

Bentley Oakes

Assistant Professor

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Key Academic Skills

Researcher: Lead- and co-author of dozens of publications with hundreds of 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: Conversational (improving)

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

Polytechnique Montréal , Guest Lecturer <ul style="list-style-type: none"> • LOG8704 • XR Software Development — Nov. 2024: <i>Digital Twins: Introductions and Intersections</i> • LOG6953DE • Model-Driven Software Engineering — Nov. 2022, Nov. 2023: Model-driven engineering, usage and verification of model transformations 	Montréal, Canada Jan 2022 – Jan 2024
McGill University , Course Lecturer/Coordinator <ul style="list-style-type: none"> • COMP 202 • 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. 	Montréal, Canada Jan 2015 – Jan 2018
University of Antwerp , Teaching Assistant <ul style="list-style-type: none"> • 2001WETMTR • Model-Driven Engineering — Fall 2020 • 2001WETMSI • Modelling of Software-Intensive Systems — Fall 2019 	Antwerp, Belgium Jan 2019 – Jan 2020
McGill University , Teaching Assistant <ul style="list-style-type: none"> • COMP 202 • Foundations of Programming (×2) • COMP 250 • Introduction to Computer Science (×2) • COMP 251 • Data Structures and Algorithms (×3) 	Montréal, Canada Jan 2012 – Jan 2014

Invited Talks and Presentations

Guest lecture — Engineering Digital Twins course, McMaster University <ul style="list-style-type: none"> • Host: Prof. Istvan David • <i>What Does Your Digital Twin Do? A Framework and Tooling for Systematic DT Reporting</i> 	Mar. 2026
Invited talk — SIG LLODIA (Lecture) <ul style="list-style-type: none"> • <i>Towards Ontology-based Digital Twin Service Construction and Reporting</i> 	Jan. 2026
Guest lecture — RAISE course, UCLA <ul style="list-style-type: none"> • Host: Dr. Maged Elaasar • <i>What is a 'Digital Twin' and How Do I Build One?</i> 	Nov. 2025
Tutorial — Software Engineering for Machine Learning Applications (SEMLA) <ul style="list-style-type: none"> • <i>What is a 'Digital Twin' and How Do I Build One?</i> 	Jun. 2025
Invited talk — EDT.Community <ul style="list-style-type: none"> • <i>Systematic Digital Twin Reporting</i> • Video recording 	May 2025
Invited talk — Next-Generation Cities Institute, Concordia University <ul style="list-style-type: none"> • <i>Accelerating Digital Twin Research and Engineering</i> 	May 2025
Conference paper presentation — ICSE 2025, Ottawa <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) 	May 2025

Guest lecture — Engineering Digital Twins course, McMaster University	Mar. 2025
<ul style="list-style-type: none"> • Host: Prof. Istvan David • <i>Accelerating Digital Twin Research and Engineering</i> 	
Research presentation — KARI Delegation, Polytechnique Montréal	Feb. 2025
<ul style="list-style-type: none"> • Advanced Air Mobility (AAM) challenges and advancements 	
Invited talk — Software Engineering at Montréal (SEMTL)	Jan 2025
<ul style="list-style-type: none"> • <i>Recent Work on Systematic Reporting and Construction for Digital Twins</i> 	
Conference paper presentation — MODELS 2024	Sep. 2024
<ul style="list-style-type: none"> • <i>Fault localization in DSLTrans model transformations by combining symbolic execution and spectrum-based analysis</i> (SoSyM journal-first) 	
Guest lecture — LOG8704 XR Software Development, Polytechnique Montréal	Nov. 2024
<ul style="list-style-type: none"> • <i>Digital Twins: Introductions and Intersections</i> 	
Invited talk — onto:Nexus Forum 2024	Jan 2024
<ul style="list-style-type: none"> • <i>Accelerating Digital Twin Construction with Ontologies</i> • Forum on Ontological Modeling and Analysis 	
Invited talk — Polytechnique Montréal	Jan 2023
<ul style="list-style-type: none"> • <i>Bridging the Gap in Verification and Validation of Complex Systems</i> 	
Guest lecture — LOG6953DE, Polytechnique Montréal	Nov. 2022
<ul style="list-style-type: none"> • Host: Prof. Mohammad Hamdaqa • <i>Model/Graph Transformations: Specification and Verification</i> 	
Invited talk — Software Engineering at Montréal (SEMTL) September seminar	Sep. 2022
<ul style="list-style-type: none"> • <i>Building Domain-Specific Machine Learning Workflows: A Conceptual Framework for the State-of-the-Practice</i> 	
Invited talk — Concordia University	Jan 2022
<ul style="list-style-type: none"> • Host: Prof. Essam Mansour • <i>Building Domain-Specific Machine Learning Workflows: A Conceptual Framework for the State-of-the-Practice</i> 	
Invited talk — Université du Québec à Montréal	Jan 2022
<ul style="list-style-type: none"> • <i>Capturing and Utilising Domain-Specific Knowledge</i> 	

Community Building

Workshop Organizer — onto:Nexus Workshop 2026 (International Workshop on Ontological Modeling and Analysis)	Jan 2026
<ul style="list-style-type: none"> • Co-located with MODELS 2026, Malaga, Spain. • Co-organizers: Maged Elaasar (Chair), Wahab Hamou-Lhadj, Mohammad Hamdaqa, Eduard Kamburjan 	
Workshop Organizer — onto:Nexus Workshop 2025 (International Workshop on Ontological Modeling and Analysis)	Oct. 2025
<ul style="list-style-type: none"> • 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

2019–2026

- ASE Research Track — 2026
- ASE NIER Track — 2025
- MODELS — 2025
- ANNSIM — 2021–2024, 2026
- DIGITA Workshop (PerCom) — 2026
- International Workshop on Architecting and Engineering Digital Twins (AEDT) — 2025, 2026
- EMMSAD — 2025
- EDTconf — 2024, 2025
- 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

- 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

- SIMULATION — *Modeling and Simulation for Software-Intensive Systems: from IoT to Digital Twins*

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	2024–2026
<ul style="list-style-type: none"> • NSERC Idea to Innovation grant — 2024 • NSERC Discovery grant — 2025, 2026 • Dutch Research Council (NWO) — 2026 	
Panelist	Jan 2023
<ul style="list-style-type: none"> • ANNSIM PhD Colloquium Panel — 2023 	
Departmental Service	2025–Present
<ul style="list-style-type: none"> • Committee Member, Committee Rayonnement (Communications committee), Department of Computer and Software Engineering, Polytechnique Montréal 	

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.