Francesco Ambrogi - Curriculm Vitae

Education

2019-2023 **Queen's University** Ph.D. Mechanical Engineering
Thesis title: *Characterization of unsteady flow separation in a turbulent boundary layer via Large-Eddy Simulation.*

2016-2019 **University of Bologna** M.S. Energy and Nuclear Engineering
Thesis title: *Tritium Transport and In-Core Absorption in the Fluoride-salt-cooled High-temperature Reactor (FHR).*

2012-2015 **University of Modena** B.S. Mechanical Engineering
Thesis title: *Identification, analysis and experimental validation of predictive models to calculate injection molding machine's energy consumption.*

Work Experience

May 2025 - Present **Queen's University** Assistant Professor (tenure-track)
Sept - May 2025 **Queen's University** Adjunct Assistant Professor

- MREN 230 (Thermodynamics and Heat Transfer): primary instructor and course developer
- MECH 444 (Computational Fluid Dynamics): co-instructor
- APSC 103 (Engineering Design): faculty advisor

Jun - Sept 2024 **University of Waterloo** Postdoctoral Research Fellow

- Research area: particle-laden turbulent flows via computational fluid dynamics.

Jan - Jun 2024 **University of Waterloo** Research Assistant

- ARC4CFD: course co-developer of Advanced Research Computing for Computational Fluid Dynamics, a 16-hours long, open-source, asynchronous course on how to leverage high performance computing resources for computational fluid dynamics.

2023-present **Royal Military College of Canada** Adjunct assistant professor

- MEE 311 (Fluid Mechanics I): primary instructor and course developer
- MEE 315 (Fluid Dynamics): primary instructor and course developer
- MEE 313 (Fluid Mechanics II): primary instructor and course developer

2022-present **Queen's University** Adjunct assistant professor

- MECH 330 Fall 2024 (Applied thermodynamics II)
- MREN 241 Fall 2024 (Fluid Mechanics and Fluid Power)
- MECH 241 Winter 2024 (Fluid Mechanics I): primary instructor and course developer.
- MECH 241 Winter 2023 (Fluid Mechanics I): primary instructor and course developer.

2019-2022 **Queen's University** Teaching Assistant

- MECH 241 (Fluid Mechanics I): lead teaching assistant (fall and winter term)
- MECH 341 (Fluid Mechanics II): lead teaching assistant and assistant instructor
- MECH 398 (Mechanical Engineering Lab): lead teaching assistant (airflow in pipes module)

2020-2022 **Queen's University** Lead teaching assistant

- Interdisciplinary engineering for sustainability and innovation. This is a winter term 4 credit course in which I acted as a lead teaching assistant to a cohort composed of 5 fellow teaching assistants, and 25 students.
- How to Change the World booth camp. This is a one-week long workshop organized across the world, in which I acted as lead teaching assistant.

Published Journal Articles

1. Hickey JP, Ambrogi F., Hillcoat S., Joseph J., Lokanatha N. **"ARC4CFD: Learning how to leverage High-Performance Computing with Computational Fluid Dynamics."** Journal of Open Source Education 8(87) 252 (2025)

2. Ambrogi F., Piomelli U., and Rival D. E. **"Influence of Time-Varying Freestream Conditions on the Dynamics of Unsteady Boundary-Layer Separation."** AIAA Journal 1-10 (2024)

3. MacDougall1 C. Y., Piomelli U., and Ambrogi F. **"Evaluation of turbulence models in unsteady separation."** Fluids 8(10) (2023).

4. Ambrogi F., Piomelli U., and Rival D. E. **"Characterization of unsteady separation in a turbulent boundary layer: Reynolds stresses and flow dynamics."** Journal of Fluid Mechanics 972 (2023): A36

5. Ambrogi F., Piomelli U., and Rival D. E. **"Characterization of unsteady separation in a turbulent boundary layer: mean and phase-averaged flow."** Journal of Fluid Mechanics 945 (2022): A10.

Conferences and other publications

- Ambrogi F., Piomelli U., and Rival D. E. **Influence of time-varying freestream conditions on unsteady separation in a turbulent boundary layer** 76th American Physical Society (APS) Division of Fluid Dynamics, Washington DC - 2023

- Ambrogi F., Piomelli U., and Rival D. E. **Advection dynamics of a turbulent separation bubble** The 14th International ERCOFTAC Symposium on Engineering Turbulence Modelling and Measurements, Barcelona (Spain) - 2023

- Ambrogi F., Piomelli U., and Rival D. E. **Frequency dependence of unsteady separation in a turbulent boundary layer** 75th American Physical Society (APS) Division of Fluid Dynamics, Indianapolis (Indiana) - 2022.

- MacDougall C.Y., Piomelli U., and Ambrogi F. **Performance of Reynolds Averaged Navier Stokes Models for Unsteady Separated flows** 75th American Physical Society (APS) Division of Fluid Dynamics, Indianapolis (Indiana) - 2022.

- Ambrogi F., Piomelli U., and Rival D. E. **Large-Eddy simulation of a turbulent boundary layer with unsteady pressure gradients** Twelfth International Symposium on Turbulence and Shear Flow Phenomena (TSFP12), Osaka - 2022.

- Ambrogi F., Piomelli U., and Rival D. E. **Dynamics of turbulent kinetic energy advection in a turbulent boundary layer under unsteady pressure gradients** 13th Direct and Large Eddy Simulation, Undine, (Italy) - 2022.

- Ambrogi F., Hantsis Z., Rival D. E., and Piomelli U. **Large-Eddy simulation of a boundary layer with unsteady pressure gradient** 74th American Physical Society (APS) Division of Fluid Dynamics, Phoenix (AZ) - 2021.

Honors and awards

- **2024-2025** Engineering Society at Queen's University
  Golden Apple Award: The Golden Apple was created in December of 1970 by the Engineering Society Development Committee as a means for undergraduate students to honor faculty members.

- **2024-2025** Mechatrocincs and Robotics Engineering program
  Most approachable professor

- **2024-2025** Queen's University
  Silver Wrench Award: presented on an annual basis, this award recognizes the professor who displays the most interest and enthusiasm towards Mechanical Engineering as chosen by the graduating year.

- **2023-2024** Queen's University **Silver Wrench Award**

- **2022-2023** Queen's University **Silver Wrench Award**

- **2022-2023** Rotary International
  Rotaract Leadership Award

- **2021-2022** Queen's University
  Bronze Wrench Award: Presented on an annual basis, this award recognizes the teaching assistant who displays the most interest and enthusiasm towards Mechanical Engineering as chosen by the graduating year.

- **2021-2022** Queen's University
  Dean's Teaching Assistant (DTA) Award

Supervision

2022-2023 **Queen's University** Claire MacDougall (M.S. student)
2022-2023 **Queen's University** Michael Kelly (B.S. student)
2025-2026 **Queen's University** Ahnaaf Khan (B.S. student)
2025-2026 **Queen's University** Antony Morales (B.S. student)

Volunteering and Association

1. 2024 - present **Rotary Club of Kingston**
   - Regular member since June 2024
   - Board of directors member since April 2025

2. 2023-2024 **Rotary International** Assistant Governor Rotaract
   This is my first district leadership position. I have been selected by the Governor-Elect (23-24) as the Assistant Governor Rotaract for the district 7040 (Ontario and upstate New York). My goal is to oversee and help all Rotaract Clubs in our Area.

3. 2022-2023 **Rotaract Club of Kingston** Club Treasurer & Past President
   Rotaract International is a non-for-profit organization partner of Rotary International. The main goal is to gather together highly motivated young and early career professionals and help the local community thrive while improving leadership skills.

Contact

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