

**Prof Francesco Montomoli, PhD, CV**

<b>Full Name and Title</b>	Francesco Montomoli, Full Professor Imperial College London
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<b>Title and Date of Current Appointment</b>	Full Professor in Computational Aerodynamics, 1 September 2021
<b>Higher Education (degrees):</b>	<p>2002 – 2004: <b>PhD in Energy Engineering</b>, University of Florence, Italy 04/29/2005  Supervisor Prof F Martelli, University of Florence, Italy  Advisor Prof J C Han, Texas AM University, TX, USA  2002-2004 PhD Scholarship of Italian Ministry of Research</p> <p>1994 – 2001: <b>MSc Mechanical Engineering</b>, University of Florence, Italy, Major in Aerospace Propulsion, Laurea 23/04/2001</p>
<b>Other courses, modules, qualifications (not degrees)</b>	<p>2019 RAEng Enterprise Fellow  2017-now : Italian Professorship Qualification, Full Professor in Engineering 09/C1  2005 CINECA Scholarship, summer school in Advanced High Performance Computing  2004, Visiting Scholar Texas AM University, US  2003 CINECA Scholarship, summer school in High Performance Computing</p>
<b>Membership of Professional Bodies, Learned Societies etc</b>	<p>2018-now Board Member Euroturbo (European Turbomachinery Organization), UK representative</p> <p>2001-now Chartered Engineering Society of Florence, Italy</p>
<b>Energy/Net Zero/ Aircraft Engines</b>	<p><b>Aircraft Engines:</b> focal point for <b>Rolls-Royce</b> at Imperial College London, research applied to real engines for Net Zero including Trent1000 (low pressure turbine, compressor), Ultrafan (intake and compressor), electrification.</p> <p><b>Energy:</b> several projects with <b>Baker Hughes TPS</b> (formerly GE Oil&amp;Gas, Nuovo Pignone Tecnologie) on gas turbines, hydrogen explosions, including a multi year collaboration agreement for Machine Learning applied to energy transformation. Analysis, simulation and reliability of components for hydrogen explosions. I have promoted and we are signing a <u>Framework Agreement</u> between Imperial College and Baker Hughes and I am confident that they will support my research in the future.</p>

	<p><b>EU Projects:</b> currently project Nextair (for Net Zero in Aviation) and Demoquas (Uncertainty Quantification for Hydrogen and Electrification)</p> <p><b>UK Projects:</b> several including Fanfare for green aviation</p>
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## APPOINTMENTS

Title of Appointment	Dates (From/To)	Department/Other Organisation	Brief Description of Responsibilities
Full Professor	09/2021-now	Dept of Aeronautics, Imperial College of London	<p>At ICL I founded and now lead the Uncertainty Quantification Laboratory, now with <b>6</b> Post Docs In total I have supervised. <b>15 PhD students</b> and <b>16 PDRAs</b>. Major collaborating with NASA, Rolls-Royce, Baker Hughes, General Electric, Airbus, Criepti (Japan energy agency) etc.</p> <p><b>Focal point of Rolls-Royce, I am discussing all the grants between the dept and Rolls-Royce on Aircraft Engines.</b></p> <p><b>Focal point for Baker Hughes collaboration, signing a Framework Agreement between ICL and BH.</b></p> <p>Part of a group of 6 academics that convinced a donor to give <b>25M£ for the new centre on Green Aviation at Imperial College London.</b></p> <p>As departmental roles, I am the Post Graduate Senior Tutor and the Aero Dept Enterprise Champion.</p> <p>As Impact I have started two companies, being the CEO of one of them, ToffeeX (named one of best companies in engineering by several lists).</p> <p>I am also the lecturer of Mathematics Y1 for Undergraduates and two MSc modules Compressible Flows and Computational Fluid Dynamics.</p>
Co-founder	CEO 2019-Jan 2023	ToffeeX (previously TOffeeAM Ltd), spinout of Imperial College	Co-founded, lead and develop TOffeeAM, design for additive manufacturing software company

	Chief Scientific Officer Jan 2023-now	London, part of Boeing accelerator	<ul style="list-style-type: none"> <li>closed a seed round of about £1m and closed a Series A round of £5m.</li> <li>part of <b>Boeing</b> accelerator</li> <li>1 of 5 winners of Formnext (the biggest manufacturing event in EU)</li> <li>projects with <b>Baker Hughes, 2 F1 teams, GE Aviation, Tier 1 Automotive, Boeing, Leonardo</b> etc</li> </ul>
RAEng Enterprise Fellow	2019-2020	Royal Academy of Engineering	Start the spinout of the college TOffeeAM
Reader	2018-now	Dept of Aeronautics, Imperial College of London	<p>At ICL I founded and now lead the Uncertainty Quantification Laboratory, now with 3 Post Docs and 8 PhD students, 3 of them graduating soon. In total I have supervised <b>15 PhD students</b> and <b>12 PDRAs</b>.</p> <p>Major collaborating with NASA, Rolls-Royce, Baker Hughes, General Electric, Airbus, Criepe etc., with grants of more than <b>2M£</b> in the last <b>three years</b>.</p> <p>As departmental roles, I am the Post Graduate Senior Tutor and the Aero Dept Enterprise Champion.</p> <p>Moreover, I am the focal points for Rolls-Royce and Baker Hughes collaborations.</p> <p>As Impact I <u>have started two companies</u>, being the CEO of one of them, TOffeeAM.</p> <p>I am also the lecturer of Mathematics Y1 for Undergraduates and two MSc modules Compressible Flows and Computational Fluid Dynamics.</p>
Senior Lecturer	2014-2018	Dept of Aeronautics, Imperial College of London	<p>At ICL I founded the UQLab, From 2014 to 2018 I have supervised <b>3</b> post docs and graduated <b>6</b> PhD students</p> <p>I had collaboration with NASA, Rolls-Royce, Baker Hughes, General Electric, Airbus, Criepe etc. with total grants awarded of more than <b>800K£</b>.</p> <p>As Departmental roles I have been the Post Graduate Senior Tutor, Career Officer and Seminar Organizer</p>

			Teacher of Mathematics Y1 for Undergraduates and two MSc modules Compressible Flows and Computational Fluid Dynamics.
Member of the Board of Directors	2016-2018	UQuant Ltd, now MonolithAI, spinout of Imperial College London	This startup is a spinout of the UQLab that I lead. Named one of 7 Deep Science Startups in the World in Industry 4.0, it focusses on AI for Engineering.
Senior Lecturer	2012-2014	University of Surrey	<p>As Senior Lecturer and a Principal Investigator at the University of Surrey I was responsible for the management of my research projects including external contractors and research partners. Rolls Royce plc sponsored this research in Computational Fluid Dynamics and Uncertainty Quantification alongside HORIZON 2020, EU-Clean-Sky project NewSmile, working on Uncertainty Quantification and Combustion Chambers.</p> <p>As recognition of my work I was awarded a prize in <b>Science of Risk from Lloyds of London (second place)</b>.</p> <p>As teaching, I have been teaching the following modules</p> <p>2014 : Design Make Evaluation, Design of UAVs</p> <p>2013 : Numerical and Experimental Methods, 50+ students</p> <p>2012 – 2014: Numerical Methods and CFD, 50+ students</p> <p>2012 – 2013: Thermo-fluids, 50+ students</p> <p>2012 : Design, Make Evaluation, 100+ students</p>
Research Professor in Applied Mathematics and Team Leader of the CFD Group	2011-2012	<p>Basque Centre for Applied Mathematics, Spain</p> <p>Since 2014 External Scientific Member</p>	As team leader of the Computational Fluid Dynamics (CFD) group at BCAM I was responsible for defining the research direction, successfully attracting research grants with industrial partners and defining international collaborations in Stochastic Methods. I oversaw industrial liaison with our sponsors, Baltogar and Aeroblade (fans and wind turbines, respectively) and won a research grant to support a PhD student

