

Nicolò Perello

ABOUT MYSELF

I am a researcher in wildfire science with a background in Mathematical Engineering and expertise in environmental modelling. I hold a PhD in Security, Risk and Vulnerability, where my research focused on mathematical modelling for wildfire risk management and civil protection applications.

WORK EXPERIENCE

CIMA Foundation - Italy, Savona

Researcher

[13/01/2025 - Current]

I am a wildfire researcher within the *Wildfire Risk Management and Forest Conservation* group, focusing on wildfire spread modeling and forest fire danger rating systems.

CIMA Foundation - Italy, Savona

Situation room operator

[01/07/2023 - Current]

I carry out technical and scientific analysis activities as a situation room operator, focusing on forecasting and monitoring tools for flood and wildfire risks.

University of Genoa - Italy, Savona

University teaching assistant

[28/10/2022 - 28/02/2026]

I conducted tutorials and seminars for the *Wildfire Risk Assessment and Management* course and for Python programming in the Master's degree program in *Engineering for Natural Risk Management*.

University of Genoa - Italy, Genova

University tutor

[14/06/2022 - 15/03/2023]

Tutoring in university courses of Calculus and Linear Algebra.

University of Genoa - Italy, Savona

Temporary research fellow

[01/07/2021 - 31/12/2021]

My research activity was entitled: *Numerical Modelling Applied to Risk Simulation and Forecasting of Forest Fire behaviour in the Wildland-Urban Interface within the Framework of the MED-Star Project*. During my activity I have focused on wildfire propagation models.

EDUCATION & TRAINING

PhD in Security, Risk and Vulnerability

University of Genova [01/01/2022 - 26/06/2025]

City: Savona | **Country:** Italy

Website: <https://sites.google.com/view/sicurezzaunigenet/> | **Thesis:** Developing a Modeling Framework for Integrated Wildfire Management Strategies: Preventing, Forecasting and Managing Extreme Wildfires

Link: <https://unige.iris.cineca.it/handle/11567/1253440>

My research topic is wildfire risk management, specifically focusing on forest fire danger rating systems and the simulation of fire behaviour and spread, with the goal of developing modelling tools suitable for operational use in the context of Civil Protection.

Environmental Modelling Training with Dinamica EGO

Universidade Federal de Minas Gerais, Centro de Sensoriamento Remoto, Instituto de Geociências [19/10/2023 - 15/01/2024]

City: Belo Horizonte | **Country:** Brazil

Website: <https://csr.ufmg.br/csr/en/>

During the time spent at the institute, I acquired the necessary knowledge to use the software *Dinamica EGO*, which is used for environmental modelling.

Summer School on Sensitivity Analysis of Model Output

Joint Research Center of the European Commission; University of Parma. [24/06/2024 - 28/06/2024]

City: Parma | **Country:** Italy

Website:

https://knowledge4policy.ec.europa.eu/event/twelfth-summer-school-sensitivity-analysis-model-output-samo-2024-parma-italy_en

I acquired fundamental knowledge of the main techniques for sensitivity analysis of mathematical models.

Winter School on Fire Behaviour, Risk and Management in the Context of Climate Change

University of Sassari; Centro Euro-Mediterraneo sui Cambiamenti Climatici [03/2022 - 05/2022]

Country: Italy

Website:

<https://www.cmcc.it/it/training-programs/cmcc-uniss-winter-school-on-behavior-risk-and-management-of-fires-in-the-context-of-climate-change>

I participated in online training sessions on wildfires, their connection to climate change, their management in the wildland-urban interface context, and land-use planning.

Master Degree in Mathematical Engineering

Polytechnic of Turin [09/2018 - 03/2021]

City: Torino | **Country:** Italy

Field(s) of study: Ingegneria matematica: | **Final grade:** 110/110 cum laude | **Thesis:** A Particle-Based Analysis of the Saltation Process: Models, Numerical Methods and Tests

My field of study focuses on *Mathematical Models and Numerical Simulations*. The main courses I have attended include Continuum Mechanics, Fluid Mechanics, Solid and Porous Media Mechanics, Mathematical Models in Biomedicine, Numerical Methods for PDEs, CFD, and Wind Engineering.

