

Pietro-Luciano Buono, PhD

Associate Professor, Mathematics, Faculty of Science at University of Ontario Institute of Technology
Oshawa, ON, CA

Using symmetry and dynamics to analyze mathematical models of complex ecological systems and micro-devices networks

Complex spatio-temporal or space-time phenomena often generate intricate and surprising patterns observed in ecological settings such as flocks of birds or schools of fish. On a larger scale, human disturbances can lead to fragmented habitats that can disturb the movement patterns of some species such as the threatened woodland caribou. Conversely, spatio-temporal patterns can be also leveraged to improve the performance of large coupled systems of devices, such as lasers and gyroscopes.

An Associate Professor of Mathematics in the Faculty of Science, Pietro-Luciano Buono, PhD, focuses his research on the development of innovative mathematical tools to build and analyze mathematical models of complex spatio-temporal phenomena, mostly via the interplay of dynamical systems and symmetry methods. Passionate about demonstrating the impact of mathematics in science and technology, he has teamed up with mathematicians, biologists and engineers to bring his expertise to the forefront of current trends in mathematical modelling across several disciplines.

Notably, his most recent collaborations aim to develop and apply mathematical approaches to the challenges of predicting animal movement and distribution. A better scientific understanding of these patterns will help optimize the management of boreal forest ecosystems essential to the economy of Canada's northern regions while mitigating the impact of human activity on caribou populations.

Inspired by the principles and possibilities of blending mathematics and science, Dr. Buono earned his both his Bachelor of Science and Master of Science in mathématiques from the Université de Montréal in Montréal, Québec, and received his Doctorate in Mathematics from the University of Houston, in Houston, Texas. He returned to Canada as a Canadian Mathematical Society Instructor at the University of Ottawa, then spent 18 months as a post-doctoral fellow at the University of Warwick and Imperial College London (UK), before receiving a two-year NSERC post-doctoral fellowship at the Centre de recherches mathématiques of the Université de Montréal.

Dr. Buono joined UOIT as an Assistant Professor in 2004, and was appointed to his current role in 2009. He has been instrumental in the development and growth of graduate programs in Modelling and Computational Science. Dr. Buono is an Adjunct Professor in the Department of Mathematics and Statistics at Queen's University in Kingston, Ontario and Université Laval in Québec.

Education/Learning, Research

Bifurcation Theory, Ordinary Differential Equations, Delay-Differential Equations, Hamiltonian Equations, Mathematical Biology, Cells and Networks, Symmetric Dynamical Systems, Ecology - Animal Movement and Space Use, Animal Gaits, N-Body Problem, Laser Dynamics

Canadian Applied and Industrial Mathematics Society , Society for Industrial and Applied Mathematics

Synchronization and Dynamics in Symmetric Networks of Differential Equations: with Applications to Sensing and Power Devices

Departmental Colloquium, Department of Mathematics and Statistics

Dynamique du mouvement animal: isolé ou en groupe, une seule approche mathématique suffit!

Midis des sciences naturelles. Département de biologie, chimie et géographie, Université du Québec à Rimouski

Patterns in Collective Motion and Space Use of Animal Populations: A Mechanistic Approach

Joint Mathematical Meetings

Stability Analysis and Bifurcations of the Hip-Hop Orbit and Beyond

Joint Mathematical Meetings

Stability Analysis and Bifurcations of the Hip-Hop Orbit and Beyond

Banff International Research Station Spectral Analysis, Stability and Bifurcation in Modern Nonlinear Physical Systems

Bifurcation in Symmetric Delay Coupled Ring of Lasers

International Conference on Theory and Application in Nonlinear Dynamics (ICAND) 2012

Robust Heteroclinic Cycles in Delay Differential Equations

9th American Institute of Mathematical Sciences (AIMS) Conference on Dynamical Systems, Differential Equations and Applications

University of Houston

PhD Mathematics

Université de Montréal

MSc Mathématiques

Université de Montréal

BSc Mathématiques

Adjunct Professor, Department of Mathematics and Statistics, Queen's University

Dr. Buono has co-supervised two MSc students and one PhD student, and serves on several graduate examining committees at Queen's University.

NSERC Post-doctoral Fellowship, Centre de recherches mathématiques, Université de Montréal

During this two-year post-doctoral fellowship. Dr. Buono collaborated with researchers in Canada and the U.S. on delay-differential equations.

Editorial Board, Accromath

Appointed to the editorial board of this Québec journal for the popularization of mathematics.

Board of Directors, Canadian Applied and Industrial Mathematics Society

In this role, Dr. Buono has been appointed Communications Officer of the Executive Committee to 2019.

[Please click here to view the full profile.](#)

This profile was created by [Expertfile](#).