Europass Curriculum Vitae

Personal information

First name(s) / Surname(s)

Address(es)

Telephone(s)

E-mail

Nationality

Date of birth

Gender

Work experience

Dates	September 2019 - present
Occupation or position held	Permenant Researcher at CIMA Research Foundation
Main activities and responsibilities	Currently I am a researcher at CIMA, in the Wildfire and Forest Biodiversity unit. My current research topic is computational wild-land fire. In particular, I develop susceptibility, risk and hazard maps via machine learning methods and other modeling tools; I help the improvement and maintenance of fire spread models; I participate to workshops and give assistance to training and teaching activities. I have held the role of Project Manager in several EU funded projects.
Name and address of employer	CIMA Research Foundation Via A. Magliotto 2, 17100, Savona, Italy
Type of business or sector	Research in Environmental Engineering, Computational Wildfire, Training
Dates	October 2023- present
Occupation or position held	Adjoint Professor (Lecturer) at University of Genoa, Italy
Main activities and responsibilities	I had been Teaching Assistant for the course Wildfire Risk Assesment and Management in the framework of the University of Genoa Master's Degree in Engineering for Natural Risk Management where I taught Machine-Learning techniques for wildfire risk mapping. For the Academic year 2023-2024 I have been the teacher of this course.
Dates	19/10/2015–15/09/2019
Occupation or position held	Researcher and PhD student
Main activities and responsibilities	I have been an Universidad del Pais Vasco PhD Student at BCAM, under the supervision of Dr Gianni Pagnini. My research topic was front propagation in random media (combustion, anomalous diffusive media, etc.). I used level set methods and other numerical recipes for front tracking issues in random environment. Main applications of the developed models were Turbulent Combustion, Wild-land fire simulation, Biofilm spread. Uncertainty Quantification and Sensitivity Analysis routines were essential tools for my research.
Name and address of employer	BCAM -Basque Center for Applied Mathematics, Bilbao (Spain)
Type of business or sector	Research - Education
Dates	01/09/2017–01/03/2018
Occupation or position held	Researcher in Uncertainty Quantification
Main activities and responsibilities	I did a research stay of 6 months at CERFACS research center located in Meteo France Research Center, Toulouse, France. I developed statistical code in C and Python in order to study the fire spotting phenomenon in wild-land fires.
Name and address of employer	CERFACS, Toulouse (France)
Type of business or sector	Research
Dates	01/02/2015–15/10/2015
Occupation or position held	Researcher
Main activities and responsibilities	I had been involved in the project "Numerical simulation of thermal plasmas and their interaction with Electro-magnetic fields for aerospace apllications". The main aim of this work is the maintainance and speed-up of a Fortran-based finite volume code that simulate the ionized high-temperature flow around a space ship during atmospherical re-entry, in order to cooperate with Telecommunications Engineers that will use the furnished data to develop the best antenna to be placed in the simulated spaceship.
Name and address of employer	Politecnico di Torino, Torino (Italy)

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Education and training

Dates	10/2015–25/10/2019
Title of qualification awarded	Ph.D. in Mathematics and Statistics
Principal subjects/occupational skills covered	4 year PhD program funded by "La Caixa Foundation" through "La Caixa 2014" program. The research has been developed at BCAM - Basque center for applied mathematics of Bilbao, Bizkaia, Basque Country, Spain.
Name and type of organisation providing education and training	Universidad del Pais Vasco - Euskal Herriko Unibertsitatea, Leioa (Spain)

Dates	09/2012–15/12/2014
Title of qualification awarded	MSc in Mathematical Engineering
Principal subjects/occupational skills covered	GPA: 28.25/30 Final degree: 110/110 Description: this degree focused on gaining a knowledge on the fields of Applied Maths and Mechanical-Civil Engineering simulations. Main subjects: Wind Engineering (30/30) , Comp. Fluid Dynamics (30/30), Numerical Methods for Partial Diff. Equations (28/30), Theoretical Fluid Dynamics (30/30 w. honors), Fluid Mechanics (30/30 w. honors), Models in Biomechanics and Biomedicine (30/30 w. honors), Stochastic Processes (30/30 w. honors).
Name and type of organisation providing education and training	Politecnico di Torino, Torino (Italy)