			and two post-doctoral researchers.
Senior Fellow (permanent) and College Lecturer	2009-2011	University of Cambridge, <b>Whittle Laboratory</b> , Girton College, UK	<p>As Principal Investigator, I was successful in the application and management of my independent research portfolio. My research on the impact of manufacturing errors and in-service degradation in CFD broke new ground. By using Uncertainty Quantification methods (UQ) I developed a new geometry of film cooling, patented by Mitsubishi Heavy Industries, with me as sole inventor. From this work, MHI provided sponsorship for my research with two new wind tunnels at Whittle Laboratory for which I was responsible for the development.</p> <p>Member of Teaching and Governing body of Girton College, University of Cambridge.</p> <p>College Lecturer in Thermofluids for Girton College.</p>
Research Associate	2009-2011	University of Cambridge, Whittle Laboratory, UK	<p>As research associate, I have been working on Unsteady Effect in Axial Compressors, SMURF Project and in transition of low pressure turbines. During the SMURF project I focused on numerical study of unsteady aerodynamic phenomena and transition in axial compressors.</p> <p>I have been also working on transition in Low Pressure Turbines. Experimental and numerical investigation of passive separation methods in high-lift profiles at different Reynolds numbers.</p> <p>My work has been applied to a real engine, the Trent1000.</p> <p>As teaching activity, I was a Tutor of Thermofluids for Sidney Sussex College.</p>
Design Engineer	2005-2006	General Electric Oil&Gas	<p>Working as part of the Heat Transfer Group, in charge of aero-derivative gas turbines. Involved in the development of the new LM2500+G4® gas turbine from the design to prototype test using Design for Six Sigma methods. Managed the activities of two</p>

			externally-contracted engineers. Development of a new 15 MW prototype, cooperating with GE Aviation and Energy.
Research Assistant-Tutor for Industrial Engineering-PhD student	2002-2004	University of Florence	During my PhD I was also engaged as a part-time Research Assistant, lecturing for the Compressible Flow and Computational Fluid Dynamics Modules. I was also teaching for the International Master's in Bio-Sciences (EU-USA)

## CURRENT AND PAST CONTRIBUTIONS TO EDUCATION

### CURRENT Undergraduate/Postgraduate Teaching

Name of programme and years of study	What Type of Teaching?	Evidence of achievement:
AE1-107 Mathematics, Undergraduates Year 1	Lectures, 15 hours, about 110 students	In the latest SOLE available, SOLE UG 2021, <b>85% of the students definitely agree or mostly agree that they were satisfied with the lecturer.</b> Some of free comments from the students are: <ul style="list-style-type: none"> <li>• Amazing interaction during lectures</li> <li>• Liked how you showed us the significance of matrices in real life and how often they're full of zeros</li> </ul>
AEM-ADV19 Computational Fluid Dynamics, Postgraduates, MSc	Lectures, 12 hours, about 70 students	SOLE for the MSc module has been always more than positive where I had even <b>100%</b> of students definitely agree or mostly agree that they were satisfied with the lecturer. Have consistently received positive comments from external examiners. I have organized seminars relevant to the module including talks from the former head of CFD of <b>McLaren</b> , senior CFD designer of <b>Foster and Partners</b> , a researcher at <b>NASA Langley</b> to name but a few.
AEM-ADV10 Compressible Flows, Postgraduates, MSc	Lectures, 12 hours, about 70 students	SOLE for the MSc module has been always more than positive, where I had even <b>100%</b> of students definitely

		agree or mostly agree that they were satisfied with the lecturer. Have consistently received positive comments from external examiners
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### **Overall Undergraduate/Postgraduate Teaching**

**2014-Now, IMPERIAL COLLEGE OF LONDON, UK,**  
feedback **top 10% among all the lecturers**

Modules:

1. AE1-107 Mathematics, 100+ students (Linear Algebra)
2. AE4-401 Application of Fluid Mechanics, 50+ students (until 2018)
3. AEM-ADV19 Computational Fluid Dynamics, 70+ students
4. AEM-ADV10 Compressible Flows, 70+ students (until 2022)
5. Group Design Project

**2012 – 2014: SENIOR LECTURER IN THERMO-FLUIDS, UNIVERSITY OF SURREY, UK**

2014 : DME, Design of UAV (supervisor of 4 groups)

2013 : Numerical and Experimental Methods, 50+ students

2012 – 2014: Numerical Methods and CFD, 50+ students

2012 – 2013: Thermo-fluids, 50+ students

2012 : Design, Make Evaluation, 100+ students

ICL: Qualification to supervise and interview PhD students

**2006 – 2012: COLLEGE LECTURER- AT UNIVERSITY OF CAMBRIDGE, UK, MEMBER OF TEACHING AND GOVERNING BOARD GIRTON COLLEGE**

2009 – 2012: College Lecturer, Thermofluids, Girton College, 18 students.

2009 – 2012: Examiner for undergraduate admission

2010 – 2012: Demonstrator: laminar-turbulent transition (64 undergrads)

2008 – 2012: Teacher of Thermofluids, Sidney Sussex College, 4 h. per week, 12 students

2006 – 2012: Supervisor of Fluids Dynamics, Power Generation, Heat Transfer modules.

**2001 – 2004: SUPERVISOR AT UNIVERSITA' DI FLORENCE, ITALY**

2004: Teacher for the International Master in Environmental Science, IMES: EU-USA, postgraduates, Module "Energy Production and Thermodynamic Cycles", in collaboration with Arizona State University and Baylor University, US.

2001 – 2004: Assistant and supervisor for oral and written examinations for undergraduate students, Computational Fluid Dynamics, Compressible Fluid Dynamics and Turbomachinery, 4 hours per week

2002 – 2004: Part time lecturer: Fluid Dynamics and Turbomachinery

2001 – 2002: Tutor for under-graduate students for industrial engineering.

#### **TUTOR:**

**2014-Now, IMPERIAL COLLEGE OF LONDON, UK,**

Post Graduate Senior Tutor for the MScs in Aeronautics (3 Masters, about 250 students)

Undergraduate personal tutor

**2012 – 2014: UNIVERSITY OF SURREY, UK**

Undergraduate personal tutor (about 20 students)

**2006 – 2012: UNIVERSITY OF CAMBRIDGE, UK, MEMBER OF TEACHING AND GOVERNING BOARD GIRTON COLLEGE**

Personal Tutor

**2001 – 2004: UNIVERSITA' DI FIRENZE, ITALY**

2001 – 2002: Tutor for under-graduate students for industrial engineering.

## Management, development and delivery of education

### **Departmental roles**

**Enterprise champion** for the department of Aeronautics, responsible for the spinouts, commercialisation, business plan

Until 09/2024 **Post Graduate Senior Tutor** (Assistant Director Post Graduate Studies since 2016), responsible for MSc students in the Department. This takes approximately 4 hours per week. I actively work to evaluate and improve the learning experience of our post graduate students, dealing with all possible issues that may arise. From 2020 to 2022 this poses new challenges, due to the pandemic situation requiring more attention to students situation and online/remote teaching.

### **Design of new modules**

I have developed the **Compressible Flow Module** for the MSc programmes. In particular I have introduced the so called Fanno and Rayleigh flows that have a strong impact in aircraft engines and aviation in general. Having about 15 years of experience in teaching compressible flow, I have found that these two flows, often neglected in compressible flow modules, are often asked during interviews with Industry. Moreover I am using my former industrial experience with transonic flows to make the module more interesting.

For **Computational Fluid Dynamics**, I maintained the structure of the module, but we decided to show some latest CFD results on Aircraft Engines and we organized a seminar with industry (for example StarCCM).