Bachelor's Degree in Mathematical Engineering

Polytechnic of Turin [09/2015 - 10/2018]

City: Torino | **Country:** Italy

Final grade: 110/110 cum laude | **Thesis:** Stability and Bifurcations in Population Dynamics Models

My field of study focuses on *Applied Mathematics in Engineering*. The main courses I have attended include

PUBLICATIONS

Statistical dynamics of wildfire burned area from cellular-automata simulators

Sahila A., Canfora B., Canzaniello M., Perello N. et al. Scientific Reports, 16, 998 (2026)

Fuel-aware forest fire danger rating system RISICO: a comparative study for Italy

Scientific paper. Analysis and validation of a fire danger rating system.

Perello N, Trucchia A, D'Andrea M, et al. International Journal of Wildland Fire 34, WF25023 (2025)

Modeling wildfires in the Alpine context: Lessons learnt from real case studies

Scientific paper. Simulation of wildfire events and model assessment.

Malanchini L., Perello N., Trucchia A., et al. Environmental Challenges, 21, 101357 (2025)

Patterns of burned area by a cellular-automata fire simulator: The role of microscale wind field

Sahila A., Fiorese A., Perello N. et al. Communications in Nonlinear Science and Numerical Simulation, 151, 109026 (2025)

[2024]

An Adaptable Dead Fuel Moisture Model for Various Fuel Types and Temporal Scales Tailored for Wildfire Danger Assessment

Scientific paper. Development of a Dead Fuel Moisture Dynamics model for forest fire danger rating systems and its calibration using field measurements.

Perello N., Trucchia A., D'Andrea M., et al. Environmental Modelling & Software, 106254 (2024)

[2024]

Cellular automata-based simulators for the design of prescribed fire plans: the case study of Liguria, Italy

Scientific paper. Use of the cellular automata-based wildfire propagation simulator *Propagator* for planning prescribed fire activities in the context of wildfire risk mitigation.

Perello N., Trucchia A., Baghino F., et al. Fire Ecology, 20, 7 (2024)

[2024]

Machine Learning-Driven Dynamic Maps Supporting Wildfire Risk Management

Short paper. Use of Machine Learning techniques for time series analysis and the development of wildfire danger forecasting maps to support decision-making in the context of Civil Protection.

Perello N., Meschi G., Trucchia A., et al. IFAC-PapersOnLine, 58, 2, pp. 67-72 (2024)

[2024]

Experiences and Lessons Learnt in Wildfire Management with PROPAGATOR, an Operational Cellular-Automata-Based Wildfire Simulator

Book chapter. Description of the *Propagator* wildfire propagation model and its use for wildfire risk management.

Trucchia A., D'Andrea M., Baghino F., Perello N. et al. in "Responding to Extreme Events" (2024)

[2024]

Integrating Phenology in Operational Early Warning for Forest Fires Using Sentinel-2 Data

Extended abstract. Use of satellite-based vegetation indices in the forest fire danger rating system *RISICO*.

Perello N., Trucchia A., D'Andrea M., Parshina O. et al. Cnr Edizioni (2024)

Operational Application of Mathematical Modeling for Enhanced Wildfire Risk Management in Liguria

Short paper. Operational use of wildfire modeling in civil protection, with a case study of the Liguria region (Italy).

Baghino F., Gissi E., Perello N., Fiorucci P. IFAC-PapersOnLine, 58, 2, pp. 61-66 (2024)

[2024]

World Drought Atlas

Book. European Commission Joint Research Centre and United Nations Convention to Combat Desertification. I contributed to the wildfire topic related to drought.

A. Toreti, D. Tsegai, and L. Rossi Eds., Publications Office of the European Union (2024)

PROJECTS

[01/05/2023 - Current]

ARISTOTLE-eENHSP As part of the project, I carry out monitoring activities for wildfire risk assessment.

Link: <http://aristotle.ingv.it/tiki-index.php>

[01/01/2023 - 02/07/2024]

SAFERS - Structured Approaches for Forest fire Emergencies in Resilient Societies I contributed to the development of the *Propagator* wildfire propagation model, integrated within the platform developed in the project.

Link: <https://safers-project.eu/>

[03/2022 - 06/2022]

MED-STAR - Strategies and measures for fire risk mitigation in the Mediterranean area I participated in firefighting training activities organized within the project, as an expert supporting the use of the propagation model *Propagator* developed by CIMA Foundation.

