

## CURRICULUM VITAE

### Giulio Gori, PhD

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### EDUCATION

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- 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

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- 2021 –      Post-doc researcher CS2 H2020 [MONNALISA](#) Project  
Department of Aerospace Science and Technology, Politecnico di Milano, Italy
- 2017 – 2020      [UTOPIAE](#) MSCA-ITN Early-Stage Researcher  
INRIA/ Centre de Mathématiques Appliquées, École Polytechnique, IPP, France ([Platon Team](#))
- 2014 – 2017      Research fellow  
[CREALab](#)/Department of Aerospace Science and Technology, Politecnico di Milano, Italy

### MOBILITY

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- 2019      Visiting fellow, Von Karman Institute for Fluid Dynamics, Belgium (4 mths). 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 mths), 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 mths). 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

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- 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

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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.

Prof. Olivier Le Maître, Senior Researcher at Platon Team CNRS/CMAP/INRIA, École Polytechnique, Palaiseau, France

Pietro M. Congedo, Head of Platon Team CMAP/INRIA, École Polytechnique, Palaiseau, France

## SCIENTIFIC ACHIEVEMENTS

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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 advancements the field of Non-Ideal Compressible Fluid Dynamics by demonstrating the admissibility of the so-called *non-ideal oblique shock-waves*. The formalization of this unprecedented phenomenon led to the beginning of new and prolific research activities, ranging from theoretical studies to experimental activities and applications, including renewable energies. I also delivered the first-ever accuracy assessment of a computational model for non-ideal flows, a fundamental step towards improving computerized models. Moreover, I co-authored several works concerning the robust optimization of Organic Rankine Cycle turbine blades.

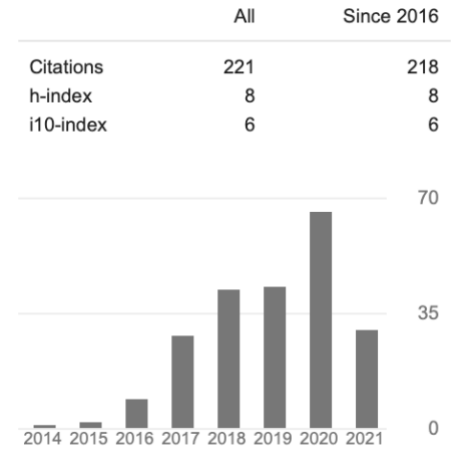
In the field of in-flight ice accretion, I identified a mathematical inconsistency in the state-of-the-art ice-accretion model, proposing a consistent solution leading to more accurate predictions. I am the creator, and I have been the leading developer from 2012 to 2017, of the PoliMIce ice accretion code. The PoliMIce suite is currently employed in several European research projects e.g., [H2020 UTOPIAE MSCA-ITN](#) (Uncertainty Treatment and OPTimisation in Aerospace Engineering, ESR10: Uncertainty Characterisation in Multi-fidelity Anti-ice system and Design), [H2020 NITROS MSCA-EJD](#) (Network for innovative training on rotorcraft safety, ESR1: Simulation and prevention of ice formation and shedding on rotorcraft) and [H2020 ICE-GENESIS](#) project coordinated by Airbus.

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.

Currently, I am working on developing multi-fidelity modeling methods under epistemic uncertainty. In particular, I am developing efficient sampling strategies for constructing databases for research, validation and design purposes.

## PUBLICATIONS RECORD

My publication record includes around 30 scientific contributions delivered in a time frame of about 6 years. Among these contributions, 10 are peer reviewed Journals, 11 are peer reviewed conference proceedings and 1 is a chapter in a book. Publications covers a wide range of topics, spanning from in-flight ice accretion, non-ideal compressible fluid flows, atmospheric entry in space applications, uncertainty quantification and turbomachinery design. According to Google Scholar metrics, my current H-index is 8. Since 2014, the number of yearly citations has grown consistently, attracting a total of 221 referencing works.