For the undergraduate module, **Application of Fluid Dynamics**, I have invited external speakers to give seminars. The students really enjoyed the seminar of the former head of aerodynamics of McLaren (now at SpaceX) and from Foster and Partners on aerodynamics in the building industry.

I have contributed to shape the new **Machine Learning** module providing aeronautical examples from sponsors (in particular from Rolls-Royce).

I am often asking some of my industrial sponsors/contacts if they can come to show how what we are teaching is applied in important companies that can inspire our undergraduates or postgraduates.

### **Successful innovation**

I arrange and promote lectures/seminars from well known experts coming from leading companies such as **SpaceX, McLaren, NASA, Heathrow Airport, Foster and Partners**, to engage with our students.

### **Successful activities**

To involve the students as partners of their learning, I am trying to have a more innovative flipped class approach for MSc module tutorials.

### **Evidence based practice**

I include real research/practical examples in my teaching. This has been successful not only for the predominantly logical modules such as CFD and Compressible Flows, but also for Mathematics (linear algebra).

## Student support, student welfare and pastoral care

Since 2016, until 09/2024 I have been the **Postgraduate Senior Tutor** for the Department of Aeronautics and in this role, I am involved in the pastoral care and wellbeing of all our graduate students (MScs), >100 students. This usually involves supporting our students, giving them all possible options available for different situations (financial problems, medical issues etc).

Since March 2020 the role presented new challenges due to the global pandemic, such as supporting students over different situations, including those who are working remotely.

I actively liaise with the Aero Wellbeing officer and the other Senior Tutors to ensure a unified approach in our actions across the Department and Faculty for all of our students no matter what level of study they are at.



For example, this has been useful in supporting students who are required to isolate due to Covid-19 or who have different mitigating circumstances associated to the pandemic.

Moreover, as **personal tutor of undergraduates** I am also involved in activities regarding the pastoral care of our students.

This experience is not new to me, being a former College Lecturer and Tutor at **University of Cambridge** where pastoral care was an important aspect of my work.

### **Schools outreach, widening participation, student recruitment and departmental admissions**

With regard to outreach activities, The UQLab that I lead, contributed to several events across UK for the dissemination of knowledge and attraction of students, including Imperial Festival (with M Pietropaoli), Alan Turing-Smith Institute events in Oxford (Audrey Gaymann and Marco Pietropaoli) and at New Scientist Life, where we were invited to disseminate mathematics to the audience.

I have also hosted at UQLab the UK NASA Workshop on Uncertainty Quantification (2015, sponsored by Airbus), three Airbus workshops in Uncertainty Quantifications (2016-2017-2021) and I have inaugurated the UQ lecture series at the Centre for Fluid Mechanics Simulations (CFMS).

All of these activities have been useful to promote our research and to engage with students. This has also been an effective method to attract talent for our doctoral program.

Outreach activities have been carried out nationally and internationally with industrial lectures. Nationally I have presented at Rolls-Royce as solo presenter on several occasions, at McLaren racing, at Foster and Partners and recently I have contributed to the COMAC lecture series at Imperial College. Internationally I have been one of two invited speakers to Technion lectures on Propulsion (2018), to present our work on Machine Learning and Turbomachinery at Jaxa and Criepe (2019), at Baker Hughes for design for additive manufacturing in gas turbines.

These outreach activities with industry convinced two companies, Rolls-Royce and Baker Hughes, to send two of their employees as PRI PhD students at Imperial College.

I have also engaged with London Airports such as Heathrow and Gatwick. I have been invited to give a seminar on risk in aviation at Heathrow Airport and with the newly funded Heathrow Centre of Excellence for Sustainability to disseminate the results on aviation to a wider audience.

### **Teaching Awards and Learning and Teaching Qualifications**

#### **Teaching Qualifications:**

I have been teaching since 2001 at University of Florence, Cambridge, Surrey and Imperial College.

#### **Cambridge University qualifications:**

Qualification to supervise PhD students.

Qualification to supervise/teach college undergraduates.

#### **Surrey University qualifications:**

Qualification to supervise PhD students, Surrey University

#### **Italian Qualification:**

I have obtained the Italian qualification of Full Professor in Engineering in ING/IND 08 since 2017 and previously I had the Italian qualification of Associate Professor in Engineering since 2014.

### **Contributions to Industry etc through Teaching/Training**

I am active in delivering Invited Lectures to Industry, below is a list of some of my seminars and workshops:

2024

- Baker Hughes University, lecture on UQ and explosion
- Rolls-Royce, Ados (optimization and Net Zero)

2023

- Baker Hughes, Hydrogen and meshgraphnet

2023

- Imperial College London, Digital Design for Net Zero in Aviation, <https://www.youtube.com/live/qtpuYkOtPIA>

2021

- Airbus lectures (3 day workshop) in Uncertainty Quantification

2020

- Comac lectures (3 days) on Optimization
- Baker Hughes, Design for Additive Manufacturing,

2019

- Crieipi lecture in Machine Learning, Japan,
- Jaxa, AI and Turbomachinery, Japan

2017

- Airbus Workshop in UQ, hosted by F Montomoli at ICL
- Foster+Partners, AI under the hood
- Heathrow Airport, Risk in Aviation, Internet of Aviation, UK
- KTN Advanced Manufacturing under Uncertainty." Knowledge Transfer Network, Uncertainty in Industry, UK

2016

- Airbus Workshop in UQ, hosted by F Montomoli at ICL
- NASA Workshop in UQ, hosted by F Montomoli at ICL
- KTN UQ and Aviation, plenary lecture to open the KTN Math lecture series

2015

- General Electric, UQ in Gas Turbines,
- Lloyd's, Science of Risk Prize, "Aviation and Risk", UK

2013

- Rolls-Royce, CFD Annual Review, "Black Swans and Hot Gas Ingestion", UK
- Rolls-Royce, ADOS, Optimization, "Impact of Rare Events in Gas Turbines: the Black Swan"

2012

- General Electric, Oil&Gas, "Uncertainty Quantification and Heat Transfer", Italy
- Rolls-Royce, Global High Spot, "Uncertainties and Gas Turbines: a Stochastic Method"
- Rolls-Royce, CFD Annual Review, "The four quadrants of knowledge in CFD", UK
- Rolls-Royce, Optimization, "UQ and Film Cooling", UK

2011

- Automotive Intelligence Center: "CFD in Automotive Industry: Real Life and Geometrical Approximations", Spain, Bilbao
- MHI, Japan, "Real Geometries and Heat Transfer", Japan

2010

- ITP-Universidad Politécnica de Madrid, "Unsteadiness in axial compressors", Spain
- MHI, Japan, "Quantitative Uncertainty and Film Cooling", Japan

2009

- Rolls-Royce, CFD Annual Review, "URANS-RANS methods in axial compressors"

2008

- Rolls-Royce, CFD Annual Review, "URANS-LES simulations"

2007

- Rolls-Royce, CFD Annual Review, "CFD activities at Whittle Laboratory"



