

Bentley Oakes

Assistant Professor

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Key Academic Skills

Researcher: Lead- and co-author of 30+ publications with 300+ citations on Google Scholar.

Collaborator: Involved in multiple international academic and industrial collaborations.

Teacher/Mentor: Extensive experience teaching courses and mentoring graduate students.

Community-Builder: Organizing and program committee member for local and global events.

Language Skills

English: Native proficiency

French: A2 proficiency (elementary)

Education

PhD	McGill University , Computer Science	Montréal, Canada
	<ul style="list-style-type: none"> Thesis: <i>A Symbolic Execution-Based Approach To Model Transformation Verification using Structural Contracts</i> Supervisors: Hans Vangheluwe and Clark Verbrugge 	Jan 2019
MSc	McGill University , Computer Science	Montréal, Canada
	<ul style="list-style-type: none"> Thesis: <i>Practical and Theoretical Issues of Evolving Behaviour Trees for a Turn-Based Game</i> Supervisor: Clark Verbrugge 	Jan 2013
BSc	University of Manitoba , Computer Science	Winnipeg, Canada
(Honours,	<ul style="list-style-type: none"> Co-op internship at Electronic Arts Inc., Montréal — Fall 2009, Summer 2010: Prototyping artificial intelligence in commercial video games. 	Jan 2011
Co-op)	<ul style="list-style-type: none"> Co-op internship at Blackberry Limited (RIM), Waterloo — Winter 2009: Implementing cryptographic communication protocols. 	

Research Experience

Polytechnique Montréal , Assistant Professor	Montréal, Canada
<ul style="list-style-type: none"> Department of Computer and Software Engineering (GIGL) Research topics: Accelerating the construction and deployment of digital twins with a knowledge-based, low-code approach. Assisting users with developing, configuring, and understanding machine learning and verification/validation services for their DT. 	Sept 2023 – present
Université de Montréal , Post-Doctoral Researcher	Montréal, Canada
<ul style="list-style-type: none"> Lab: GEODES Software Engineering Research Group Supervisors: Houari Sahraoui and Michalis Famelis Research topic: Assisting non-machine learning experts in constructing ML solutions by exploring tailoring of computational workflows. 	Sept 2021 – Aug 2023

- University of Antwerp**, Post-Doctoral Researcher Antwerp, Belgium
Sept 2018 – July 2021
- Labs: Antwerp Systems and Software Modelling, and Constrained Systems Lab
 - Supervisors: Hans Vangheluwe and Joachim Denil
 - Research topics: Verification and validation of cyber-physical systems, model-driven engineering, multi-paradigm modelling, co-simulation, and digital twins.
- Université de Montréal**, Visiting Researcher Montréal, Canada
May 2018
- Host: Eugene Syriani, GEODES Software Engineering Research Group
 - Research topic: Developing an interface between the AToMPM modelling tool and the ModelVerse modelling repository.
- fortiss GmbH**, Visiting Researcher Munich, Germany
July 2016 – Aug 2016
- Host: Levi Lúcio
 - Research topic: Formalizing representations of model transformation languages.
- General Motors Technical Center**, Visiting Researcher Warren, USA
Oct 2014 – Dec 2014
- Host: Ramesh Sethu
 - Research topics: Applying model transformations for code/model modernization at an industrial scale, and industrial intellectual property concerns.

Industrial Collaborations

- Framework for Systematic Design of Digital Twins (DTDesign)** 2019–2021
- Collaborators: Atlas Copco, Flanders Make
 - Topics: Digital twin characteristics, integrating knowledge graphs and digital twins.
 - Funding: Flanders Innovation and Entrepreneurship Agency (VLAIO)
- Automated & Simulation-based Functional Safety Engineering Methodology (aSET)** 2018–2020
- Collaborators: Dana Belgium NV, Siemens Industry Software (Leuven), Flanders Make
 - Topics: Verification of safety-critical cyber-physical systems (formal methods, fault injection using ML, simulation/visualization), DevOps for functional safety.
 - Funding: Flanders Innovation and Entrepreneurship Agency (VLAIO)
- Innovation in the Development of Electrical Systems For Aeronautics (INES)** 2019–2020
- Collaborators: Boeing Research & Technology Europe (Madrid), Siemens Industry Software (Leuven), Flanders Make
 - Topics: Co-simulation configuration, fault injection in co-simulation.
 - Funding: Flanders Innovation and Entrepreneurship Agency (VLAIO)
- Network for the Engineering of Complex Software-Intensive Systems for Automotive Systems (NECSIS)** 2013–2016
- Collaborators: General Motors of Canada Ltd., Queen's University, University of Antwerp
 - Topic: Verification of model transformations.
 - Funding: \$14M from Automotive Partnership Canada and Natural Sciences and Engineering Research Council of Canada (NSERC)