### Peer Reviewed Journals

- **G. Gori**, O. Le Maître and P. M. Congedo, *A Confidence-based Aerospace Design Approach Robust to Structural Turbulence Closure Uncertainty*, Journal article submitted to Computer & Fluids, 2021 (under review)
- **G. Gori**, O. Le Maître and P. M. Congedo, *On the Sensitivity of Structural Turbulence Uncertainty Estimates to Time and Space Resolution*, technical note submitted to Computer & Fluids, 2021 (under review)
- **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.
- **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.
- D. Vimercati, **G. Gori**, A. Guardone, *Non-Ideal Oblique Shock Waves*, Journal of Fluid Mechanics, Vol. 847, pp. 266-285, 2018.
- **G. Gori**, G. Parma, M. Zocca and A. Guardone, *Journal of Aircraft, Local Solution to the Unsteady Stefan Problem for In-Flight Ice Accretion Modeling*, Vol. 55, pp. 251-262, 2018.
- 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.
- **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.

### 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, 2021.

### Peer Reviewed Conference Proceedings

- **G. Gori**, O. Le Maître and P.M. Congedo, *A Review of some recent advancements in Non-Ideal Compressible Fluid Dynamics*, International Conference on Uncertainty Quantification & Optimization conference, Virtual Event, 2020.
- **G. Gori**, N. Razaaly, G. Iaccarino and P. M. Congedo, *Structural Uncertainty Estimation of Turbulence Models in Organic Rankine Cycle Applications*, ORC2019 conference, Athens, Greece, 2019.
- N. Razaaly, **G. Gori**, G. Iaccarino, P. M. Congedo, *Optimization of an ORC Supersonic Nozzle Under Epistemic Uncertainties due to Turbulence Models*, Global Power and Propulsion Society GPPS2019 Conference, Zurich, Switzerland, 2019.
- 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*, Summer Program at the Center for Turbulence Research, Stanford University, California, USA, 2018.

- **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.
- 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.
- 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.
- **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.
- **G. Gori**, D. Vimercati and A. Guardone, *Non-Ideal Compressible-Fluid Effects in Oblique Shock Waves*, Journal of Physics: Conference Series, Vol. 821, 2017.
- **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*, 3<sup>rd</sup> International Seminar on ORC Power Systems, Brussels, Belgium, 2015.

### **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*, 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*, 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*, 31<sup>st</sup> 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*, 7<sup>th</sup> 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*, 7<sup>th</sup> 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*, 22<sup>nd</sup> AIAA Computational Fluid Dynamics Conference, Dallas, Texas, USA, 2015.
- **G. Gori**, M. Zocca and A. Guardone, *A Model for In-flight Ice Accretion Based on the Exact Solution of the Unsteady Stefan Problem*, 7<sup>th</sup> AIAA Atmospheric and Space Environments Conference, Dallas, Texas, USA, 2015.

### **AWARDED FELLOWSHIPS**

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| 2021 –      | Temporary Research Fellowship for Research Activities UOR DAER “Development of simplified models for the aerodynamics of wings at high angle of attack” CS2-H2020 MONNALISA/Department of Aerospace Science and Technology, Politecnico di Milano, Italy |
| 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

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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

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

## TEACHING ACTIVITY

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2021 - Teaching assistant for the course “Compressible Fluid Dynamics” held by Prof. Alberto Guardone at the Department of Aerospace Science & Technology, Politecnico di Milano. In charge of delivering exercise sessions and numerical laboratories (frontal lectures).

## SUPERVISING ACTIVITY

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

- *A new Statistical Snow Cloud Model for Aeronautical Applications*, A. Raimondi, 2021.
- *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), <a href="#">UQOP2019</a> , March 18-20, Paris, France.   |
| 2017 | Staff member, <a href="#">4<sup>th</sup> International Seminar on ORC Power Systems</a> , September 13-15, Milano, Italy.  |
| 2016 | Staff member, <a href="#">NICFD-PP 2016: 1<sup>st</sup> International Seminar on Non-Ideal Compressible-Fluid Dynamics for Propulsion &amp; Power</a> , October 20-21, Varenna, Italy. |

## 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 (since 2014). |

Milano,  
April 24<sup>th</sup> 2021