## B. Research

### RESEARCH STUDENTS SUPERVISED

Type of Degree	Start Date	Writing Up/ Awaiting Viva/ End Date	Name of Student (and transfer date, if applicable)	Title of Project	Name of Primary Supervisor	Name of Secondary Supervisor(s) if applicable
PhD	1/2021	1/2024	Ginevra Covoni	Mesh Graph Net for hydrogen explosions	V Tagarielli	F Montomoli
PhD	1/2020	1/2023	Yuri Frei	Data Driven Turbulence Closures	F Montomoli	
PhD	10/2019	10/2022	Valentina Bisio	Blast and explosions in hydrogen: numerical simulations and machine learning	V Tagarielli	F Montomoli
PhD	10/2019	10/2022	James Hammond	Gene Expression Programming for Fluid Structure Topology Optimization	F Montomoli	M Eaton
PhD	10/2019	10/2022	Riccardo Friso	Towards Machine Learning for Design for Fouling	M Pinelli (U Ferrara)	F Montomoli
PhD	10/2017	06/2021	Nicholas Pepper	Uncertainty Quantification and Machine Learning in Aviation (Airbus UK-Fr-De)	F Montomoli	
PhD	10/2017	10/2021	Mayu Sakuma	Arbitrary Polynomial Chaos for Wind Engineering	Wuchner R (TUM)	F Montomoli
PhD	10/2016	10/2019	Andrea Cassinelli	High Order Methods for CFD (Rolls-Royce)	S Sherwin	F Montomoli
PhD	10/2015	10/2018	Audrey Gaymann	Fluid Topology Optimization Under Uncertainty (GE-Smith Institute)	F Montomoli	
PhD	10/2015	10/2018	Marco Pietropaoli	Fluid Topology Optimization and Heat Transfer (CDT)	F Montomoli	
PhD	10/2015	10/2018	Hannes Gauch	Blast in Oil and Gas Applications (GE)	V Tagarielli	F Montomoli
PhD	10/2015	10/2018	Nicola Casari	Fouling Models	M Pinelli (U Ferrara)	F Montomoli,

						L Di Mare (U of Oxford)
PhD	10/2014	10/2017	Richard Ahlfeld	A Data-Driven Uncertainty Quantification Method for Scarce Data and Rare Events (EPSRC)	F Montomoli	
PhD	10/2011	10/2015	Antonio D'Ammaro	Film Cooling and Heat Transfer (MHI)	Nick Atkins (U Cambridge)	F Montomoli (first supervisor until 2012)
PhD	10/2009	10/2012	Mauro Carnevale	Large Eddy Simulation and Uncertainty (MIUR)	F Martelli (U Florence)	F Montomoli
<b><u>EXAMINER PHD THESES</u></b> Imperial College, University of Oxford, University of Cambridge, University of Leeds, University of Surrey, University of Florence.						

**MSC THESES, 78 IN TOTAL**

## RESEARCH SUMMARY

The Uncertainty Quantification laboratory (UQLab), that I lead, has gained international recognition both in academia and in industry, to develop Machine Learning tools to enable energy transition in Aviation (with Rolls-Royce and Airbus) and Energy sector (with Baker Hughes, Nuova Pignone Tecnologie). The mission of the lab is to contribute to all aspects of the so-called Industry 4.0, enabling robust Digital Design with Uncertainty Quantification, developing design for Additive Manufacturing algorithms and leveraging Machine Learning and Data Driven methodologies for **Net Zero**. These algorithms are used from the design of heat exchangers for electrification to fuel cells and electrolyzers.

I am also currently part of 2 EU projects on Net Zero with Hydrogen and Electrification, Demoquas and Nextair. I am also part of other UK projects like Fanfare, Cordite etc.

I am developing such techniques for world leading industries and I have collaborated with **Rolls-Royce (UK and Germany), Baker Hughes (US-Italy, formerly General Electric Oil&Gas), GE Aviation (Germany), Airbus (UK-France), Criepe (Japan), MHI (Japan)**.

In recognition of my research and my close collaboration with industry, I have received several national and international prizes, including the **RAEng Enterprise Fellowship** that allowed the spinout of my second Imperial College company, **TOffeeAM Ltd in 2019 (now ToffeeX, employing more than 30 engineers)**. This new venture that I was leading as CEO, closed a **seed round of approximately £1m** in 2020, and closing a **£5m**. ToffeeX won **FormNext**, the biggest manufacturing event in Europe, and is currently listed as one of the best engineering companies in the world by several rankings. ToffeeX has several clients such as Rolls-Royce, Baker Hughes, Airbus, GE, Boeing, etc. Baker Hughes and Boeing, two significant industrial collaborators, have also accepted a place on the Advisory Board for this company. We won 3 projects on energy transformation, an SRBI grant for Net Zero and Nuclear, and two projects on Hydrogen and Fuel cells.

My three main areas of research, all in methods, are **Uncertainty Quantification, Fluid Structure Topology Optimization** and **Data Driven Machine Learning methods**, mainly for **transition to NetZero, including component design and risk assessment (for hydrogen explosions)**.

### Uncertainty Quantification

I am working towards Data Driven UQ methods using arbitrary polynomial chaos expansions for rare events like hydrogen explosions. This research is showing a lot of traction in both academia and industry. Different ML methods are used in close collaboration with Baker Hughes.

### Design for Additive Manufacturing

I am working towards the generation of more efficient designs for additive manufacturing. This research is supported by **Baker Hughes**, one of the biggest investors in the world in Additive Manufacturing and is used for **heat exchangers, hydrogen electrolyzers, carbon capture etc.** One of the main limitations of Fluid Topology Optimization is that it relies on RANS modelling, inherently not accurate for heat transfer. In order to overcome this limitation, we used machine learning methods, to train RANS models with high fidelity DNS and DES simulations.

### Machine Learning

For this reason, I am focusing on **Machine Learning**. In particular, I am investigating Gene Expression Programming (with Baker Hughes) and Deep Neural Networks (with Rolls-Royce) to improve the accuracy of turbulence closures. With Baker Hughes we are also exploring how to replace the CFD solvers for Blast/Explosions with Deep Neural Networks. More recently I have investigated how to use Machine Learning to replace the classical algorithms of Fluid Topology Optimization. Mimicking the idea of AlphaGO, I have applied Deep Neural Networks for topology optimization. The preliminary results have been presented recently in our publication in Nature Scientific Reports.

The UQLab has had several international academic collaborations, with institutions in US (Stanford), Australia (U Melbourne), Spain (BCAM), Italy (Padova and Ferrara), Japan (Criepi), Germany, (TUM) etc.  
We have also had a long collaboration with **NASA Langley** (US). Four of my PhD students had the opportunity to carry out research with them

### **Impact of Research**

My research has a direct impact on knowledge, economy and society.

Highlights of recent impact of my research to **knowledge**:

- 1) One of the main contributions to science has been my work on Uncertainty Quantification. My work in UQ was applied to a real gas turbine for Mitsubishi Heavy Industry, and had a tremendous impact in industry, being invited by General Electric and Rolls-Royce to their global high spot events as solo presenter. Based on that, in the last 5 years I have developed long and successful relationships with industry and in particular with **General Electric Oil&Gas** (now **Baker Hughes**) and **Rolls-Royce**, now major sponsors of the UQLab and the Aeronautics Department.
- 2) In the field of Fluid Topology Optimization, we are the first group able to use RANS models with the same fidelity of Detached Eddy Simulations. This has been possible leveraging our results in machine learning.

Highlights of recent impact of my research to **economy**:

- 3) **NASA Langley** is using our Uncertainty Quantification models for the launcher that will bring humans to Mars in 2030. This is a great recognition of our international impact and we will contribute to a milestone for mankind.
- 4) **Baker Hughes**, one of the biggest investors in Energy Transition in the world, is using our tools.
- 5) **Aircraft Engine Development**: the ongoing work carried out for FANfare is being directly applied to a real Aircraft Engine under development at **Rolls-Royce**. The so-called ultra-Fan technology is posing new challenges but will allow further reduction of emissions and more reliable aircraft engines.
- 6) The energy agency of Japan, **Criepi**, is using our Uncertainty Quantification models for the design of their gas turbines.
- 7) I have started **two spinouts of the College**, UQuant Ltd (now MonolithAI) and TOffeeAM Ltd (now ToffeeX). As former CEO of TOffeeAM we established several collaborations with different companies around the World (Boeing, Rolls-Royce, Baker Hughes, 2 F1 teams, GE etc) and submitting research proposals with Imperial College. ToffeeX has now more than 30 employees.