Dates	2009–25/07/2012
Title of qualification awarded	BsC in Mathematics and Applications
Principal subjects/occupational skills covered	GPA: 28.66/30 Final Degree: 110/110 with honors This degree focused heavily on gaining a wide knowledge of theoretical and applied maths. Main subjects: Mathematical Analysis, Geometry, Numerical Analysis, Optimization, Statistics, C/C++ programming.
Name and type of organisation providing education and training	University of Camerino, Italy

Mother Toungue: Italian

Self-assessment	Understanding				Speaking				Writing	
European level (*)	Listening		Reading		Spoken interaction		Spoken production			
English	C1		C1		C1		C1		C1	
	IELTS 8									
Spanish	C2		C2		C2		C2		C2	
Basque	B1		B1		B1		B1		B1	
	HABE B1 ZIURTAGIRIA									
French	A2		B2		A2		A2		B1	

(*) Common European Framework of Reference for Languages

Personal skills

Communication skills	Good communication skills gained through years of university studies and in the years of PhD, then further developed in the last years of work during training and workshop carried on for different projects.
Organisational / managerial skills	Excellent organisational skills developed in years of workshop, classes and related activity management. I held the role of Project Manager for several EU funded projects in the field of early warning systems and capacity building.
Digital competence	Basic: C++, FreeFem, R Intermediate: C, L A TEX,, Microsoft Windows, MPI packages, Matlab, Octave, Petsc, WRF-Sfire, NetCDF and HFD5 data management Advanced: Linux environment, Fortran, Python (scikit-learn, Matplotlib, openturns, scipy, pandas, geopandas...) environments. Knowledge of the use of the Moodle learning platform and of some online tools for creation of content useful for training and online workshop (Miro, Wooclap, Padlet, Kahoot). Knowledge of GIS environments such as QGIS and GDAL libraries.
Driving licence	Driving licence cat. B

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Additional information

Participation and technical, management and scientific roles in relevant projects (selection):

