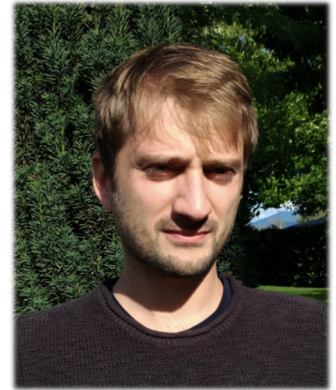


CURRICULUM VITAE

Giulio Gori, PhD

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EDUCATION

- 2019 Ph.D. Aerospace Engineering
Thesis: *Non-Ideal Compressible Fluid-Dynamics: Developing a Combined Perspective on Modeling, Numerics and Experiments.*
Department of Aerospace Science and Technology, Politecnico di Milano, Italy
Advisor: Prof. Alberto Matteo Attilio Guardone
- 2013 Master Degree in Aeronautical Engineering
Thesis: *PolIMice: un ambiente di simulazione per la previsione dell'accrescimento di ghiaccio su velivoli.*
Department of Aerospace Science and Technology, Politecnico di Milano, Italy
Supervisor: Prof. Alberto Matteo Attilio Guardone
- 2010 Bachelor Degree in Aerospace Engineering
Department of Aerospace Science and Technology, Politecnico di Milano, Italy
- 2007 High school diploma at Liceo Scientifico Amedeo di Savoia duca di Aosta, Pistoia, Italy

CURRENT AND PREVIOUS POSITIONS

- 2017 – UTOPIAE MSCA-ITN Early Stage Researcher
INRIA/ Centre de Mathématiques Appliquées, École Polytechnique, IPP, France
- 2014 – 2017 Research fellow
CREALab/Department of Aerospace Science and Technology, Politecnico di Milano, Italy

MOBILITY

- 2019 Visiting fellow, Von Karman Institute for Fluid Dynamics, Belgium (4 mth). Uncertainty Quantification for hypersonic flows and heat shield ablation for atmospheric entry applications.
- 2018 Visiting fellow, Center for Turbulence Research at Stanford University (1.5 mth), Palo Alto, CA, USA. Development of robust optimization approaches for Organic Rankine Cycle applications.
- 2016 Visiting Ph.D. candidate, UT Twente, Faculty of Engineering Technology, Enschede, Netherlands (3 mth). Developing numerical methods for sliding mesh interfaces in computational fluid dynamics.
- 2014 Visiting fellow, Aerospace Design Lab (ADL) at Stanford University (1 mth), Palo Alto, CA, USA. Development and implementation of the SU2 non-ideal compressible-fluid dynamics solver.

COMMISSIONS OF TRUST

- 2015 – Invited referee for the following international scientific Journals: Journal of Computational Physics, Physics of Fluids, Mathematics and Computers in Simulations, Applied Mathematics and Computation.
- 2014 – Co-supervisor, tutoring master students in authoring their final thesis.
- 2014 – 2017 Coordinator of the SU2 open-source CFD solver User Group at Politecnico di Milano, Italy.

MAJOR INTERNATIONAL COLLABORATIONS

Prof. Juan J. Alonso, full professor in Aeronautics & Astronautics at Stanford University, CA, USA. Founder and director of the Aerospace Design Lab.

Prof. Gianluca Iaccarino, full professor in Mechanical Engineering and director of the Institute for Computational Mathematical Engineering (ICME) at Stanford University, CA, USA.

Prof. Thierry Magin, associate professor at the Aeronautics and Aerospace Department at the Von Karman Institute for Fluid Dynamics, Belgium. Winner of a European Research Council Starting Independent Researcher Grant.

Prof. Piero Colonna, full professor, Chair of Propulsion and Power at Delft University of Technology, Delft, Netherlands.

SCIENTIFIC ACHIEVEMENTS

In my career, I have been actively contributing to wide variety of topics related both to fundamental science and to industrial applications. I demonstrated creativity, commitment and ability to conceive out-of-the-box solutions to unprecedented problems.

I have delivered substantial advancements the field of Non-Ideal Compressible Fluid Dynamics by mathematically demonstrating the admissibility of an unprecedented gasdynamics phenomenon, the so-called *non-ideal oblique shock-waves*, which are of the utmost relevance for Organic Rankine Cycle turbines, in the field of renewable energies. The formalization of non-ideal oblique shock waves led to the beginning of new and prolific research activities ranging from theoretical studies to experimental activities and applications. The impact of the incipient scientific paper¹ I authored in 2017 is testified by the diverse scope of the following citing works.

