

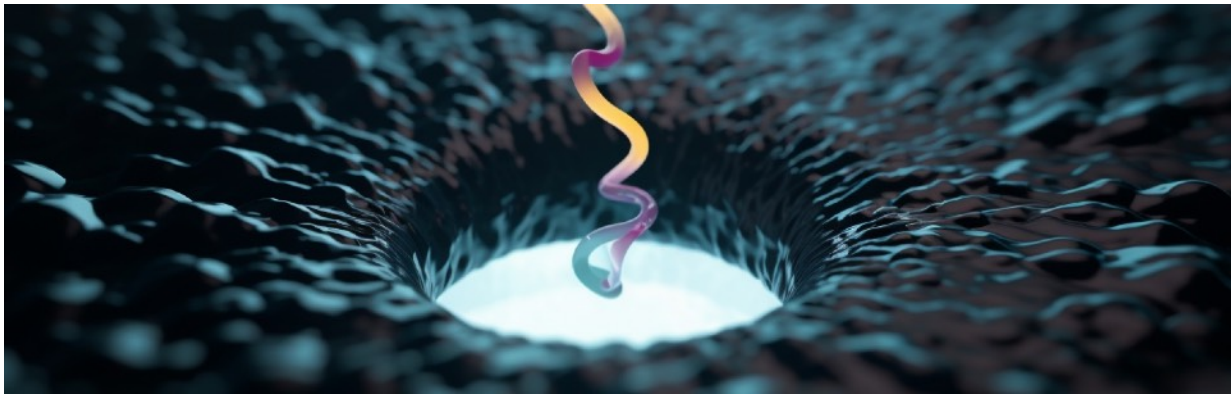
Vincent Tabard-Cossa

Department of Physics, University of Ottawa, Ottawa, ON

www.tcoosalab.net

Title: Nanopores: a transforming technology for genomics and proteomics.

Abstract: In the last decade, the emergence of single-molecule DNA and RNA nanopore sequencing has transformed genomics. Nanopores are molecular size holes in thin membranes that can electrically identify single molecules as they thread through. Yet, applications of nanopores extend far beyond the current success of the technology, and nanopores are being explored to decode digital information stored on synthetic molecules, quantify disease biomarkers, fingerprint proteins and more. In this talk, I will review fundamental and applied advances in the nanopore field, with a focus on recent progress toward developing applications in proteomics.



Bio: Vincent is a Full Professor in the Department of Physics at the University of Ottawa, a University Research Chair in Nanoscale Biophysics and Nanopore Science, and Vice-Dean innovations, entrepreneurship and strategic partnerships for the Faculty of Science. He is a member of the Ottawa-Carleton Institute for Biomedical Engineering, and cross-appointed with the Department of Chemistry and Biomolecular Sciences. He was also Chief Scientific Officer (part-time) of Northern Nanopore Instruments, a company he co-founded in 2020 that specializes in research tools and solutions to support fundamental and applied research on solid-state nanopores, until its acquisition in 2023 by Oxford Nanopore Technologies.



His research program is dedicated to the development of novel techniques and methods to manipulate and characterize single molecules using nanofluidic devices, to unravel the basic physics governing the behaviour of biological molecules in nanoconfined geometries, and ultimately to translate these discoveries into new tools for the health and life sciences. He is known for the pioneering of a simple, yet remarkably precise nanofabrication technique for making nanopores in thin solid-state membranes, which is helping to democratize nanopore-based research.

EDUCATION

- B.Sc. Physics, McGill University, Canada, 2000
- Ph.D. Physics (supervisor: P. Grutter), McGill University, Canada, 2006
 - *Ph.D. thesis research was performed in Peter Grütter's Scanning Probe Microscopy and Nanoscience group in the Physics Department at McGill University. He investigated the origins of surface stress when various types of molecules trigger chemical/physical reactions at gas-solid and liquid-solid interfaces using AFM-based microcantilever sensors.*
- 2006-2008: Postdoctoral Fellow, Applied Biophysics. (supervisor: A. Marziali), University of British Columbia,
 - *In the applied biophysics group of Andre Marziali at the University of British-Columbia (UBC), he studied single-molecule bonds (DNA-DNA for genotyping and receptor-ligand for drug screening applications) using solid-state nanopore-based force spectroscopy.*
- 2008-2010: Postdoctoral Fellow, Stanford Genome Technology Centre (supervisor: R. W. Davis), Stanford University
 - *At the Stanford Genome Technology Center, with Ron Davis, he studied the screening behaviour of DNA polymers and fluid transport under high electric fields in nanofluidic transistors, i.e. electrically gated nanopore devices.*

EMPLOYMENT HISTORY

- 2024-present Vice-Dean innovations, entrepreneurship and strategic partnerships, Faculty of Science, University of Ottawa
- 2022- present Full Professor, Department of Physics, University of Ottawa
- 2015-2022 Associate Professor, Department of Physics, University of Ottawa
- 2020-2023 Chief Scientific Officer (part-time) and co-founder, Northern Nanopore Instruments
- 2010-2015 Assistant Professor, Department of Physics, University of Ottawa

ACADEMIC HONOURS

- 2021 Canadian Association of Physicists (CAP) Industrial and Applied Physics Medal
- 2019 Member of the College of the Royal Society of Canada
- 2018 University of Ottawa Early Career Researcher of the Year Award
- 2016 Ontario Early Researcher Award
- 2009 Rising Young Investigator Award, Genome Technology Magazine