Teaching Experience

- Polytechnique Montréal**, Course Instructor Montréal, Canada
Jan 2024 – present
- LOG6310E
 - Engineering of Digital Twins — Winter 2025
 - LOG8371E
 - Software Quality Engineering — Fall 2024
 - INF6900AE/INF7900A
 - Scientific and Technical Communication — Winter 2024, Fall 2024

<p>Polytechnique Montréal, Guest Lecturer</p> <ul style="list-style-type: none"> LOG8704 <ul style="list-style-type: none"> XR Software Development — Nov. 2024: <i>Digital Twins: Introductions and Intersections</i> LOG6953DE <ul style="list-style-type: none"> Model-Driven Software Engineering — Nov. 2022, Nov. 2023: Model-driven engineering, usage and verification of model transformations 	<p>Montréal, Canada Jan 2022 – Jan 2024</p>
<p>McGill University, Course Lecturer/Coordinator</p> <ul style="list-style-type: none"> COMP 202 <ul style="list-style-type: none"> Foundations of Programming — Winter 2015, 2017, 2018 (six terms, avg. 189 students) Developed and presented lecture material on Java programming for students with no prior programming experience. Created assessments and marking guides; coordinated with other instructors and TAs. 	<p>Montréal, Canada Jan 2015 – Jan 2018</p>
<p>University of Antwerp, Teaching Assistant</p> <ul style="list-style-type: none"> 2001WETMTR <ul style="list-style-type: none"> Model-Driven Engineering — Fall 2020 2001WETMSI <ul style="list-style-type: none"> Modelling of Software-Intensive Systems — Fall 2019 	<p>Antwerp, Belgium Jan 2019 – Jan 2020</p>
<p>McGill University, Teaching Assistant</p> <ul style="list-style-type: none"> COMP 202 <ul style="list-style-type: none"> Foundations of Programming (×2) COMP 250 <ul style="list-style-type: none"> Introduction to Computer Science (×2) COMP 251 <ul style="list-style-type: none"> Data Structures and Algorithms (×3) 	<p>Montréal, Canada Jan 2012 – Jan 2014</p>

Invited Talks and Presentations

<p>Guest lecture — RAISE course, UCLA</p> <ul style="list-style-type: none"> Host: Dr. Maged Elaasar <i>What is a 'Digital Twin' and How Do I Build One?</i> 	<p>Nov. 2025</p>
<p>Tutorial — Software Engineering for Machine Learning Applications (SEMLA)</p> <ul style="list-style-type: none"> <i>What is a 'Digital Twin' and How Do I Build One?</i> 	<p>Jun. 2025</p>
<p>Invited talk — EDT.Community</p> <ul style="list-style-type: none"> <i>Systematic Digital Twin Reporting</i> Video recording 	<p>May 2025</p>
<p>Invited talk — Next-Generation Cities Institute, Concordia University</p> <ul style="list-style-type: none"> <i>Accelerating Digital Twin Research and Engineering</i> 	<p>May 2025</p>
<p>Conference paper presentation — ICSE 2025, Ottawa</p> <ul style="list-style-type: none"> <i>Building Domain-Specific Machine Learning Workflows: A Conceptual Framework for the State-of-the-Practice</i> (journal-first) 	<p>May 2025</p>
<p>Guest lecture — Engineering Digital Twins course, McMaster University</p> <ul style="list-style-type: none"> Host: Prof. Istvan David <i>Accelerating Digital Twin Research and Engineering</i> 	<p>Mar. 2025</p>
<p>Research presentation — KARI Delegation, Polytechnique Montréal</p> <ul style="list-style-type: none"> Advanced Air Mobility (AAM) challenges and advancements 	<p>Feb. 2025</p>

Conference paper presentation — MODELS 2024 Sep. 2024
• *Fault localization in DSLTrans model transformations by combining symbolic execution and spectrum-based analysis* (SoSyM journal-first)

Guest lecture — LOG8704 XR Software Development, Polytechnique Montréal Nov. 2024
• *Digital Twins: Introductions and Intersections*

Community Building

Workshop Organizer — onto:Nexus Workshop 2025 (International Workshop on Ontological Modeling and Analysis) Oct. 2025
• Co-located with MODELS 2025, Grand Rapids, MI. Hybrid event with IEEE proceedings.
• Co-organizers: Maged Elaasar (Chair), Wahab Hamou-Lhadj, Mohammad Hamdaqa

Lead Organizer — Software Engineering at Montréal (SEMTL) Montréal, Canada
Aug 2022 – present
• Regular seminars for the software engineering researchers in Montréal (~40 attendees per meeting, ~30% are professors).
• Coordinating with meeting hosts on content, venue, date, and maintaining website.