- February 2024- ongoing project "Apoyo al desarrollo de la sub-acción '4.4 Reforzar la adaptación y reducción de riesgo ante incendios forestales a través la participación, acceso a la información y empoderamiento climático de las entidades públicas, organizaciones y poblaciones en la Chiquitanía' del Plan de Acción País del programa EUROCLIMA en Bolivia. LOTE 2 Desarrollo de herramienta digital de monitoreo y alerta temprana para la ayuda a toma de decisión del conjunto de actores locales (diseño, desarrollo y equipamiento). In this project, where I am Project Manager for CIMA, Early Warning Systems are established for forests fire hazard in Chiquitania region, Bolivia.
- January 2023- onoging SAILOR (Cross Border Risk Assessment and Action Plan in Georgia-Azerbaijan), Funded by the EU Civil Protection Mechanism. This project aims to carry out a forest fire risk assessment in the cross-border area between Georgia and Azerbaijan in the South Caucasus, with the participation of the national civil protection authorities of both countries. Project Manager for CIMA.
- 2023-2025 CLIMAAX (CLIMAte risk and vulnerability Assessment framework and toolboX). Funded within Horizon Europe Programme, it aims to provide support for adaptation and risk management and in the development of Climate Risk Assessments (CRAs) to several European regions. I am responsible for the Wildfire Workflow to provide fast climate assessment of wildfire risk to pilot areas and stakeholder community.
- 2023-2026 MedEWSa project (Mediterranean and pan-European forecast and Early Warning System against natural hazards). Led by the World Meteorological Organization (WMO). Funded under Horizon Europe. It aims to create a multi-hazard and impact-based alerting system at the pan-European, Mediterranean, and African levels. I am a researcher in the twin Ethiopia – Attica responsible for implementing wildfire spread simulators and medium range forecasts for wildfire danger.
- October 2020 – March 2024 SAFERS (Structured Approaches for Forest fire Emergencies in Resilient Societies) Funded under the European H2020 program. This project is dedicated to managing the entire forest fire emergency cycle. Specifically, the project aims to implement an Emergency Management System (EMS) that collects data from various sources for use in prevention, response, and post-event assessments. I have been responsible of the implementation of a forest fire spread model in the provided SAFERS EMS platform.
- 2019- 2022 MED-Star, Funded under the Interreg Italy-France Maritime Program 2014-2020,it aimed to improve the capacity of public institutions to manage and prevent the growing fire risk, due to climate change, in the cooperation area. To achieve this, the project strengthened fire prediction, prevention, and suppression capacities, particularly for areas with high human presence and/or wildlife interest.
- 2020-2021 Disaster Risk Reduction Capacity Building in Ethiopia: development of an information management system for early warning for forest fires in Ethiopia. Activities done in the project: wildfire expert ; coordinated the creation of static hazard maps at national scale; coordinated several general and technical training, e-learning and workshops on EWS tools and methodologies
- 2021 – in progress –PPRD East Prevention, Preparedness and Response to natural and man-made disaster in Eastern Partnership countries – phase 3 - activity done in the project: Preparation of the material and training of the partner above the use of Dewetra platform for civil protection purposes
- 2020 – in progress – *MAE - ASEAN fornitura di servizi di consulenza per la diffusione delle conoscenze e competenze italiane nel settore della Protezione Civile, sia accademiche che tecniche, attraverso la fornitura di un corso pre-registrato rivolto a Istituzioni di settore dei Paesi dell'ASEAN – Introduzione ai principi di pianificazione delle emergenze ed utilizzo di sistemi di supporto alle decisioni per Early Warning Systems (myDEWETRA.world)* - activity done in the project: Training of the partner above the use of Dewetra platform for data sharing and crossing information
- 2019 – in progress – ARISTOTLE -ENHSP (All Risk Integrated System TOwards Trans-boundary hoListic Early-warning - European Natural Hazards Scientific Partnership): aimed to offer the European Emergency Response Coordination Centre (ERCC) a service system for hazard-related natural phenomena. Role in the forecasting and monitoring operational activities. In summer 2023 I have been part of the "The Wildfire Support Team" in ERCC, Bruxelles, Belgium, to provide assistance as "Aristotle Expert". During this activity I helped in quantifying fire danger in pan-european domain during the summer season.
- 2020-2021 – PPRD-South 3 the project is aimed to increasing resilience and reducing the social, economic and environmental costs of natural and man made disasters in the ENP South region Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia: Training over the data sharing and visualization platform MyDewetra.
- 2020 - Bolivia FAO: project funded by the Italian Cooperation and managed by Bolivia's FAO division with the aim of implementing an Early Warning System at national level. Role in the activities related to the training over the products developed and finalized within the project.
- 2016-2019 - ANYWHERE (EnhANcing emergencY management and response to extreme WeatHER and climate Events) is designed to improve emergency management and to respond to extreme or high-impact weather events such as floods, landslides, storms, heavy snowfalls, forest fires, heat waves and droughts.

Selected publications on peer reviewed journals:

- A. Trucchia, V.Egorova, A. Butenko, I. Kaur, G. Pagnin, RandomFront 2.3 A physical parametrisation

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of fire-spotting for operational fire spread models: Implementation in WRF-Sfire and response analysis with LSFire+ Geoscientific Model Development 12 (1) **2019**, https://www.geosci-model-dev-discuss.net/gmd-2018-33/