Link: <https://interreg-maritime.eu/web/med-star>

[03/2022 - 06/2022]

CRISPRO - Security and Protection Through Knowledge Synergies I participated in the evaluation of the *e-tool* for self-assessment of territorial vulnerability developed within the project, and I conducted some training sessions during the experience-sharing meetings and discussion-based exercises organized in Spain and Italy.

Link: <https://crispro.eu/>

CONFERENCES & SEMINARS

[03/11/2025 - 07/11/2025] Cargese, Corsica (France)

Numerical Wildfire and AI Weather 2025 I presented: "From Research to Operational Tool: PROPAGATOR as an Open-Source Cellular Automata Wildfire Simulator"

Link: <https://forefireapi.github.io/cargese2025/>

[09/09/2025 - 11/09/2025] Turin

Workshop GdL Gestione Incendi Boschivi SISEF I was speaker for a presentation titled: "RISICO: A Fuel-Informed Fire Danger Rating Tool for Operational and Strategic Applications"

[28/04/2025 - 04/05/2025] Vienna

EGU General Assembly 2025 I was speaker for a presentation entitled: "Fuel-aware Forest Fire Danger Rating"

System RISICO: a comparative study for Italy".

Link: <https://www.egu25.eu/>

[01/10/2024 - 04/10/2024] Luso, Portugal

Optimization and Wildfire Conference I was a speaker for a presentation titled: "Optimized Design of Wildfire Risk Mitigation Actions," where I demonstrated how the *Propagator* propagation model can be used to optimize prescribed fire actions. I also presented a study titled: "Optimized Hourly Fuel Moisture Model for Enhanced Wildfire Danger Assessment," in which an hourly dynamic model of dead fuel moisture was developed and calibrated.

Link: <https://ow.dps.uminho.pt/>

[19/09/2024 - 20/09/2024] Milan, Italy

13th EARSeL Workshop on Forest Fires 2024 - Remote Sensing of Forest Fires: Lessons learned and future challenges under a changing climate I was a speaker for a presentation titled: "Integrating Phenology in Operational Early Warning for Forest Fires Using Sentinel-2 Data," where I analyzed the impact of integrating satellite-derived vegetation indices into the forest fire danger rating system *RISICO*.

Link: <https://forest-fires.earsel.org/workshop/13-FF-2024/>

[15/07/2024 - 17/07/2024] Gran Canaria, Spain

10th International Conference on Time Series and Forecasting I presented an analysis titled: "Dynamic Maps Powered by Machine Learning and Time Series Classification for Wildfire Risk Management," in which I demonstrated the operational implementation of a wildfire occurrence forecasting model that uses time series analysis with Machine Learning techniques.

Link: <https://itise.ugr.es/>

[29/05/2024 - 31/05/2024] Savona, Italy

3rd IFAC Workshop on Integrated Assessment Modeling for Environmental Systems I presented an analysis titled: "Machine Learning-Driven Dynamic Maps Supporting Wildfire Risk Management," in which I showcased a model for forecasting wildfire occurrence events through time series analysis using Machine Learning techniques. The paper was awarded the "Best Young Paper Award IAMES 2024."

Link: <https://iames.unige.it/it>

[15/04/2024 - 19/04/2024] Tralee, Ireland

7th International Fire Behavior and Fuels Conference I was a speaker for a presentation titled: "The use of Machine Learning-informed fuel map in the wildfire propagation model PROPAGATOR," where I analysed the use of a fuel map derived from Machine Learning techniques within the *Propagator* wildfire propagation model. I also presented a poster titled: "PROPAGATOR for large wildfires: Brazilian case study," where I used the *Propagator* model to simulate large wildfires in Brazil.

Link: <https://tralee.firebehaviorandfuelsconference.com/>

[11/12/2023 - 12/12/2023] Campo Grande, Brazil

II Seminário Anual PELD Fogo I presented an analysis of the modeling tools dedicated to wildfire risk management developed by the CIMA Foundation and the Remote Sensing Center at the Federal University of Minas Gerais.

Link: <https://nefaupeldfogopantanal-inbio.ufms.br/>

[29/05/2023 - 01/06/2023] Turin, Italy

2nd International Conference on Mathematical and Computational Modelling, Approximation and Simulation I presented an analysis titled: "PROPAGATOR for Prescribed Fires: Liguria Case Study," where the use of the *Propagator* forest fire propagation model for prescribed fire planning is shown.