Organizing Committee Member 2022–2026
• FSE 2026 — Student Volunteer Co-Chair
• MODELS 2025 — Student Volunteer Co-Chair
• ICSE 2025 — Posters Co-Chair
• SEMLA 2024, 2025 — Posters Co-Chair
• EDTconf 2024 — Publicity Co-Chair
• ANNSIM 2024 — Proceedings Co-Chair
• ANNSIM 2022, 2023 — Cyber-Physical Systems Track Co-Chair
• MODELS 2022 — Posters Co-Chair

Session Chair 2021–2024
• SEMLA LLM Ops Day — 2024
• Model-Driven Engineering of Digital Twins Workshop (ModDiT) — 2023
• Artificial Intelligence and Model-driven Engineering Workshop (MDEIntelligence) — 2023
• Consortium for Software Engineering Research (CSER) Spring Meeting — 2023
• Model-Driven Engineering and Software Development (MODELSWARD) — 2021

Program Committee Member 2019–2025
• ASE NIER Track — 2025
• MODELS — 2025
• International Workshop on Architecting and Engineering Digital Twins — 2025
• EMMSAD — 2025
• EDTconf — 2024, 2025
• ANNSIM — 2021–2024
• MDE Intelligence — 2022, 2023, 2024
• International Workshop on Models and Evolution — 2022
• ACM Student Research Competition — 2022
• Spring/Summer Simulation Conference — 2019, 2020

Journal Reviewer	2021–2025
<ul style="list-style-type: none"> • Journal of Systems & Software (JSS) — 2025 • Information and Software Technology (IST) — 2025 • Journal of Software and Systems Modeling (SoSyM) — 2020, 2021, 2023, 2025 (Top 1% Reviewer 2020, 2021; Best Reviewer Award 2025) • ACM Transactions on Software Engineering and Methodology (TOSEM) — 2024 • SIMULATION — 2023, 2024 (Best Reviewer Award June 2023) • Science of Computer Programming (SCP) — 2023 • Journal of Computer Languages (JCL) — 2022 • Journal of Object Technology (JOT) — 2022 • Empirical Software Engineering (EMSE) — 2022 • IEEE Transactions on Automation Science and Engineering (T-ASE) — 2021 	
Guest Editor for Journal Special Issue	Jan 2023
<ul style="list-style-type: none"> • SIMULATION — <i>Modeling and Simulation for Software-Intensive Systems: from IoT to Digital Twins</i> 	
Jury Member	2023–2024
<ul style="list-style-type: none"> • Polytechnique Montréal — M.Sc. Thesis Jury President (2024) • McGill University — PhD Thesis External Reviewer (2024) • McGill University — M.Sc. Thesis External Reviewer (2023) 	
Grant Reviewer	2024–2025
<ul style="list-style-type: none"> • NSERC Idea to Innovation grant — 2024 • NSERC Discovery grant — 2025 	
Panelist	Jan 2023
<ul style="list-style-type: none"> • ANNSIM PhD Colloquium Panel — 2023 	
Scholarships and Awards	
SoSyM Best Reviewer Award	Jan 2025
<ul style="list-style-type: none"> • Journal of Software & Systems Modeling 	
Simulation Journal Best Reviewer Award	June 2023
SoSyM Top 1% Reviewer	2020, 2021
<ul style="list-style-type: none"> • Journal of Software & Systems Modeling 	
Best Student Paper Award	Jan 2019
<ul style="list-style-type: none"> • SIMULTECH — for the paper <i>HintCO – Hint-based configuration of co-simulations</i> 	
NSERC Postgraduate Scholarship – Doctoral (PGS D)	2015–2016
<ul style="list-style-type: none"> • Natural Sciences and Engineering Research Council of Canada 	
Lorne Trottier Science Accelerator Fellowship	2015, 2016
<ul style="list-style-type: none"> • McGill University 	
Harold H. Helm Fellowship	2013, 2014
<ul style="list-style-type: none"> • McGill University 	
Grad Excellence Award in Computer Science	2012, 2014
<ul style="list-style-type: none"> • McGill University 	

Publications

- See bentleyoakes.com/publications for a full list of 30+ peer-reviewed publications, including journal articles, book chapters, conference papers, workshop papers, and technical reports/theses.