2019 Oxford Rhodes Scholarship Nominee (selected as one of 3 university-wide finalists of 15 000)
- 2019 **Leaders of Tomorrow Award** (awarded by SOPREMA) (\$2500)
- 2019 **University of Toronto Scholar** (awarded to top student(s) in faculty) (\$1500)
- 2019 University of Toronto Dean's List Scholar
- 2019 **NSERC Undergraduate Student Research Award** (Materials Engineering) (\$6500)
- 2018 University of Toronto Dean's List Scholar
- 2018 **NSERC Undergraduate Student Research Award** (Civil Engineering) (\$6500)
- 2017 University of Toronto Dean's List Scholar
- 2017 Cansbridge Fellowship Finalist (selected as one of 30 finalists from 360 applicants)
- 2016 DECA Top 10 Provincial Placement (Distributive Education Clubs of America)
- 2016 Lynn MacGillivray Memorial Scholarship (\$300)
- 2016 Rob Crombie Memorial Scholarship (\$2000)

Formal Research Activities

- 2020/20 **Functional and Adaptive Surfaces Group, Materials Science and Engineering**
NSERC Undergraduate Student Research Award, University of Toronto, Prof. Benjamin Hatton
Conceived and led project using instabilities between fluids to create conditions for reversible fluid pocket growth within building skins to regulate heat and light transmission.
- 2019/20 **Sustainable Built Environment Performance Assessment Group, School of the Environment**
Undergraduate Researcher, University of Toronto, Prof. John Robinson
Led project addressing the discrepancy between perceived indoor air quality and measured indoor air quality, and set best practices for alleviating this discrepancy.
- 2019/20 **Functional and Adaptive Surfaces Group, Materials Science and Engineering**
NSERC Undergraduate Student Research Award, University of Toronto, Prof. Benjamin Hatton
Led project designing, prototyping, and testing micro-fluidic window system, based on biological capillary temperature regulation.

- 2018/19 **Siegel Group, Indoor Air Quality, Civil and Mineral Engineering**
NSERC Undergraduate Student Research Award, University of Toronto, Prof. Jeffery Siegel
Led project comparing microbial research within lab setting to microbial growth in field setting. Conducted experiments investigating particulate matter emissions from indoor sources, and filter forensics experiments studying new means of collecting indoor air quality data.

Informal Research Activities

- 2019/20 **Self-Propelling Autonomous Robotic Locomotion**
University of Waterloo, University of Toronto, Prof. David Correa
Co-designed and fabricated (w/ Kevin Nitiéma) self-propelling hygroscopic robot with capability to crawl without active energy.
- 2019/19 **Sustainable Design Team, Net Positive Data Centre**
Living Lab of Sustainability, University of Toronto, Prof. John Robinson
Provided design suggestions to the Managing Director of University of Toronto Planning for one of the first net-energy positive buildings in Toronto (course code: ENV461).

Employment

- 2019/19 **School of the Environment, University of Toronto, Toronto, Ontario**
Studied and quantified effect of psychosocial influences on indoor air quality measurement.
- 2017/18 **Founder, TAP Parking, Toronto, Ontario**
Co-founded a startup concept that connects drivers with empty driveways in areas where parking opportunities are scarce and expensive. Eventually met with leading competitor, Rover, to discuss ways to work together to solve ultimate goal of alleviating parking stress.
- 2017/17 **Remote Intern, Public Architecture, San Francisco, California**
Worked with leader in social-impact environmental design, specifically facilitating the connection between non-profit organizations and pro bono design work.

International Collaboration

- 2019 **Delft University of Technology, Certificate, Planning and Design with Water for Sustainability**
Chosen as one of three students to represent Canada in multinational water management program. Collaborated with students from 52 countries to engineer flood-protection solutions along coastlines.

Refereed Research Contributions

- 2020 First author. Kay, R, Nitiéma, K, Correa, D. **The bio-inspired design of a self-propelling robot driven by changes in humidity**, *eCAADe* 38. http://papers.cumincad.org/cgi-bin/works/Show?ecaade2020_195.