Highlights of recent impact of my research to **society**:

- 8) **Aircraft engine emission reduction**: my research has contributed to the goal of obtaining more fuel efficient gas turbines. With my studies on transition, for example, I have identified that in the Rolls-Royce Trent1000, it was possible to achieve a reduction of 0.7% in specific fuel consumption by using as-cast blades and exploiting the beneficial effect of wake-passing in the low pressure turbine. The work was featured in Aerospace International, June 2011, pg15.

My opinion on future of aviation was featured by Heathrow Airport

We received a donation of 25M£ to open a new center of sustainable aviation (I was one of 6 professors discussing with the donor the new center)

- 9) **Imperial Festival**: the UQLab contributed to show fluid dynamics structures to visitors

## **International Collaborations**

I have several international connection and collaborations as shown by the number of invited lectures and joint PhD supervision. Below some of the main collaborations:

### **UK**

**Imperial, Aero** Prof Sherwin, Dr Cantwell, Dr Tagarielli, joint PhDs, publications and grants,

**Imperial, Mech Dept**, Dr M Eaton, joint PhD supervision

**University of Oxford**, Dr L di Mare, joint supervision PhD student and 4 papers

**University of Sussex, Dept of Mathematics**, Prof Scalas, papers

### **US**

**NASA Langley**: Dr Crespo, to test our uncertainty models. Four of my PhD students have collaborated and visited NASA Langley.

**Stanford University**, Prof Iaccarino, visited the UQLab, a researcher from my group was a visiting fellow in his group and he is also collaborating with a PhD student of mine for epistemic uncertainty.

### **Spain,**

**Basque Centre for Applied Mathematics**, as a former research professor, I am still an external scientific member and have collaborated with Dr Giorda (now at Johannes Kepler University Linz). We recently published in NATURE Scientific Reports on dispersion of alien species.

### **Italy**

**University of Padova**, Prof Cavazzini: in 2019 I have been a **Visiting Professor** investigating the design of scroll machines under uncertainty. Joint publications.

**University of Ferrara**, Prof Pinelli: co-supervisor of three PhD students working on fouling and design of new configurations for turbomachinery, several joint publications.

### **Germany**

**TUM** Joint supervision of PhD student on UQ for environmental flows

### **Japan**

**Criepi**, Dr Sakai: several visits (1 year stay at Imperial) and joint publications on multi-fidelity methods.

### **Australia**

**University of Melbourne**, Prof Sandberg. Joint publications on data driven models for turbulence modelling, exchanging codes and data.

### **Industry**

International sponsors including Criepi (Japan), Baker Hughes (Italy-US), Airbus (UK-Fr-DE), GE Aviation (Germany).

### **Entrepreneurship/spinout**

**TOffeeAM** (ToffeeX) collaboration with several companies across the world.



### Post-Doctoral Staff (PDRAs)

I encourage applications from under-represented groups, and 30% of the members of my group are BAME. As training I have followed the classes on Recruitment and Selection, Equality and Diversity or Unconscious Bias.

Moreover, Audrey Gaymann received the Amelia Earhart Fellowship for one of the best 32 women working in Aerospace around the world.

#### **Current**

1. 07/2022-07/2025 Dr Xiao He, sponsor **Baker Hughes TPS (Nuovo Pignone)**
2. 12/2020- now Dr Joao Isler (together with Prof Sherwin), compressible flow solvers for fans in Turbomachinery, sponsor **ATI/Rolls-Royce**
3. 12/2020- now Dr Guglielmo Vivarelli, Numerical simulations of real aircraft engines fans, sponsor **ATI/Rolls-Royce**
4. 01/08/2023-now Dr Cleopatra Ciuciumita, EU **Nextair**, Net Zero in Aviation
5. 21/11/2022-now Dr Anirudh Rao, EU **Nextair**, Net Zero in Aviation
6. 01/07/2024-01/05/2027 To be appointed, new EU **Demoquas** PDRA on Hydrogen and Electrification
7. 01/10/2024 PDRA on Hydrogen by **Baker Hughes**

#### **Former**

8. 07/2022-01/06/2024 Dr Zhihui Li EU Horizon Fellow in **Machine Learning and Aircraft Engines**
9. 10/2020- 10/2021 Dr Chikwesiri Imediegwu, Fluid Topology Optimization, sponsor Baker Hughes
10. 10/2019-10/2020 Dr Audrey Gaymann, Machine Learning and Fluid Topology Optimization
11. 03/2020-09/2020 Dr Andrea Cassinelli (together with Prof Sherwin), Aircraft Engines
12. 10/2018-03/2020 Dr Marco Pietropaoli, Multi-objective Fluid Structure Optimization
13. 2017-2020 Dr Giacomo Castiglioni (together with Prof Sherwin), Rolls-Royce, compressible solvers for turbomachinery
14. 10/2017-03/2019 Dr Richard Ahlfeld, EPSRC Doctoral Fellow, only supervisor, Machine Learning
15. 09/2017-09/2018 Dr Hui XU (co-supervised with Prof S Sherwin), High Order Methods in CFD, sponsor Rolls-Royce. Dr Hui investigated the impact of high order methods for noise predictions.
16. 03/2017-03/2018 Dr Eiji Sakai, Visiting Researcher, sponsored by Criepti on Uncertainty Quantification. Dr Sakai analysed how to use UQ methods for heat transfer.

## SOME RECENT PROJECTS

Source of Funds	Title	Duration	Start Date	End Date	Funds £	Role	Other Comments
General Electric	Fluid Topology Optimization	36	10/2015	06/2019	~100K	PI	<b>Gas turbines</b> PhD student
General Electric	Blast Explosion	36	10/2015	10/2018	~100K	Co-I	<b>Gas Turbines</b> PhD student
Smith Institute of Mathematics	Fluid Topology Optimization	36	10/2015	06/2019	82K	PI	<b>Gas Turbines</b> Case award
Rolls-Royce	High Order Methods for CFD	36	10/2016	10/2019	~100K-200K	Co-I	<b>Aircraft Engines</b> PhD student
Criepi, Japan	Visiting Researcher	12	03/2017	03/2018	20K	PI	<b>Energy</b> visitor
Rolls-Royce	High Order Methods for Noise	36	10/2017	10/2019	~200K	Co-I	<b>Aircraft Engines</b> <b>Ultrafan</b> Post Doc
Airbus/EPSRC	Uncertainty Quantification	36	10/2017	10/2020	~100K-200K	PI	<b>Airframe</b> PhD case award
EPSRC	EPSRC Doctoral Fellowship in Machine Learning	12	10/2017	10/2018	50K	PI	<b>Aircraft Engines</b> PDoc
EPSRC	EPSRC Doctoral Fellowship in Additive Manufacturing	12	01/2018	01/2019	50K	PI	<b>Gas Turbines</b> PDoc
EPSRC	EPSRC Doctoral Fellowship in Design for Additive	12	01/2019	01/2020	50K	PI	<b>Aircraft Engines</b> PDoc
Royal Academy of Engineering	Enterprise Fellowship in AI	12	03/2018	03/2019	65K	Co-I	PDoc
Rolls-Royce	High Order Methods for Intake Aerodynamics	36	01/2018	01/2021	~100K-200K	Co-I	<b>Aircraft Engines/Intakes</b> Post Doc
Baker Hughes	Design for Additive Manufacturing	12	01/2020	02/2021	~100K-200K	PI	<b>Gas Turbines</b> PDoc
Baker Hughes	Blast Modelling for Hydrogen	36	01/2019	1/2022	~100K-200K	Co-I	<b>Gas Turbines</b> PhD student
Rolls-Royce	AI for Turbulence modelling	36	04/2019	04/2022	~100K-200K	PI	<b>Aircraft Engines/Ultrafan</b> PhD student
Royal Academy of Engineering	Enterprise Fellowship in AI and Additive	12	03/2019	03/2020	65K	PI	Personal Fellowship



