

## CURRICULUM VITAE

### Giulio Gori, PhD

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Post-doctoral fellow, DeFI team, INRIA/Centre de Mathématiques Appliquées, École Polytechnique, Institut Polytechnique de Paris.  
1 Rue Honoré d'Estienne d'Orves, 91120 Palaiseau, France.

Email: [giulio.gori@inria.fr](mailto:giulio.gori@inria.fr)  
Mobile: +39 333 9308997  
Laboratory web page: <http://www.cmap.polytechnique.fr/~defi/>



### 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: *PoliMlce: 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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- 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

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- 2019      Visiting fellow  
Von Karman Institute for Fluid Dynamics, Belgium (4 months)
- 2018      Visiting fellow  
Center for Turbulence Research at Stanford University (1.5 months), Palo Alto, CA, USA
- 2016      Visiting Ph.D. candidate,  
UT Twente, Faculty of Engineering Technology, Enschede, Netherlands (3 months)
- 2014      Visiting fellow  
Aerospace Design Lab (ADL) at Stanford University (1 month), Palo Alto, CA, USA

## 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.

## 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.

In my PhD, 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* i.e., a Mach number increase across oblique shock waves of finite amplitude in molecular complex vapor flows, 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 paper I authored in 2017, “Non-ideal compressible-fluid effects in oblique waves”, Journal of Physics: Conference Series, Vol. 821, is testified by the diverse scope of the following citing works.

In the field of non-ideal flows, 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 was able exploit data-driven techniques to provide substantial indication for developing novel experiments. I co-authored several works concerning the robust optimization of Organic Rankine Cycle turbine blades. Currently, I am in the process of authoring a paper introducing a novel design approach robust to structural turbulence closure uncertainty.

In the field of in-flight ice accretion, I was able to identify a mathematical inconsistency in the state-of-the-art ice-accretion model and to propose a consistent solution leading to more accurate predictions, see “PoliMIce: a simulation framework for three-dimensional ice accretion”, Applied Mathematics and Computation, 267, 96-107. 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 now 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 European Joint Doctorate, 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.

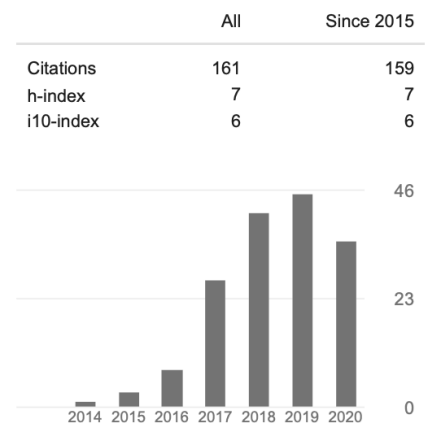
Since 2014, I am a principal developer of the SU2 open-source suite, a successful software for Computational Fluid Dynamics (CFD) which is currently a reference for universities and institutions spread all over the world. In this context, I contributed developing several modules e.g., the non-ideal solver 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.

## 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, *PoliMlce: 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 3<sup>rd</sup> 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 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*, proceeding at the 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*, proceeding at the 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*, proceeding at the 22<sup>nd</sup> 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 7<sup>th</sup> 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

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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.

## 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:

- *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 ( <a href="https://uqop.sciencesconf.org">https://uqop.sciencesconf.org</a> )  |
| 2017 | Staff member, <i>4<sup>th</sup> International Seminar on ORC Power Systems</i> , September 13-15, Milano, Italy ( <a href="http://orc2017.fyper.com">http://orc2017.fyper.com</a> )  |
| 2016 | Staff member, <i>NICFD-PP 2016: 1<sup>st</sup> International Seminar on Non-Ideal Compressible-Fluid Dynamics for Propulsion &amp; Power</i> , October 20-21, Varenna, Italy ( <a href="https://easychair.org/smart-program/NICFD2016/index.html">https://easychair.org/smart-program/NICFD2016/index.html</a> ) |

## 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,  
September 9<sup>th</sup> 2020



‘I hereby authorize the use of my personal data in accordance to the GPR 679/2016.’