- A. Trucchia,V. Egorova, G. Pagnini, M.C. Rochoux, On the merits of sparse surrogates for global sensitivity analysis of multi-scale nonlinear problems: application to turbulence and fire-spotting model in wildland fire simulators, (2019), Communications in Nonlinear Sciences and Numerical Simulation, Volume 73, 15 July **2019**, pages 120-145, doi = https://doi.org/10.1016/j.cnsns.2019.02.002
- V.N. Egorova, A. Trucchia, G. Pagnini, Fire-spotting generated fires.Part I: The role of atmospheric stability (**2019**), Applied Mathematical Modelling. doi = https://doi.org/10.1016/j.apm.2019.02.010
- A. Trucchia, M.R. Mattei, V. Luongo, L. Frunzo, M.C. Rochoux, Surrogate-based Uncertainty and Sensitivity Analysis for Bacterial Invasion in Multi-species Biofilm Modeling, Communicationsin Nonlinear Sciences and Numerical Simulation, Volume 73, 15 July **2019**, Pages 403-424, doi =https://doi.org/10.1016/j.cnsns.2019.02.024
- A. Trucchia and Gianni Pagnini. Restoring property of the Michelson-Sivashinsky equation. Combustion Science and Technology 191 (9), (**2019**), doi = 10.1080/00102202.2019.1632839
- Marj Tonini, Mirko D'Andrea, Guido Biondi, Silvia Degli Esposti, Andrea Trucchia and Paolo Fiorucci, A machine learning based approach for wildfire susceptibility mapping. The case study of Liguria region in Italy., Geosciences **2020**, 10, 105.
- Trucchia, A.; D'Andrea, M.; Baghino, F.; Fiorucci, P.; Ferraris, L.; Negro, D.; Gollini, A.; Severino, M. PROPAGATOR: An Operational Cellular-Automata Based Wildfire Simulator. Fire **2020**, 3, 26.
- Trucchia, A.; Frunzo, L. Surrogate based Global Sensitivity Analysis of ADM1-based Anaerobic Digestion Model . Journal of Environmental Management, **2021**, 282.
- Trucchia, A.; Izadgoshabsb, H; Isnardi, S.; Fiorucci, P.; Tonini, M. Machine-Learning Applications in Geosciences: Comparison of Different Algorithms and Vegetation Classes' Importance Ranking in Wildfire Susceptibility. Geosciences, **2022**, 12 (11), 424
- Trucchia, A.;Meschi, G.; Fiorucci, P.; Gollini, A.; Negro, D. Defining Wildfire Susceptibility Maps in Italy for Understanding Seasonal Wildfire Regimes at the National Level. Fire, **2022**, 5, 30. https://doi.org/10.3390/fire5010030
- Egorova, V.N., Andrea Trucchia, Pagnini, G. Fire-spotting generated fires. Part II: The role of flame geometry and slope. Applied Mathematical Modelling, **2022**, 104. pp 1-20 , ISSN 0307-904X, https://doi.org/10.1016/j.apm.2021.11.010.
- Trucchia, A.; Meschi, G.; Fiorucci, P.; Provenzale, A.; Tonini, M; Pernice, U. Wildfire hazard mapping in the Eastern Mediterranean landscape.International Journal of Wildland Fire, **2023**. 32(3) 417-434 https://doi.org/10.1071/WF22138
- Marcos López-De-Castro, Andrea Trucchia, Umberto Morra di Cella, Paolo Fiorucci, Antonio Cardillo, Gianni Pagnini, Fire-spotting modelling in operational wildfire simulators based on Cellular Automata: A comparison study, Agricultural and Forest Meteorology, Volume 350, **2024**, 109989, ISSN 0168-1923, doi = https://doi.org/10.1016/j.agrformet.2024.109989
- Perello, N., Trucchia, A., Baghino, B.S. Asif, L. Palmieri, N. Rebora, P. Fiorucci, Cellular automata-based simulators for the design of prescribed fire plans: the case study of Liguria, Italy.Fire Ecology 20, 7 (**2024**). doi = https://doi.org/10.1186/s42408-023-00239-7

