

# Keagan Hudson Rankin

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## EDUCATION

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**University of Toronto** **2021 - Present**  
MAsc & PhD in Engineering, GPA - 4.0/4.0  
Supervisors - Shoshanna Saxe, I. Daniel Posen  
Toronto, Canada

**University of New Brunswick** **2017 - 2021**  
BAsc in Civil Engineering, GPA - 4.2/4.3  
Fredericton, Canada

## EXPERIENCE

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**University of Cambridge** **Sep 2024 - Mar 2025**  
Visiting researcher, Resource Efficiency Group  
Cambridge, UK

**City of Toronto** **Sep 2022 - Aug 2024**  
MITACS accelerate intern, Planning and Sustainability Divisions  
Toronto, Canada

**University of Toronto** **Sep 2021 - Jan 2024**  
Teaching assistant, Faculty of Applied Science and Engineering  
Toronto, Canada

**University of Victoria** **May 2019-Aug 2019**  
Undergraduate researcher, Faculty of Engineering  
Victoria, Canada

**University of New Brunswick** **May 2019-Aug 2021**  
Research assistant  
Fredericton, Canada

## RESEARCH INTERESTS

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- Industrial ecology, material efficiency, life-cycle assessment, climate-change mitigation, and infrastructure systems.
- Applications of data science, statistical/machine learning, stochastic simulation, optimization, and quantitative decision making to sustainability problems.

## PUBLICATIONS

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### Journal Papers

- [Rankin KH](#), Saxe. 2024. A future growth model for building more housing and infrastructure with less embodied greenhouse gas emissions. *In Review*
- Yoffe, [Rankin KH](#), Bachmann, Saxe, Posen. 2024. A top-down assessment of GHG emissions in the Canadian construction sector. *Environmental Research: Infrastructure and Sustainability*.
- [Rankin KH](#), Arceo, Isin, Saxe. 2024. Embodied GHG of missing middle: residential building forms and strategies for more efficient housing. *Journal of Industrial Ecology*

### Conference Papers

- [Rankin KH](#), Arceo, Yoffe, Isin, Saxe. 2023. Forecasting embodied housing emissions and material efficiency scenarios to 2030 in Ontario, Canada. *ISIE Biannual Conference*.
- [Rankin KH](#), Zhuo, Lei, Rizaee, Searle, Ene, Amuno, 2022. Pull-based simulation modeling for modular supply chain analysis: A case study in Northern Canada. *Proceedings of the Canadian Society of Civil Engineering Annual Conference*.

- Froese, Bristow, Rankin K 2021. Towards a sustainability-centred design curriculum in civil engineering. *Engineering Education for Sustainable Development (EESD)*.

## Posters

- Rankin KH, Arceo, Yoffe, Isin, Saxe. 2023. The potential for missing middle to provide more housing with less embodied emissions: quantifying and optimizing material efficiency in low-rise, multi-unit housing. *ISIE Biannual Conference*.
- Yoffe, Rankin, KH, Bachmann, Posen, Saxe. 2023. A Top-Down approach for downscaling sectoral emission budgets. A case study of Canada’s construction sector. *ISIE Biannual Conference*.
- Rankin, KH, Isin, Arceo, Saxe. 2023. Evaluating the material intensity of missing-middle *Gordon Research Conference in Industrial Ecology*

## Reports

- Hudgins, Haralampides, Dolan, Rankin K, Yamazaki (2019). Results and analysis of the 2018 suspended solids field program in the Mactaquac headpond, Saint John River, NB.

## RECOGNITIONS

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### National

Vanier Scholarship Finalist	Apr 2024
TAC Esch Foundation Scholarship	Sep 2020
NSERC Undergrad Research Award 3x	2018, 2019, 2020

### Grad

Ontario Graduate Scholarship	Sep 2023
David Scrymgeour Community Bursary	Aug 2023
QEII Scholarship in Science and Technology	Sep 2022
CW Bowman Scholarship in Energy Research	Apr 2022
NSERC Alexander Graham Bell Award CGSM	Sep 2021
CIVMIN top-5 incoming students award	Sep 2021

### Undergrad

Lieutenant Governor Silver Medal Nominee	Apr 2021
D. Malcolm Jeffrey Memorial Prize - highest department GPA over 4 years	Apr 2021
Annual capstone design report 1st prize	Apr 2021
\$ 25,000 of total merit/research award funding over course of degree	Sep 2017 - Apr 2021

## INVITED TALKS

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*Building more housing with less embodied greenhouse gas.* School of Cities Embodied Emissions Symposium. Toronto, Ontario. **May 2024**. [recording link](#)

*Carbon capture’s make or break role in climate-change mitigation.* Massey College Junior Fellow Lecture Series. Toronto, Ontario. **Feb 2024**

*Providing more housing with less embodied greenhouse gas.* UofT Engineering Research Council Annual Conference. Toronto, Ontario. Awarded 2nd out of ~100 for oral presentations. **Aug 2023**.

## SERVICE AND AFFILIATIONS

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### Peer Review

IOP Science – Environmental Research: Infrastructure and Sustainability

<b>Campus Cooperative Residence Inc (CCRI)</b> Board of Directors	<b>Jan 2023 - Present</b>
<b>Massey College</b> Junior Fellow	<b>Jun 2022 - Present</b>
<b>Association for Professional Engineers and Geoscientists NB</b> Engineer in Training	<b>May 2021 - Present</b>
<b>UofT CIVMIN Graduate Society</b> Academic Director	<b>Sep 2021 - Sep 2022</b>
<b>Shad Valley</b> Student Mentor	<b>Jun 2021 - Jul 2021</b>

## **SKILLS**

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### **Programming/Markup Languages** (in order of experience)

Python, R, Matlab, TeX, SQL, Git, HTML + CSS, Visual Basic

### **Software** (in no particular order)

Excel, REVIT, ArcGIS, OnScreenTakeoff, SAP2000, AutoCAD, EPANET, LabView, OpenLCA, Brightway2, Exiobase

### **Languages**

English (native), French (proficient)

### **Rowing**

Team New Brunswick - Eastern Canadian champion in open four, finalist at 2017 Canada Games

Vic City Rowing Club - High performance team member

UNB Rowing - 3x Atlantic Canadian University champion