I also delivered the first-ever accuracy assessment of a computational model for non-ideal flows, a fundamental step towards improving computerized models and I was able exploit data-driven techniques to provide substantial indication for developing novel experiments. Moreover, I authored and co-authored several works concerning the robust optimization of Organic Rankine Cycle turbine blades.

In the field of in-flight ice accretion, I identified a mathematical inconsistency in the state-of-the-art ice-accretion model, proposing a consistent solution leading to more accurate predictions². I am the creator, and I have been the leading developer from 2012 to 2017, of the PoliMice ice accretion code. The PoliMice suite is currently employed in several European research projects e.g., UTOPIAE (Uncertainty Treatment and OPTimisation in Aerospace Engineering, H2020 MSCA-ITN, ESR10: Uncertainty Characterisation in Multi-fidelity Anti-ice system and Design. Website: <http://utopiae.eu>), NITROS MSCA-ITN (Network for innovative training on rotorcraft safety, H2020 MSCA-EJD, ESR1: Simulation and prevention of ice formation and shedding on rotorcraft. Website: <https://www.nitros-ejd.org>) and H2020 ICE-GENESIS project (<https://www.ice-genesis.eu>) coordinated by Airbus. During my secondment at the Von Karman Institute for Fluid Dynamics, I have been investigating the ablation of the heat shield of a spacecraft during the hypersonic atmospheric entry. In particular, I have applied Uncertainty Quantification techniques to evaluate the credibility of computational model predictions w.r.t. uncertain initial conditions.

Since 2014, I am a developer of the SU2 open-source suite, a successful software for Computational Fluid Dynamics (CFD) which is currently a reference. In this context, I contributed developing several modules e.g., the non-ideal solver and the sliding mesh interface. I actively contributed to the development of SU2 by participating to the Annual Developer's meeting and hackathons, and by providing code maintenance on a regularly basis.

¹ "Non-ideal compressible-fluid effects in oblique waves", Journal of Physics: Conference Series, Vol. 821

² "PoliMice: a simulation framework for three-dimensional ice accretion", Applied Mathematics and Computation, 267, 96-107

PUBLICATIONS RECORD

My publication record includes more than 20 scientific contributions delivered in a time frame of about 5 years.

Among these contributions, 8 are peer reviewed Journals, 10 are peer reviewed conference proceedings whereas the remaining are non-reviewed contributions. Publications covers a wide range of topics, spanning from in-flight ice accretion, non-ideal compressible fluid flows, atmospheric entry for space applications, uncertainty quantification and turbomachinery design.

According to Google Scholar metrics, my current H-index is 7. Since 2014, the number of yearly citations has grown consistently, attracting a total of 161 referencing works.

Hereinafter, the publication list includes the citation metric count from Google Scholar cleansed from self-citations i.e., citing research where the applicant appears as author (or even co-author) are excluded.



Peer Reviewed Journals

- **G. Gori**, M. Zocca, A. Guardone, O. Le Maître and P. M. Congedo, *Bayesian Inference of Thermodynamic Models from Vapor Flow Experiments*, Computer & Fluids, Vol. 205, 104550, 2020.
- N. Razaaly, G. Persico, **G. Gori** and P.M. Congedo, *Quantile-Based Roust Optimization of a Supersonic Nozzle for Organic-Rankine Cycle Turbines*, Applied Mathematical Modelling, Vol. 82, pp. 802-824, 2020
- **G. Gori**, M. Zocca, G. Cammi, A. Spinelli, P. M. Congedo and A. Guardone, *Accuracy Assessment of the Non-Ideal Computational fluid Dynamics Model for Siloxane MDM from the open-source SU2 suite*, European Journal of Mechanics-B/Fluids, Vol. 79, pp. 109-120, 2019. (1 citation)
- **G. Gori**, A. Guardone, *VirtuaSchlieren: a Hybrid GPU/CPU-based Schlieren Simulator for Ideal and Non-Ideal Compressible-Fluid Flows*. Journal of Applied Mathematics and Computation, Vol. 319, pp. 647-661, 2018. (4 citations)
- D. Vimercati, **G. Gori**, A. Guardone, *Non-Ideal Oblique Shock Waves*, Journal of Fluid Mechanics, Vol. 847, pp. 266-285, 2018. (6 citations)
- **G. Gori**, G. Parma, M. Zocca and A. Guardone, *Local Solution to the Unsteady Stefan Problem for In-Flight Ice Accretion Modeling*, Vol. 55, pp. 251-262, 2018. (2 citations)
- M. Zocca, **G. Gori** and A. Guardone, *Blockage and Three-Dimensional Effects in Wind-Tunnel Testing for Ice Accretion over Wings*, Journal of Aircraft, Vol. 54, pp. 759-767, 2017. (3 citations)
- **G. Gori**, M. Zocca, M. Garabelli, A. Guardone and G. Quaranta, *PoliMice: a Simulation Framework for Three-Dimensional Ice Accretion*, Journal of Applied Mathematics and Computation, V. 267, pp. 96-107, 2015. (10 citations)