## Management, Administrative and Other Relevant Activities

My current administrative roles for the department of Aeronautics are:

1. 2019-now **Enterprise Champion**: supporting the technological transfer office to analyze the internal IP of the Department of Aeronautics
2. 2017-now **Post Graduate Senior Tutor** for MScs, dealing with problems that may arise during the course of studies, analyze mitigating circumstances and identification of support needed for our students
3. **Rolls-Royce Focal Point**: this is not a University Admin Role, but it is an admin role. I discuss with Rolls-Royce current and future grants for the Department of Aeronautics, liaising with the Rolls-Royce VUTC.
4. 2015-now Aeronautics Department **CONTACT FOR CITY AND GUILDS COLLEGE ASSOCIATION**.
5. 2016-2017 **Careers Officer**, liaising with college sponsors and companies regarding internships and career opportunities for our undergraduates
6. 2014-2016 **Seminar Organizer**: International Speakers invited to the Department of Aeronautics and sponsored by external Companies. As an example, the NASA Seminar was sponsored by Airbus and KTN. International speakers from Stanford Univ, NASA Langley, Minnesota University, Oxford Univ, Cambridge Univ, without using Departmental funding

For the Department of Aeronautics, I am part of the Industrial Committee to define the strategy to obtain more industrial funded research.

I collaborate with other departments to define common synergies in the following research lines: Additive Manufacturing, Machine Learning and Statistical Methods (DSI academic fellow).

## Personal Development and Developing Others

I have followed all Dept activities for personal development, including, among the others, the Active Bystander activity and the workshop on Unconscious Bias. Having a mentoring role for my researchers, I believe that these aspects are important and I am fully committed to diversity in the workplace. My group includes people of different cultures, gender, ethnic origins etc. The group is composed of people coming from different backgrounds and we celebrate this rich cultural diversity. One third of people in my group are from minority groups.

Concerning the support of female researchers, Audrey Gaymann, working at UQLab that I lead, has been awarded the Amelia Earhart Fellowship, given to one of best 32 women in the world pursuing a PhD in Aerospace. This is an important recognition of the diversity and high quality of research in my group.

I promote the growth of people in my group, letting them carry out research abroad (NASA), participating to international schools (Tokyo University, Stanford University, University of Florence etc) and allowing them to present on behalf of the UQLab in several different events.

## **Evidence of Esteem, External Visibility and Professional Activities**

### **Fellowships (PI)**

**RAEng Enterprise Fellowship** to F Montomoli for the spinout TOffeeAM

Group fellowships: Amelia Earhart fellowship for one of best 32 women working in aerospace, 3 EPSRC Doctoral Prize Fellowships

### **Worldwide Impact**

1. My researches have been applied to minimize emission in aviation in real aircraft engines including RR Trent1000 (compressor and low pressure turbine), new designs as Ultrafan, commercial gas turbines like GE LM2500+G4, MHI J1 etc.
2. Baker Hughes, GE Aviation, and two well know F1 teams used our in house code TOffeeAM for their components
3. The energy agency of Japan, Criepti, used our codes

### **Prizes**

1. 2022-2024 several prizes as ToffeeX recognized one of best engineering company
2. 2022 finalist TCT Award for collaboration between Rolls-Royce and TOffeeAM
3. 2020, finalist at **The Engineer**, for the collaboration between Baker Hughes, Imperial College UQLab and TOffeeAM
4. 2020 TOffeeAM won **Formnext**, the biggest Manufacturing event in EU
5. 2019 **RAEng Enterprise Fellowship** to F Montomoli
6. 2018-2019 2 Techcelerate Program Winners
7. 2018 TakeAIM prize
8. 2019 ASME IGTI Travel Award
9. 2017 STEM for Britain Presentation finalist
10. 2017 Take AIM prize, Smith Institute, second place
11. 2014 Lloyds Runner up Science of Risk

### **Spinouts, TOffeeAM (now ToffeeX)**

TOffeeAM, co-founder, closed a seed round during pandemic outbreak of ~1M, now closing a 5M£, won Formnext, has been featured in several newspapers, including 3DNatives (3 times), AM Metal (2 times). Named by StartUS one of best 5 AI companies on engineering

### **Spinouts, UQuant Ltd, now MonolithAI (from 2015 to 2018 member of the board)**

UQuant Ltd, co-founder, spinout of ICL, named one of 7 best Deep Science Startups in the World in industry 4.0.

### **Membership**

1. Euroturbo UK Representative
2. External Scientific Member for BCAM

### **Expert Reviewer for National Councils**

1. Expert for Italian Research Council
2. Reviewer for the Welsh and French Research Council
3. Reviewer for EU calls

### **Recent Notably Invited Lectures**

2021 invited lectures by Airbus

2019 invited lectures in Japan, Jaxa, Criepti, IGTC

2019 Technion, one of the two plenary speakers invited

2018 CMFS: Plenary Lecture to open the lectures series in UQ

Academic Lectures: Aix Marseille, University of Florence, University of Sussex, University of Oxford.

**INDUSTRIAL LECTURES: BAKER HUGHES, GENERAL ELECTRIC, ROLLS-ROYCE, FOSTER+PARTNERS, MCLAREN**

## **Publications**

### **PI=Principal Investigator**

1 PROGRESS IN ENERGY AND COMBUSTION SCIENCE (IF=26.46), 3 NATURE SCIENTIFIC REPORTS (IF=4.25), 1 PROCEEDINGS OF ROYAL SOCIETY (IF=4.84), 1 J COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING (IF=4.8), 1 STRUCTURAL AND MULTIDISCIPLINARY OPTIMIZATION (IF=3.925), 1 INTERNATIONAL JOURNAL OF IMPACT ENGINEERING (IF=3.17), 1 JOURNAL OF APPLIED MECHANICS (IF=2.12), 2 INT. J OF HEAT AND FLUID FLOW (IF=2), 12 J. OF TURBOMACH. (IF=2.45), 2 INT. J. OF HEAT AND MASS TRANSFER (IF=4.34), 1 J COMPUTATIONAL PHYSICS (IF=2.84), 3 J COMPUTER AND FLUIDS (IF=2.22), 1 J OF FLUID ENGINEERING (IF=1.91), 3 JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER (IF=1.74), 1 INT. J FOR NUMERICAL METHODS IN FLUIDS (IF=1.63), 2 AIAA J. OF PROP AND POWER (IF=1.13), 2 J OF AUTOMOBILE ENGINEERING (IF=0.6), 3 J OF POWER AND ENERGY (SNIP=0.59), 1 SAE INT J OF MATERIALS AND MANUFACTURING, 1 ENERGY PROCEDIA

### **BOOKS**

1. **Montomoli F**: UQ and Aircraft Engines, 2021, Springer Chinese Version, published
2. **Montomoli F**, Uncertainty Quantification in Computational Fluid Dynamics and Aircraft Engines ISBN 978-3-319-92943-9, © 2019, Springer (and a Chinese edition)
3. **Montomoli F**, Carnevale M, Massini M, D'Ammaro A, Salvadori S, 2015, Uncertainty Quantification in Computational Fluid Dynamics and Aircraft Engines, Publisher: Springer, ISBN: 978-3319146805