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Conference Proceedings

- Egorova V. N.; Pagnini G.; Trucchia A. Wildland fire propagation modeling: fire-spotting parametrisation and energy balance. Proceedings of the 17th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2017, pp. 805 - 813, **2017**-07-04
- Egorova V. N.; Pagnini G.; Trucchia A. Wildland fire propagation modelling. MODELLING FOR ENGINEERING AND HUMAN BEHAVIOUR 2017 Extended abstract, December **2017**
- Pagnini G.; Trucchia A. Darrieus-Landau instabilities in the framework of the G-equation. Digital proceedings of the 8th European Combustion Meeting, 18-21 April 2017, Dubrovnik, Croatia, April **2017**
- G. Pagnini, A. Trucchia, Quasi-probability Approach for Modelling Local Extinction and Counter-gradient in Turbulent Premixed Combustion . Proceedings Joint Meeting the German and Italian Sections of the Combustion Institute, 23-26/05/**2018**, Sorrento, Italy
- A. Trucchia, G. Pagnini, The role of the environment in front propagation, Proceedings of the 18th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2018 July 9–14, 2018, **2018**-07-09
- Egorova V. N., Trucchia A. , Pagnini G.; Concurent multi-scale physical parametrization of fire-spotting: A study on the role of macro- and meso-scale characteristics of the system , Advances in Forest Fire Research, **2018**
- Pagnini G.; Egorova V.; Trucchia A.; Mentrelli A.; Kaur I. , Wildfire Propagation Modelling, Geophysical Research Abstracts Vol. 20, **2018**
- Pagnini G., Trucchia A., Front Curvature Evolution and Hydrodynamics Instabilities, Proceedings/Extended Abstract Book (6 pages) of the XXXX Meeting of the Italian Section of the Combustion Institute, Rome, Italy, **2017**-06-07
- M.C. Rochoux, A. Costes, R Paugam, G. Rea, L. Thouron, A. Trucchia, C. Zhang, T. Jaravel, C. Lac, V. Masson, A. Trouvé, O. Vermorel, D. Lucor. Emulating environmental modeling systems in presence of uncertainties: overview and challenges. Workshop on Frontiers of Uncertainty Quantification in Fluid Dynamics 11–13 September **2019**, Pisa, Italy
- Crespo-Santiago, A.; Trucchia, A.; Fiorucci, P.; Pagnini, G. Probability Density Function of a Random Area and Its Application to Wildfires. Environ. Sci. Proc. **2022**, 17, 75 https://doi.org/10.3390/environsciproc2022017075
- Meschi, G.; Trucchia, A.; Biondi, G.; Fiorucci, P. Using Crossborder Multisource Burned Area Datasets for Assessing Wildfire Susceptibility Using Machine Learning Techniques. Environ. Sci. Proc. **2022**, 17, 33. https://doi.org/10.3390/environsciproc2022017033
- 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. **2022**, 17, 37. https://doi.org/10.3390/environsciproc2022017037
- López-De-Castro, M.; Trucchia, A.; Fiorucci, P.; Pagnini, G. Physical and Non-Physical Fire-Spotting Models: A Comparison Study by a Wildfire Simulator Based on a Cellular Automata Approach. Environ. Sci. Proc. **2022**, 17, 27. https://doi.org/10.3390/environsciproc2022017027
- D'Andrea, M.; Trucchia, A.; Biondi, G.; Degli Esposti, S.; Fiorucci, P. Sharing Information for Wildfire Risk Management: The MEDSTAR Platform. Environ. Sci. Proc. **2022**, 17, 25. https://doi.org/10.3390/environsciproc2022017025
- López-De-Castro, M; Trucchia, A;, Fiorucci P.; Pagnini G. A comparison study between fire- spotting models by a wildfire simulator based on a cellular automata approach - EGU General Assembly Conference Abstracts, **2022**
- Trucchia, A; Meschi, G.; Tonini, M; Fiorucci P.; Computing wildfire Susceptibility Maps at the national level in Italy: a Machine Learning approach - EGU General Assembly Conference Abstracts, **2022**
- A. Trucchia, P. Fiorucci, M. Massabò, A. Zegeye, K. M. Soltesova, N. Yasin, C. Debele, A. Abebe. A multi-agency Forest Fire Early Warning System for environment and biodiversity preservation in Ethiopia, XV World Forestry Congress, **2022**, Seoul, Republic of Korea
- N Perello, A Trucchia, M D'Andrea, G Meschi, S degli Esposti, P Fiorucci, A Tailored Fine Fuel Moisture Content Model for Improving Wildfire Danger Rating Systems EGU General Assembly Conference Abstracts, EGU-14313, **2023**