Chapter in Books

- J. Reis, **G. Gori**, P.M. Congedo and O. Le Maître, *Introduction to Spectral Methods for Uncertainty Quantification*, Chapter in *Optimization Under Uncertainty with Applications to Aerospace Engineering*, Massimiliano Vasile, Springer Nature, 2020. (Submitted, in editing process)

Peer Reviewed Conference Proceedings

- **G. Gori**, N. Razaaly, G. Iaccarino and P. M. Congedo, *Structural Uncertainty Estimation of Turbulence Models in Organic Rankine Cycle Applications*, proceeding at the ORC2019 conference, Athens, Greece, 2019. (1 citation)
- N. Razaaly, **G. Gori**, G. Iaccarino, P. M. Congedo, *Optimization of an ORC Supersonic Nozzle Under Epistemic Uncertainties due to Turbulence Models*, proceeding at the Global Power and Propulsion Society GPPS2019 Conference, Zurich, Switzerland, 2019. (4 citation)
- N. Razaaly, **G. Gori**, O. Le Maître, G. Iaccarino, P. M. Congedo, *Robust Optimization of Turbine Cascade for Organic Rankine Cycles Operating with Siloxane MDM*, proceeding of the Summer Program at the Center for Turbulence Research, Stanford University, California, USA, 2018. (1 citation)
- **G. Gori**, M. Zocca, G. Cammi, A. Spinelli and A. Guardone, *Experimental Assessment of the Open-Source SU2 CFD suite for ORC Applications*, Energy Procedia, Vol. 129, pp. 256-263, 2017. (9 citations)

- D. Vimercati, **G. Gori**, A. Spinelli and A. Guardone, *Non-Ideal Effects on the Typical Trailing Edge Shock Pattern of ORC turbine Blades*, Energy Procedia, Vol. 129, pp. 1109-1116, 2017. (5 citations)
- P. Molesini, **G. Gori** and A. Guardone, *An Analysis of fast-Response Pressure Probes Dynamics for ORC Power Systems*, Energy Procedia, Vol. 129, pp. 264-271, 2017.
- M. Pini, S. Vitale, P. Colonna, **G. Gori**, A. Guardone, T. Economon, J. J. Alonso and F. Palacios, *SU2: the open-source software for Non-Ideal Compressible Flows*, Journal of Physics: Conference Series, Vol. 821, 2017. (13 citations)
- **G. Gori**, P. Molesini, G. Persico and A. Guardone, *Non-Ideal Compressible-Fluid Dynamics of Fast-Response Pressure Probes for Unsteady Flow Measurements in Turbomachinery*, Journal of Physics: Conference Series, Vol. 821, 2017. (1 citation)
- **G. Gori**, D. Vimercati and A. Guardone, *Non-Ideal Compressible-Fluid Effects in Oblique Shock Waves*, Journal of Physics: Conference Series, Vol. 821, 2017. (12 citations)
- **G. Gori**, A. Guardone, S. Vitale, A. Head, M. Pini, P. Colonna, *Non-Ideal Compressible-Fluid Dynamics Simulations with SU2: Numerical Assessment of Nozzle and Blade Flows for Organic Rankine Cycle Applications*, proceeding of the 3rd International Seminar on ORC Power Systems, Brussels, Belgium, 2015. (5 citations)