### **JOURNALS**

1. He, X., **Montomoli, F.**, Michelassi, V., Panizza, A., and Pulga, L. (September 3, 2024). "Characteristics of Deterministic and Stochastic Unsteadiness of Trailing Edge Cutback Film Cooling Flows." ASME. J. Turbomach. January 2025; 147(1): 011009., **PI collaboration with Baker Hughes**
2. James Hammond, Luis G. Crespo, Francesco **Montomoli**, A distributionally robust data-driven framework to reliability analysis, Structural Safety, Volume 111, 2024, 102501, ISSN 0167-4730, **collaboration with NASA Langley**
3. Covoni, G., **Montomoli, F.**, Tagarielli, V.L. et al. Application of graph neural networks to predict explosion-induced transient flow. Adv. Model. and Simul. in Eng. Sci. 11, 18 (2024). <https://doi.org/10.1186/s40323-024-00272-4>, co-I **collaboration with Baker Hughes**
4. V. Bisio, F. **Montomoli**, S. Rossin, V.L. Tagarielli, Deflagration inside an elastic spherical shell: Fluid-structure interaction effects, Combustion and Flame, Volume 267, 2024, 113594, ISSN 0010-2180, co-I **collaboration with Baker Hughes**
5. R Sarosi, F **Montomoli**, Z Li, RK Agarwal, Optimization of Pin Fins Using Computational Fluid Dynamics and Machine Learning, Journal of Thermophysics and Heat Transfer, 1-13
6. Z Li, F **Montomoli**, Aleatory uncertainty quantification based on multi-fidelity deep neural networks, Reliability Engineering & System Safety 245, 109975, 2024
7. V Bisio, F **Montomoli**, S Rossin, VL Tagarielli, On the pressure wave emanating from a deflagration flame front, Heliyon, 2024
8. L Zhihui, F **Montomoli**, S Sharma, Investigation of Compressor Cascade Flow Using Physics-Informed Neural Networks with Adaptive Learning Strategy, AIAA Journal 2024
9. Christopher M Baker, Palma Blonda, Francesca Casella, Fasma Diele, Carmela Marangi, Angela Martiradonna, Francesco **Montomoli**, Nick Pepper, Cristiano Tamborrino, Cristina Tarantino, Using remote sensing data within an optimal spatiotemporal model for invasive plant management: the case of Ailanthus altissima in the Alta Murgia National Park, Scientific Reports
10. MP Zhihui Li, Francesco **Montomoli**, Nicola Casari, High-Dimensional Uncertainty Quantification of High-Pressure Turbine Vane Based on Multifidelity Deep Neural Networks, Journal of Turbomachinery
11. J Hammond, M Pietropaoli, F **Montomoli**, Robust data-driven turbulence closures for improved heat transfer prediction in complex geometries, International Journal of Heat and Fluid Flow 98, 109072
12. N Pepper, L Crespo, F **Montomoli**, Adaptive learning for reliability analysis using support vector machines, Reliability Engineering & System Safety 226, 108635

13. N Pepper, F **Montomoli**, S Sharma, A Non-Parametric Histogram Interpolation Method for Design Space Exploration, Journal of Mechanical Design 144 (8), 081703, **PI, collaboration with Airbus**
14. Hammond J, **Montomoli** F, Pietropaoli M, Sandberg RD, Michelassi V Machine Learning for the Development of Data-Driven Turbulence Closures in Coolant Systems, Journal of Turbomachinery 144(8):01 Aug 2022, **collaboration with Baker Hughes, PI**
15. N Pepper, L Crespo, F **Montomoli**, Adaptive learning for reliability analysis using Support Vector Machines  
Reliability Engineering & System Safety, 108635, **collaboration with NASA Langley, PI**
16. J Hammond, M Pietropaoli, F **Montomoli** Topology optimisation of turbulent flow using data-driven modelling, Structural and Multidisciplinary Optimization 65 (2), 1-21, **PI**
17. J Hammond, N Pepper, F **Montomoli**, V Michelassi Machine Learning Methods in CFD for Turbomachinery: A Review, International Journal of Turbomachinery, Propulsion and Power 7 (2), 16, **PI**
18. Hammond J, Marioni YF, **Montomoli** F, Error Quantification for the Assessment of Data-Driven Turbulence Models, FLOW TURBULENCE AND COMBUSTION 109(1):1-26 (26 pages) 07 Mar 2022, **PI**
19. V Bisio, F **Montomoli**, S Rossin, M Ruggiero, VL Tagarielli, Predictions and uncertainty quantification of the loading induced by deflagration events on surrounding structures, Process Safety and Environmental Protection 158, 445-460, **collaboration with Baker Hughes, PI**
20. M Sakuma, N Pepper, S Warnakulasuriya, F **Montomoli**, R Wuchner Multi-fidelity uncertainty quantification of high Reynolds number turbulent flow around a rectangular 5: 1 Cylinder, Wind and Structures 34 (1), 127-136, **collaboration with TUM,**
21. N Pepper, A Gaymann, S Sharma, F **Montomoli**, Local bi-fidelity field approximation with knowledge based neural networks for computational fluid dynamics, Scientific Reports 11 (1), 1-11, **PI**
22. Y Frey Marioni, EA de Toledo Ortiz, A Cassinelli, F **Montomoli**, P Adami, R Vazquez, A Machine Learning Approach to Improve Turbulence Modelling from DNS Data Using Neural Networks, International Journal of Turbomachinery, Propulsion and Power 6 (2), 17, **finalist best paper award ETC 2021, PI**
23. Andrea Cassinelli, Andrés Mateo Gabín, Francesco **Montomoli**, Paolo Adami, Raúl Vázquez Díaz, Spencer John Sherwin Reynolds Sensitivity of the Wake Passing Effect on a LPT Cascade Using Spectral/hp Element Methods, , International Journal of Turbomachinery, Propulsion and Power 2021, **co-PI**
24. F **Montomoli**, S Antorkas, M Pietropaoli, A Gaymann, J Hammond, et al Towards digital design of gas turbines  
Journal of the Global Power and Propulsion Society 2021 (May), 1-12, **invited paper**
25. N. Pepper, F. **Montomoli** & S. Sharma. Identification of missing input distributions with an inverse multi-modal polynomial chaos approach based on scarce data.  
Probabilistic Engineering Mechanics **PI (research from UQLab)**
26. N Pepper, F **Montomoli**, S Sharma, Data fusion for Uncertainty Quantification with Non-Intrusive Polynomial Chaos Computer Methods in Applied Mechanics and Engineering 374, 113577 **PI (research from UQLab)**
27. N Pepper, A Gaymann, S Sharma, F **Montomoli**, Local Navier-Stokes approximation with a Knowledge Based Neural Network, **NATURE Scientific Reports**, 2019, **PI (research from UQLab)**
28. LJA Voet, R Ahlfeld, A Gaymann, S Laizet, F **Montomoli**, A hybrid approach combining DNS and RANS simulations to quantify uncertainties in turbulence modelling, Applied Mathematical Modelling 89, 885-906 **PI (research from UQLab)**
29. A Gaymann, F **Montomoli**, Deep Neural Network and Monte Carlo Tree Search applied to Fluid-Structure Topology Optimization, **NATURE Scientific Reports**, 2019, **PI (research from UQLab)**
30. G Cavazzini, F Giacomel, G Ardizzon, N Casari, E Fadiga, M Pinelli, F **Montomoli**, CFD-based optimization of scroll compressor design and uncertainty quantification of the performance under geometrical variations, Energy 209, 118382