Link: <https://www.macmas2023.unito.it/>

[16/05/2023 - 19/05/2023] Porto, Portugal

8th International Wildland Fire Conference I presented a poster titled: "The Role of Vegetation in Forest Fire Danger Rating Systems: RISICO Experience in Italy," where the use of Machine Learning techniques for fuel map definition useful for forest fire modeling is shown.

Link: <https://www.wildfire2023.pt/>

[23/04/2023 - 28/04/2023] Vienna, Austria

EGU General Assembly 2023 I presented a poster titled: "A Tailored Fine Fuel Moisture Content for Improving Wildfire Danger Rating Systems," showing a model for fuel moisture simulation and its calibration on observed data.

Link: <https://www.egu23.eu/>

[04/10/2022 - 07/10/2022] Florence, Italy

Fire Ecology Across Boundaries I presented an analysis titled: "The Use of Modelling Tools for an Optimized Design of Prescribed Fire Plans," in which I showed how the *Propagator* forest fire propagation model, developed by CIMA Research Foundation, can be used for prescribed fire planning.

Link: <https://fireecology.org/calendar-entries/fire-ecology-across-boundaries>

[03/05/2022 - 06/05/2022] Alghero, Italy

International Conference of Fire Behavior and Risk I presented an analysis titled "RISICO, an Enhanced Forest Fire Danger Rating System: Validation on 2021 Extreme Wildfire Season in Southern Italy", in which I analyzed the forest fire danger rating system *RISICO* and its performances in summer 2021 in Italy.

Link: <https://www.icfbr2022.it/icfbr-papers-it/>

HONOURS AND AWARDS

[31/05/2024] IFAC - International Federation of Automatic Control

Best Young Paper Award IAMES 2024 I was awarded the best paper presented at the conference: "3rd IFAC Workshop on Integrated Assessment Modeling for Environmental Systems."

[22/03/2024] University of Genoa

Best Poster Award I was awarded the best poster presented at the "Annual Poster Session of the PhD in Security, Risk and Vulnerability."

[15/10/2018] Polytechnic University of Turin

Percorso per i Giovani Talenti I participated in the "Percorso per i Giovani Talenti" at the Polytechnic University of Turin, dedicated to students selected based on merit criteria, offering specific training activities focused on problem-solving and the development of soft skills.

SKILLS

QGIS | Git, GitHub | LINUX(Ubuntu) | VisualStudio Code | Jupyter notebooks | Windows System | LaTeX | Office Suite - Microsoft Office

Programming Languages

Python | Rust | Matlab | C | C++

Simulation Software

Dinamica EGO | FDS | CFAST

LANGUAGE SKILLS

Mother tongue(s): Italian

English

LISTENING: C1 **READING:** C1 **WRITING:** C1
SPOKEN PRODUCTION: C1
SPOKEN INTERACTION: C1

Portuguese

LISTENING: B1 **READING:** B1 **WRITING:** A2
SPOKEN PRODUCTION: B1
SPOKEN INTERACTION: B1

COMMUNICATION AND INTERPERSONAL SKILLS

Soft Skills

- Excellent communication and interpersonal skills, developed during collaborations at the university web radio *OndeQuadre* (where I contributed to the production and hosting of radio programs), during tutoring activities at the University of Genoa, and during scientific communication events organised in collaboration with CIMA Foundation. Notably, I participated in the "Pint of Science Festival 2024," a scientific communication festival, where I took part in an event held in Genoa titled *Fuoco amico: la riscoperta di un antico alleato?*
- Strong teamwork skills gained in the university, during my experience in these years working in a research centre and during the projects in which I have been involved, where the interaction with the different stakeholders involved in the wildfire risk management was of primary importance.
- Proved to be adaptable and proactive in addressing challenges and contributing to the collective success in the different projects in which I was involved.
- Willing to undertake transfers and missions in Italy or abroad, as was the case during my PhD regarding the various projects and conferences in which I participated.

Link: <https://pintofscience.it/event/fuoco-amico-la-riscoperta-di-un-antico-alleato>

Autorizzo il trattamento dei miei dati personali presenti nel CV ai sensi dell'art. 13 d. lgs. 30 giugno 2003 n. 196 - "Codice in materia di protezione dei dati personali" e dell'art. 13 GDPR 679/16 - "Regolamento europeo sulla protezione dei dati personali".