Conference Proceedings

- **G. Gori**, A. Turchi, T. Magin, O. Le Maître and P. M. Congedo, *Exploring the Impact of the Initial Temperature Field Uncertainty on the Response of Ablative Materials*, proceeding at the International Conference on Flight Vehicles, Aerothermodynamics and Re-Entry Missions and Engineering, Bari, Italy, 2019.
- B. Arizmendi, T. Bellosta, A. del Val, **G. Gori**, M. O. Prazeres and J. Reis, *On Real-Time Management of On-Board Ice Protection Systems by Means of Machine Learning*, Proceeding at the AIAA Aviation Forum 2019, Dallas, Texas, USA, 2019.
- **G. Gori**, D. Vimercati and A. Guardone, *A Numerical Investigation of Oblique Shock Waves in Non-Ideal Compressible-fluid Flows*, proceeding at the 31st International Symposium on Shock Waves ISSW31, Nagoya, Japan, 2018.
- M. Zocca, **G. Gori**, O. Le Maître, P. M. Congedo and A. Guardone, *A Robust Experiment Design for the Investigation of Non-Ideal Compressible Fluid Flow Effects*, proceeding at the 7th European Conference on Computational Fluid Dynamics (ECFD7), Glasgow, United Kingdom, 2018.
- N. Razaaly, G. Persico, **G. Gori**, P. M Congedo, *Robust Optimization of a Supersonic ORC Turbine Cascade: a Quantile-Based Approach*, proceeding at the 7th European Conference on Computational Fluid Dynamics (ECFD7), Glasgow, United Kingdom, 2018.
- S. Vitale, **G. Gori**, M. Pini, A. Guardone, T. D. Economon, F. Palacios, J. J. Alonso and P. Colonna, *Extension of the SU2 Open-Source CFD Code to the Simulation of Turbulent Flows of Fluids Modelled with Complex Thermophysical Laws*, proceeding at the 22nd AIAA Computational Fluid Dynamics Conference, Dallas, Texas, USA, 2015. (29 citations)
- **G. Gori**, M. Zocca and A. Guardone, *A Model for In-flight Ice Accretion Based on the Exact Solution of the Unsteady Stefan Problem*, proceeding at the 7th AIAA Atmospheric and Space Environments Conference, Dallas, Texas, USA, 2015. (1 citation)

AWARDED FELLOWSHIPS

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| 2017 – 2020 | Early Stage Researcher Fellowship within the Marie Skłodowska-Curie Innovative Training Network H2020-MSCA-ITN-2016, Grant Agreement n. 722734, INRIA/Centre de Mathématiques Appliquées, École Polytechnique, Institut Polytechnique de Paris, France |
| 2015 – 2017 | Temporary Research Fellowship for Research Activities UOR DAER “Metodi numerici per la simulazione di correnti di fluidi comprimibili non-ideali” CREALab/Department of Aerospace Science and Technology, Politecnico di Milano, Italy |
| 2014 – 2015 | Temporary Research Fellowship for Research Activities UOR DAER “Simulazione numerica di correnti di gas densi con codici fluidodinamici per griglie chimera” CREALab/Department of Aerospace Science and Technology, Politecnico di Milano, Italy |

RESEARCH EXPEDITIONS LED

I successfully submitted a proposal to the Summer Program 2018 of the Center for Turbulence Research (CTR), at Stanford University, California, USA. I was responsible of leading a research project titled *On the calibration of turbulence models for a siloxane MDM in the Non-Ideal regime and application to the robust optimization of turbine cascades*, devoted to the development of innovative data-driven approaches for the calibration of molecular complex fluid models and for the robust optimization of Organic Rankine Cycle turbine blades.

FUNDINGS RECEIVED

Personal scholarship of \$ 3,550 to participate to the CTR Summer Program 2018 at Stanford University, CA, USA.

SUPERVISING ACTIVITY

Co-supervision of master students in developing their final MSc thesis at the Department of Aerospace Science and Technology of Politecnico di Milano:

- *Un Modello Semplificato per l'Accrescimento di Ghiaccio su Profili Alari Oscillanti*, D. Sangaletti, 2017.
- *Dynamics of Line-Cavity Systems for Ideal and Non-Ideal Compressible-Fluid Flows*, P. Molesini, 2016.
- *Generazione di Immagini Schlieren da Simulazioni Fluidodinamiche su Architettura GPU*, L. Virtuani, 2015.
- *A Model for In-Flight Ice Accretion Based on the Exact Solution of the Unsteady Stefan Problem*, G. Parma, 2015.
- *Effetti di Galleria nelle Misure di formazione di Ghiaccio su Velivoli*, M. Zocca, 2013.

CONFERENCE ORGANIZATION

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| 2019 | Member of Organizing Committee (Local Organizer), <i>UQOP: Uncertainty Quantification and Optimization</i> , March 18-20, Paris, France (https://uqop.sciencesconf.org) |
| 2017 | Staff member, <i>4th International Seminar on ORC Power Systems</i> , September 13-15, Milano, Italy (http://orc2017.fyper.com) |
| 2016 | Staff member, <i>NICFD-PP 2016: 1st International Seminar on Non-Ideal Compressible-Fluid Dynamics for Propulsion & Power</i> , October 20-21, Varenna, Italy (https://easychair.org/smart-program/NICFD2016/index.html) |

SOFTWARE DEVELOPMENT

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| PoliMice | Core developer member of the early versions of the integrated CFD-multiphase software for in-flight ice accretion (2012-2017). |
| SU2 | Member of the Principal Developers team of the SU2 open-source CFD solver for compressible and incompressible flows. |

Paris,
December 10th 2020

