NICOLÒ PERELLO

MATHEMATICAL ENGINEER

ABOUT ME

I am a PhD student at the University of Genoa in Risk, Climate Change and Sustainable Development.
I am interested in developing mathematical models and software tools for the simulation of environmental and physical problems. My research focuses on wildfires, in particular on forest fire danger forecast systems and the simulation of wildfire propagation.

CONTACTS

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Hard Skills
Mathematical and physical modeling - Numerical simulation

Soft Skills
Working in a team - Communication skills - Creative mind

RESEARCH EXPERIENCE

PhD Student
UNIVERSITY OF GENOA | JANUARY 2022 - PRESENT

I am enrolled in the PhD in Security, Risk and Vulnerability - curriculum Risk, Climate Change and Sustainable Development. My research will focus on mathematical modelling for wildfire risk management.
I am currently conducting my research activity at CIMA Research Foundation within the Wildfire Risk Management and Forest Conservation group.

Research Visiting Period
FEDERAL UNIVERSITY OF MINAS GERAIS (BRAZIL)
CSR - CENTRE OF REMOTE SENSING
OCTOBER 2023 - JANUARY 2024

I carried out a research period in the Centre of Remote Sensing of the Federal University of Minas Gerais (Belo Horizonte, Brazil) to study the models developed by the hosting institution on wildfire risk management. During this time, I also learned the basic concepts of the Dinamica EGO simulation software.

University Teaching Assistant
UNIVERSITY OF GENOA

Mentoring and seminars for the course "Wildfire Risk Assessment and Management" of the Master of Science in Engineering for Natural Risk Management (a.y. 2022-2023 / 2023-2024).

LANGUAGE SKILLS

Italian Mother tongue
English *Listening* C1 | *Reading* C1 | *Writing* C1 | *Speaking* C1
Portuguese *Listening* B1 | *Reading* B1 | *Writing* A1 | *Speaking* A2

DIGITAL SKILLS

- Windows, Ubuntu
- Python, C, C++, Matlab
- Visual Studio Code, JupyterLab, Conda, Git/GitHub, QGIS, Dinamica EGO, LaTeX

Temporary Research Fellow

UNIVERSITY OF GENOA | JULY 2021 - DECEMBER 2021

My research activity was entitled: "Numerical Modeling Applied to Risk Simulation and Prediction of Forest Fire and Urban-Forest Interface Fire Behaviour in the Framework of the MED-Star Project". The objective of the MED-Star project was to develop common strategies in preventing and managing wildfires in the Mediterranean area. In particular, during my activity I have focused on modeling, data mining and data analysis .
I conducted my research activity at CIMA Foundation within the Wildfire Risk Management and Forest Conservation group.

EDUCATION

Master Degree in Mathematical Engineering

POLYTECHNIC OF TURIN | 2018 - 2021

Study field: Mathematical Engineering - Mathematical Models and Numerical Simulations
Final grade: 110/110 cum laude
Thesis: A Particle-Based Analysis of the Saltation Process: Models, Numerical Methods and Tests

My M.Sc. degree gave me a solid foundation in mathematics, and the ability to build mathematical models for engineering and environmental problems. Further, my education in numerical modelling allows me to simulate such models with software tools. The main courses I have attended are: Continuum Mechanics, Fluid Mechanics, Solid and Porus Media Mechanics, Mathematical Models in Biomedicine, Numerical Methods for PDE, CFD and Wind Engineering. During my thesis I developed a model to simulate the windblown sand phenomenon.

Bachelor Degree in Mathematical Engineering

POLYTECHNIC OF TURIN | 2015 - 2018

Field of study: Applied Mathematics in Engineering
Final grade: 110/110 cum laude
Thesis: Stability and Bifurcations in Population Dynamics Models

I was part of the Young Talent Path at the Polytechnic of Turin, which allowed me to attend seminars and additional activities. The main courses I have followed are: Calculus, Functional Analysis, PDE, Probability Theory, Statistics, Computer Programming, Scientific Programming, Numerical Methods.

CONFERENCES

- IAMES2024 - 3rd IFAC Workshop on Integrated Assessment Modeling for Environmental Systems
- FBF2024 - 7th International Fire Behvaior and Fuels Conference
- MACMAS - 2nd International Conference on Mathematical and Computational Modeling, Approximation and Simulation 2023. 29-31 May, Turin (Italy)
- 8th International Wildland Fire Conference 2023. 16-19 May, Porto (Portugal)
- EGU General Assembly 2023. 23-28 April, Wien (Austria)
- Fire Ecology Across Boundaries 2022. 4-7 October, Firenze (Italy)
- ICFBR 2022 - Third International Conference of Fire Behavior and Risk. 3-6 May, Alghero (Italy)

PROJECTS

- ARISTOTLE-ENHSP
http://aristotle.ingv.it/tiki-index.php

- SAFERS
https://safers-project.eu/

- MED-STAR
https://interreg-maritime.eu/web/med-star

PUBLICATIONS

- Perello, N., Trucchia, A., Baghino, F. et al. *Cellular automata-based simulators for the design of prescribed fire plans: the case study of Liguria, Italy*. fire ecol 20, 7 (2024). https://doi.org/10.1186/s42408-023-00239-7

- Trucchia A, D'Andrea M, Baghino F, Perello N, Rebora N, Paolo Fiorucci. *Experiences and Lessons Learnt in Wildfire Management with PROPAGATOR, an Operational Cellular-Automata-Based Wildfire Simulator*. In: Responding to Extreme Weather Events (pp.49-76), online ISBN: 9781119741374 (2024) https://doi.org/10.1002/9781119741374.ch3

- Perello, N.; Trucchia, A.; D'Andrea, M.; Esposti, S.D.; Fiorucci, P. RISICO, An Enhanced Forest Fire Danger Rating System: Validation on 2021 Extreme Wildfire Season in Southern Italy. Environ. Sci. Proc. 17, 37 (2022). https://doi.org/10.3390/environsciproc2022017037

COMMUNICATION AND INTERPERSONAL SKILLS

- Ability to work as part of a team gained in the university, and refined during my experience in these years working in a research center and being involved in different projects, where the interaction with stakeholders was of primary importance.

- Good communication and interpersonal skills, developed during my university studies, working at the university library and in a web radio, and during the tutoring activity I conducted at the University of Genoa. I have refined my communication skills during these years working in different projects and participating to conferences.