



# AIDAA Educational Series and Academy Challenges and opportunities for the aerospace frontier research offered by the ERC and the MSCA programme

*Feb 22, 2021*

The main instruments for the development and attraction of talent to the European Union (EU) are the European Research Council (ERC) and the Marie Skłodowska-Curie Actions (MSCA). Over the last decade, the ERC and the MSCA found wide and diverse areas of research of relevance to aerospace and gave many researchers the opportunity to develop their projects with highly competitive conditions.

This short webinar is addressed to early-career and experienced researchers and is intended to promote successful proposals for the ERC and MSCA.

In the first part, EU scientific officers and experts will give an overview on the main characteristics and opportunities offered by the ERC and MSCA funding schemes. Particular attention will be focussed on mission, funding, and evaluation process.

In the remaining part of the course, authors of successful ERC and MSCA-IF grant proposals on arguments of aerospace relevance will present their own stories and projects and will give application advice. Details on lessons learnt, proposal writing, preparation of the curriculum vitae, and stage-2 interview will be discussed along with eventual opportunities to join an ERC team.

## Speakers

### George Symeonidis

George Symeonidis has an Aerospace Engineering background (B.Sc. – Ph.D. Univ. Bristol; Diploma & Ph.D. work von Karman Institute, VKI) and is Scientific Officer at the ERC working with the PE7 Systems and Communication Engineering and PE8 Products and Processes Engineering Panels. He has previous research experience in aerothermodynamics and hypersonics (VKI & ESTEC), industrial experience in aircraft and aero-engine maintenance/repair/overhaul (Hellenic Aerospace Industry), and teaching experience in aerodynamics/gas dynamics/flight mechanics (Univs. Thessaly & Patras).

### Manuel de la Guia Solaz

Manuel de la Guia Solaz holds a BSc in Telecommunications Engineering and a BSc in Electronic Engineering by the University of Valencia (Spain), and a PhD in Microelectronics by the University of Limerick (Ireland).

Manuel has worked through the years in several engineering fields, from microelectronics to system design for test and measurement devices. Having spent time on the public and private sectors, he pursued a PhD while teaching several engineering modules at the University of Limerick. In 2011, after his PhD, he moved to Belgium to work with the Interuniversitair Micro-Electronica Centrum “imec”, where he acted as an R&D Engineer and Project Manager. In 2016 he joined the REA as a Project Officer in the Engineering panel, where he was Call Coordinator for MSCA-IF 2019.

### **Camilla Colombo**

Camilla Colombo is Associate Professor at Politecnico di Milano since 2016 where she is the PI of several projects funded by the European Space Agency and an ERC Starting Grant on the project COMPASS “Control for Orbit Manoeuvring through Perturbations for Application to Space Systems” ([www.compass.polimi.it](http://www.compass.polimi.it)). She leads a team of 11 Postdoc and PhD researchers working on the study of natural and artificial perturbations and their use for application to space debris modelling and mitigation, trajectory design and mission analysis of missions involving constellation of satellites and formation flying and mission to near-Earth asteroids. After her PhD (2010) at University of Glasgow (UK), she has served as Research Fellow at the University of Strathclyde (UK), then at the University of Southampton (UK) as Lecturer and then Associate Professor. In 2012 she was awarded a Marie Skłodowska-Curie Action for a research stay at Politecnico di Milano on “Space Debris Evolution, Collision risk, and Mitigation”. Since 2017 she serves as delegate for the Italian Space Agency at the Inter-Agency Space Debris Coordination Committee and at the COPUOS Science and Technical Subcommittee Space Mission Planning Advisory Group. Her research is published in over 100 journal and conference publications.

### **Francesco Topputo**

Francesco Topputo is an Associate Professor of Aerospace Systems at Politecnico di Milano, Italy, and holds a position as Visiting Researcher at TU Delft, The Netherlands. His core research activities involve spacecraft flight dynamics and control, interplanetary CubeSat mission and system design, autonomous guidance and navigation. Prof. Topputo is an ERC laureate (CoG 2019) and has been PI in 10 research projects, with over EUR 3.5M research grants allocated to work under his direction. He leads a research group composed of 16 Post-Doctoral fellows and PhD students. He has authored 50 peer-reviewed articles published in international journals, 8 book chapters, and over 200 works in total.