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Book Chapters

- Vera N. Egorova, Andrea Trucchia, Gianni Pagnini, Physical Parametrisation of Fire-Spotting for Operational Wildfire Simulators, Applied Mathematics for Environmental Problems, Print ISBN: 978-3-030-61794-3, Electronic ISBN: 978-3-030-61795-0, Copyright Year: 2021
- Trucchia, A., D'Andrea, M., Baghino, F., Perello, N., Rebora, N. and Fiorucci, P. (2024). Experiences and Lessons Learnt in Wildfire Management with PROPAGATOR, an Operational Cellular-Automata-Based Wildfire Simulator. In Responding to Extreme Weather Events (eds D. Sempere-Torres, A. Karakostas, C. Rossi and P. Quevauviller). https://doi.org/10.1002/9781119741374.ch3

Invited Talks

- Presentation of seminar “Front propagation in random media” at the GNFM XLI Mathematical Phyisics Summer School, Ravello, Italy, 15/09/**2016**
- Presentation of seminar "The role of the environment in front propagation" at the International Conference on Computational and Mathematical Methdos in Science and Engineering, CMMSE 2018 (July 9-14 **2018**, Rota, Cadiz, Spain)
- Seminar "Surrogated - based Uncertainty Quantification and Sensitivity Analysis of a Wild-land fire model" at BCAM LIGHT SEMINAR, May 3rd **2018**, BCAM, Bilbao, Spain
- Seminar "Surrogate-based Uncertainty Quantification and Sensitivity Analysis for Bacterial Invasion in Multi-species Biofilms" at BCAM LIGHT SEMINAR, February 19th **2019**, BCAM, Bilbao, Spain
- Talk “Surrogate Analysis of turbulence and fire spotting in wild-land fire modeling” delivered at FIRST BYMAT CONFERENCE: BRINGING YOUNG MATHEMATICIANS TOGETHER May 07-09 **2018** , ICMAT, Universidad Autonoma de Madrid, Madrid, Spain.
- Seminar "Uncertainty Quantification and Sensitivity Analysis of a Wild-land fire model" delivered at Mathematics Department "Renato Caccioppoli" at Federico II University, Naples, Italy, November **2019**
- Seminar "Seeding and Dispersal of Planar Microbial Biofilms: a chance for modelling" delivered at workshop QBIO2019 - Quantitative Biomedicine for Health and Disease, Bilbao, February 13th, **2019**
- Talk “Uncertainty Quantification and Sensitivity Analysis for bacterial invasion in biofilm modeling” delivered at SECOND BYMAT CONFERENCE: BRINGING YOUNG MATHEMATICIANS TOGETHER May 20-24 **2019**, ICMAT, Universidad Autonoma de Madrid, Madrid, Spain.
-Talk “Uncertainty Quantification and Sensitivity Analysis for bacterial invasion in multi-species biofilms” delivered at WASCOM **2019** - XX INTERNATIONAL CONFERENCE ON WAVES AND STABILITY IN CONTINUOUS MEDIA, June 10-14, **2019**,Maiori (SA), Italy.
- Presentation "Wildfire susceptibility mapping via machine learning: the case study of Liguria Region, Italy" at EGU General Assembly **2020** (held Online), https://doi.org/10.5194/egusphere-egu2020-18802, 4-8 May 2020
- Invited talk on “'A machine learning approach for wildfire susceptibility and hazard mapping at supranational level: The case study of Eastern Mediterranean”, at ITU Webinar on "Fighting wildfires with AI-powered insights", 19 April **2023,** https://www.itu.int/en/ITU-T/webinars/20230419/Pages/default.aspx
- Invited talk “The role of artificial intelligence machine learning & big data”, The Arab-Africa science, technology, policy & private sector nexus for disaster risk reduction conference. Conference Palace, Tunis, Tunisia on 02 - 03 October **2023**

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