Non-refereed Research Contributions

- 2020 Co-author. Kay, R, Nitiéma, K. **Bio-inspired fluid cell growth for adaptive optical transmission in buildings**. Faculty of Architecture, University of Toronto.
- 2019 Co-author. Kay, R, Chakwera, A, Patrick, B, Vashisth, S, Trewern, N, Husodo, Y. **Report to the Department of Campus and Facilities Planning: Vision for a net-positive data sciences centre**. University of Toronto.

Working Refereed Research Contributions

- 2021 First author. Kay, R, Nitiéma, K, Katrycz, C, Hatton, B. **Active fluidic pigment control for buildings**, for submission to *Science*.
- 2021 First author. Kay, R, Katrycz, C, Hatton, B. **Multilayered fluidics for buildings**, for submission to *Nature Materials*.
- 2021 First author. Kay, R, Mattacchione, A, Katrycz, C, Hatton, B. **Self-organizing biological networks as a basis for urban design**, for submission to *PLOS One*.
- 2021 First author. Kay, R, Katrycz, C, Hatton, B. **Fluidic apertures for tunable light transmission in buildings**, for submission to *Scientific Reports*.
- 2021 First author. Kay, R, Hatton, B. **Adaptive biological skins for architecture**.

Scholarly and Selected Academic Presentations

- 2020 **From pinecones to robots**, in *Cognizant Architecture - What if Buildings Could Think?* 38th eCAADe Conference, TU Berlin (virtual). <https://vimeo.com/452713318>.
- 2020 **Hypothesized design of a contactless delivery robot for SARS-CoV-2 testing and administration**. Final presentation: Physical Computing course, University of Toronto. <https://vimeo.com/403169347>.

Awarded Features, Public Exhibitions, and Interviews

- 2020 **Molten Snowflakes**, selected as Research Revealed feature. <https://researchrevealed.utoronto.ca/shape-changing-apertures-that-control-how-much-light-or-heat-enters-a-building/>.
- 2020 **Check out the work of the Daniels Faculty's first-ever undergraduate thesis students**. <https://www.daniels.utoronto.ca/news/2020/05/11/check-out-work-daniels-facultys-first-ever-undergraduate-thesis-students/>.
- 2019 **A Graduate of the University of Toronto Faculty of Architecture Receives Soprema's Leaders of Tomorrow Award**. <https://www.soprema.ca/graduate-university-toronto-faculty-architecture-receives-sopremas-leaders-tomorrow-award/>.

Audited/Online Coursework (i.e., coursework not on transcript)

- 2021 **Engineering Chemistry and Materials Science** (University of Toronto)
- 2021 **Multivariable Calculus**, *in progress* (Khan Academy)
- 2021 **Learn to Program**, python language (Coursera, University of Toronto)
- 2020 **Introduction to Materials Science** (University of Toronto)
- 2020 **Fluid Mechanics I** (University of Toronto)
- 2020 **Introductory Physics II** (University of Toronto)
- 2019 **Physical Chemistry** (University of Toronto)

Leadership Activities and Achievements

- 2018/20 **Intramural Basketball, Dodgeball Captain**, University of Toronto
- 2019/19 **Orientation Leader**, University of Toronto Faculty of Architecture
- 2017/18 **Head of Recruitment**, Alpha Epsilon Pi, Tau Omega Chapter
- 2008/16 **Provincial Club Basketball Player**, Ontario Basketball Association
- 2016/16 **Culture Club President**, North Toronto Collegiate Institute
- 2016/16 **Volunteer House League Basketball Head Coach**, North Toronto Basketball Association
- 2015/17 **Senior Basketball Camp Coach and Counsellor**, Upper Canada College Summer Camps
- 2015/16 **Co-captain**, North Toronto Collegiate Institute senior basketball team
- 2013/14 **Captain, Most Valuable Player**, North Toronto Collegiate Institute junior basketball team

April 2021