### **Alberto Giacomello**

Alberto Giacomello is Associate Professor of Fluid Dynamics at the Department of Mechanical and Aerospace Engineering of Sapienza University and principal investigator of the ERC-StG project HyGate. His research is in theoretical and computational fluid mechanics of interfaces at the micro- and nanoscale. In particular, research is focused on understanding the origin of metastability in problems of engineering and multidisciplinary interest, including ion channel gating, superhydrophobicity, contact angle hysteresis, nanobubbles, and cavitation inception. In 2010, Alberto obtained a double MS degree in Mechanical Engineering from Sapienza University of Rome and the Polytechnic Institute of New York University. He holds a PhD in Theoretical and Applied Mechanics from Sapienza. In 2014 he moved to Germany to work as postdoc at the Max Planck Institute for Intelligent Systems of Stuttgart with which the collaboration is ongoing. From 2019 he is a member of the Sapienza School for Advanced Studies (SSAS).

### **Alfonso Pagani**

Alfonso Pagani serves as associate professor at the Department of Mechanical and Aerospace Engineering, Politecnico di Torino. He earned a Ph.D. in Aerospace Engineering at City University of London in 2016 and, earlier, a Ph.D. in Fluid-dynamics at Politecnico di Torino under the supervision of Prof. E. Carrera. Recently, Dr. Pagani has been awarded an EU-H2020 ERC starting grant for an exploratory study into a new approach to the problem of design, manufacturing and analysis of variable stiffness composite materials ([www.pre-eco.eu](http://www.pre-eco.eu)). In 2018, Alfonso joined California Institute of Technology as visiting associate to work on acoustics

of meta-materials. Also, he spent research periods at Purdue University in 2016, where he worked on micro-mechanics of fibre-reinforced composites with Prof. W. Yu; RMIT Melbourne in 2014; and at Universidade do Porto in 2013. Alfonso is the co-author of some 120 publications. He acts as a reviewer for more than 20 International journals and is associate editor for *Advances in Aircraft and Spacecraft Structures*, an Int'l Journal edited by Techno-Press, and *International Journal of Dynamics and Control*, Springer Nature.

### **Fabio Ferrari**

Fabio Ferrari is a Senior Research Associate at the University of Bern and holds a visiting position at NASA Jet Propulsion Laboratory. His research interests are in the field of astrodynamics and planetary science, both with applications to small celestial bodies of the Solar System, such as asteroids and comets. After earning his PhD in Aerospace Engineering from Politecnico di Milano in 2017, he was Postdoctoral Fellow at NASA JPL and spent research periods at Observatoire de la Côte d'Azur, Nice. In 2018 he was awarded a MSCA IF – Global Fellowship to study the dynamics and evolution of rubble-pile asteroids. He is co-investigator of projects related to small-body exploration and is member of the scientific teams of ESA's Hera and NASA's DART mission. He is currently the PI of a SNSF Ambizione Grant. To date, he has been awarded over 1M€ of research grants as PI, he is author of 22 indexed publications and about 40 works in total. He serves as reviewer for several international journals in the field of space engineering and planetary science.

### **Mirko Trisolini**

Mirko Trisolini is a Postdoctoral Researcher at the Department of Aerospace Science and Technology of the Politecnico di Milano. His research interests are in the field of astrodynamics, spacecraft and asteroid re-entry, space debris assessment and mitigation strategies. He received his PhD in Aerospace Engineering from the University of Southampton in 2019. In 2020 he has been awarded a MSCA IF – Global Fellowship to study the motion of particles orbiting asteroids and other small bodies and investigate possible ways to safely collect these samples via the preliminary design of a collection device. He will start the MSCA IF in March 2021, in partnership with the Japan Space Exploration Agency (JAXA) and the University of Padova. He has participated in four research projects in collaboration with ESA and ASI. He is the author of 15 indexed publications, a book chapter, and about 30 works in total. He serves as reviewer of international journals in the field of aerospace engineering and celestial mechanics.

