Cyril Tain

Doctor in Applied Mathematics

Born: May 19, 1982.
Nationality: French.
City: Rouen (France).

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Research interests and skills

Scientific Computing, Mathematical Modelling, Numerical Analysis,

- Numerical analysis and methods for modelling superconductivity in 2D and 3D: London model, time dependent Ginzburg-Landau model, steady state Ginzburg-Landau model.
- Finite elements (Lagrange, Raviart-Thomas, Nedelec), finite and boundary elements coupling (FEM-BEM), optimization (Sobolev Gradients), finite difference.
- Expertise with FreeFem. Fluent in Matlab, Fortran. Good knowledge of Python (data science). Basics in R, C/C++, MPI/OpenMP.
- Other interests: machine learning, modelling of medical or biological systems, modelling earth.

Education and Work Experience

- **2023** Temporary position for research and teaching (ATER).
  Subjects (level): scientific calculus (3rd year students in mathematics), statistics (3rd year students in biology), probability and statistics (2nd year students in informatics), basic calculus (1st year students in chemistry).
  University of Rouen Normandy.
- **2023** PhD in Applied Mathematics (2021-2023).
  Dissertation: Modelling Type II Superconductors: Implementation with

FreeFEM.
INSA Rouen Normandy and University of Rouen Normandy.

- **2020** MSc in Applied Mathematics.
  Specialities: partial differential equations, probability.
  University of Rouen Normandy.
  With honours.

- **2018** External agrégation in mathematics (speciality: probability and statistics).

- **2012-2020** Teaching duty in secondary and high schools (France).

Invited and conference talks

- (2025) *7th Edition of the Advanced Materials Science World Congress.* London UK, on March 24-25.
  (https://advanced-materialsscience.peersalleyconferences.com)

- (2024) *Workshop on Vortices in fluids and superfluids. Geophysics and quantum physics flows.* LMRS, Rouen Normandy University, in front of Japanese scientists. (https://lmrs-num.math.cnrs.fr/workshop.html)

- (2023) *The 13th International Workshop on Processing and Applications of Superconducting (RE)BCO Materials (PASREG 2023).* Caen Normandy University. (https://pasreg2023.sciencesconf.org)

- (2023) *Workshop on Multiscale analysis and methods for PDEs: fluids and active matter dynamics.* Scientific session for young researcher at IMS (Institute for Mathematical Science) in Singapour. (https://ims.nus.edu.sg/events/qkp2023/)

Other presentations

- (2022) *Workshop Nonlinear and Random Waves.* RIMS, Kyoto. Presentation of my work to the Japanese team lead by Pr. Takashi Sakajo. (IEA-CNRS *Mathematical and Physical Models for Superfluids and Superconductors* lead by Pr. Ionut Danaila).

- (2022) *Jean-Morlet Chair 2022: Research School - Domain Decomposition for Optimal Control Problems.* CIRM, Marseille. Poster session. (https://www.cirm-math.fr/index.html)

- (2022) *45th National Congress of Numerical Analysis.* Evian-les-Bains. Poster session. (https://canum2020.math.cnrs.fr)

Publications

- C. Tain and J-G. Caputo and I. Danaila, Influence of gauges in the numerical simulation of the TDGL model. *Acta Appl Math* 194, 13, 2024. (https://link.springer.com/article/10.1007/s10440-024-00701-x).
- C. Tain, *Modelling of type II superconductors: implementation with FreeFem*, Analysis of PDEs [math.AP]. Normandie Université, 2023. English. NNT : 2023NORMIR40 . tel-04546205. (https://theses.hal.science/tel-04546205/file/TAIN-Cyril.pdf)
- J-G. Caputo, I. Danaila, and C. Tain, *An Abelian Higgs model of pulsed field magnetization in superconductors*, **Journal of Physics: Conference Series**, 2043, p. 012006, 2021. (https://iopscience.iop.org/article/10.1088/1742-6596/2043/1/012006/pdf)

Engagement in networks/groups

- Representative of the doctoral students at the doctoral school edMIIS (duration: October 2021 - February 2024).
- Representation of the doctoral students at LMRS, University of Rouen Normandy (duration: 17/03/2022 - 08/02/2024).
- Co-organizer of the seminars dedicated to doctoral students (duration: June 2022 - October 2023).

Spoken langages

- French (native)
- English (level: B2)
- German (classroom study)