### **Bin Wu**

Recently, Bin Wu has been awarded a Marie Curie Individual Fellow (MSCA IF) to study the dynamic characteristics of soft electro-active materials and structures at NUI Galway (Ireland), with special emphasis on characterization of soft intelligent materials and structures (DYN-SEAM Action). He earned a Ph.D. in Solid Mechanics at Zhejiang University (China) in 2018 under the supervision of Prof. W.Q. Chen. Earlier from 2014 to 2016, he was a joint training Ph.D. student in Structural Mechanics at University of Siegen (Germany) in the Computational Elastodynamics Group lead by Prof. Ch. Zhang. In 2018, he was a Postdoctoral Fellow for one year in the MUL2 Group led by Prof. E. Carrera at the Department of Mechanical and Aerospace Engineering, Politecnico di Torino. In 2019, he was awarded an IRC (Irish Research Council) Postdoctoral Fellow to join the Soft Matter Group led by Prof. M. Destrade at NUI Galway. His research interests include mechanics of smart materials and structures, wave propagation and free vibration analysis, fluid-structure interactions, tunable phononic crystals and metamaterials, and customized CUF FEM. To date, he has participated in 7 research projects and he has authored 30 peer-reviewed articles published in international scientific journals, 2 reviews, and 1 book chapter. He serves as a reviewer for more than 10 International Journals and cooperates with more than 20 international collaborators.

## Timetable

8.40 – 9.00	Welcome <i>E. Carrera, President of AIDAA</i> <i>A. Pagani, Politecnico di Torino</i>
9.00 – 9.20	The European Research Council <i>G. Symeonidis, ERC Scientific Officer</i>
9.30 – 9.50	The Marie Skłodowska-Curie Actions Postdoctoral Fellowships <i>M. de la Guia Solaz, Call Coordinator for MSCA-IF</i>
10.00 – 10.20	COMPASS – Control for Orbit Manoeuvring through Perturbations for Application to Space Systems <i>C. Colombo, ERC-StG grantee, Politecnico di Milano</i>
10.30 – 10.50	EXTREMA – Engineering Extremely Rare Events in Astrodynamics for Deep-Space Missions in Autonomy <i>F. Toppo, ERC-CoG grantee, Politecnico di Milano</i>
11.00 – 11.20	HyGate – Hydrophobic Gating in nanochannels: understanding single channel mechanisms for designing better nanoscale sensors <i>A. Giacomello, ERC-StG grantee, Sapienza Università di Roma</i>
11.30 – 11.50	PRE-ECO – A new Paradigm to RE-Engineering printed COMposites <i>A. Pagani, ERC-StG grantee, Politecnico di Torino</i>
12.00 – 12.20	GRAINS – Gravitation of Rubble-pile Asteroid with Internal N-body Structure <i>F. Ferrari, MSCA-IF fellow, Politecnico di Milano</i>
12.30 – 12.50	CRADLE - Collecting Asteroid-Orbiting Samples: enabling a safer, sustainable, and autonomous exploration of asteroids <i>M. Trisolini, MSCA-IF fellow, Politecnico di Milano</i>
13.00 – 13.20	Manipulating and tuning dynamic characteristics of soft electro-active materials: Modelling, simulations and experiments <i>W. Bin, MSCA-IF fellow, National University of Ireland, Galway</i>

## Registration and Webinar Platform

The registration is mandatory as follows:

- Non-AIDAA members
  - The registration fee is 50 euro via Credit Card (<https://www.aidaa.it/challenges-and-opportunities.htm>) or bank transfer (AIDAA Rome, Italy / IBAN: IT83F0200805164000005064973, BIC SWIFT: UNCRITM1B57 / Webinar AIDAA-012021)
  - The registration fee includes the membership to AIDAA for 2021
  - After the payment, please, send an email to [info@aidaa.it](mailto:info@aidaa.it) with the payment details
  - Deadline: 15 February 2021
- AIDAA members
  - There are no fees but, please, send an email to [info@aidaa.it](mailto:info@aidaa.it) to register
  - Deadline: 15 February 2021
- The link to attend the webinar will be sent via email a few days before the event