31. Pepper N, **Montomoli F**, L. Gerardo-Giorda, Metamodeling on detailed geography for accurate prediction of invasive alien species dispersal, **NATURE Scientific Reports**, (accepted with minor revisions) **PI** (research from UQLab)
32. Gauch H, Tagarielli V, **Montomoli F**, Rossin S, Bisio V: Predictions of the transient loading on box-like objects by arbitrary pressure waves in air, **Proceedings of Royal Society**, co-investigator
33. Pepper N, **Montomoli F**, Sharma S: Multiscale Uncertainty Quantification with Arbitrary Polynomial Chaos, **J Computer Methods in Applied Mechanics and Engineering**, 2019, (accepted) **PI** (research from UQLab)
34. A Gaymann M Pietropaoli, F **Montomoli**, Fluid Topology Optimization: Bio-Inspired Valves for Aircraft Engines, International Journal of Heat and Fluid Flow, 2019, **PI** (research from UQLab)
35. Alessio Suman, Nicola Casari, Elettra Fabbri, Luca di Mare, Francesco **Montomoli**, Michele Pinelli, Generalization of Particle Impact Behavior in Gas Turbine via Non-Dimensional Grouping, Progress in Energy and Combustion Science, co-investigator
36. Ahlfeld R, Ciampoli F, Pietropaoli M, Pepper N, **Montomoli F** 2019, Data Driven Uncertainty Quantification for Formula 1: Diffuser, Wing Tip and Front Wing Variations, Journal of Automobile Engineering, **PI** (research from UQLab)
37. A Suman, N Casari, E Fabbri, M Pinelli, L di Mare, F **Montomoli**, Gas Turbine Fouling Tests: Review, Critical Analysis, and Particle Impact Behavior Map, Journal of Engineering for Gas Turbines and Power 141 (3), 032601, collaboration with Univ of Oxford and Ferrara
38. Sakai E, Meng B, Ahlfeld R, **Montomoli F**. Bi-fidelity UQ with Combination of co-Kriging and Arbitrary Polynomial Chaos: Film Cooling with Back Facing Step using RANS and DES International Journal of Heat and Mass Transfer, collaboration with Crieipi Japan, **PI** (research from UQLab)
39. Pietropaoli M, **Montomoli F**, Gaymann A, 2018, Three Dimensional Fluid Topology Optimization for Heat Transfer, Structural and Multidisciplinary Optimization, ISSN: 1615-147X, **PI** (research from UQLab)
40. Gaymann A, Pietropaoli M, Crespo L, Kenny S, **Montomoli F**. Random Variable Estimation and Model Calibration in the Presence of Epistemic and Aleatory Uncertainties SAE International Journal of Materials and Manufacturing 05 Oct 2018, collaboration with NASA Langley, **PI** (research from UQLab)
41. Griffini D, Salvadori S, Carnevale M, **Montomoli F**. Uncertainty Quantification in Hydrodynamic Bearings, Energy Procedia, 2018
42. Gauch HL, **Montomoli F**, Tagarielli VL, 2018, On the role of fluid-structure interaction on structural loading by pressure waves in air, Journal of Applied Mechanics, Transactions ASME, Vol: 85, ISSN: 0021-8936, Co-Investigator (research from UQLab)
43. Sakai E, Klemmer, **Montomoli F**, Uncertainty Quantification and Film Cooling, Journal of Gas Turbine Society of Japan 2018, Vol.46 No.6 Nov. 2018, **PI** (research from UQLab)
44. Ahlfeld R, Carnevale M, Salvadori S, **Montomoli F**. 2018, "An Autonomous Uncertainty Quantification Method for the Digital Age: Transonic Flow Simulations Using Multivariate Padé Approximations", Journal Turbomachinery, **PI** (research from UQLab)
45. Ahlfeld R, **Montomoli F**, 2017, "A Single Formulation for Uncertainty Propagation in Turbomachinery: SAMBA PC", Journal of Turbomachinery, **PI** (research from UQLab)
46. Pietropaoli M, Ahlfeld R, **Montomoli F**, Ciani A, D'Ercole M, "Design for Additive Manufacturing: Internal Channel Optimization", Journal of Engineering for Gas Turbines and Power, Impact finalist STEM for Britain, 2017, **PI** (research from UQLab)
47. Mazzoni C, Ahlfeld R, Rosic B, **Montomoli F**, "Uncertainty quantification of leakages in a multistage simulation and comparison with experiments", Journal of Fluids Engineering-Transactions of the ASME, 2017, **PI** (research from UQLab)
48. Ahlfeld R, **Montomoli F**, Scalas E, Shahpar S, 2017, "Uncertainty Quantification for Fat-Tailed Probability Distributions in Aircraft Engine Simulations", JOURNAL OF PROPULSION AND POWER, Vol: 33, Pages: 881-890, ISSN: 0748-4658, **PI** (research from UQLab)



49. Casari N, Pinelli M, Suman A, di Mare L., **Montomoli F**, 2018 "EBFOG: Deposition, Erosion and Detachment on High Pressure Turbine Vanes". Journal Turbomachinery, collaboration with Univ of Oxford and Ferrara
50. Gauch H, Tagarielli V, **Montomoli F**, "The response of an elastic-plastic clamped beam to transverse pressure loading", International Journal of Impact Engineering, 2018, Co-Investigator (research from UQLab)
51. Casari N, Pinelli M, Suman A, Di Mare L, **Montomoli F**, "AN ENERGY BASED FOULING MODEL FOR GAS TURBINES: EBFOG", Journal of Turbomachinery - Transactions of the ASME, ISSN: 0889-504X, 2017, collaboration with Univ of Oxford
52. Ahlfeld, R, Belkouchi B, **Montomoli F**, "SAMBA: Sparse Approximation Moment-Based Arbitrary Polynomial Chaos", Journal Computational Physics, finalist for Reynolds prize poster presentation & Elaine Austin Centenary Memorial Prize, PI (research from UQLab)
53. **Montomoli F**, D. Amirante, N Hills, S. Shapahr, M. Massini, "Stochastic Variations of Metal Temperature During a Transient: Uncertainty Quantification, Rare Events and Mission Optimization", Journal of Gas Turbine and Power, finalist for ASME IGTI Best Paper Award, 2015, PI (research from UQLab)
54. Bradford J., **Montomoli F.**, D'Ammaro A.: "Uncertainty Quantification and Race Car Aerodynamics", Journal of Automobile Engineering, 2014, **PI** (research from UQLab)
55. D'Ammaro A, **Montomoli F.**: "Uncertainty Quantification and Film Cooling", Journal of Computer and Fluids, 2013, doi: 10.1016/j.compfluid.2012.10.021, **PI** (research from UQLab)
56. **Montomoli F**, D'Ammaro A., Uchida S. "Numerical and Experimental Investigation of a New Film Cooling Geometry with High P/D Ratio", J. of Heat and Mass Transfer, 2013, doi 10.1016/j.jheatmasstransfer.2013.07.036 Output: new geometry patented by MHI, PI (research from UQLab)
57. **Montomoli F.**, D'Ammaro A, Uchida S.: "Uncertainty Quantification and Conjugate Heat Transfer: a Stochastic Analysis", Journal of Turbomachinery, 2013, doi: 10.1115/1.4007516. Output: defined in a document of AIR FORCE INSTITUTE OF TECHNOLOGY, AFIT/DS/ENY/12-02, "one of the most realistic 3-D vane geometries to date", PI (research from UQLab)
58. **Montomoli F.**, E. Naylor, H.P. Hodson, L. Lapworth "Unsteady effects in cantilevered axial compressors: a multistage simulation", AIAA Journal of Propulsion and Power, 2013, doi: 10.2514/1.B34273. Output: research applied to the jet engine Trent 1000, Rolls-Royce
59. Salvadori S, **Montomoli F**, Martelli F: "Film Cooling Performance in Supersonic Flows: Effect of Shock Impingement", Journal of Power and Energy, 2013, doi: 10.1177/0957650912474444
60. Carnevale M., **Montomoli F.**, D'Ammaro A., S Salvadori, F Martelli, "Uncertainty Quantification: A Stochastic Method for Heat Transfer Prediction Using LES", Journal of Turbomachinery, 2013, doi: 10.1115/1.4007836, **PI** (research from UQLab)
61. **Montomoli F.**, Massini M, Salvadori S., Martelli F: "Geometrical Uncertainty and Film Cooling: Fillet Radii", Journal of Turbomachinery, 2012, Vol. 134, doi: 10.1115/1.4003287. Output: runner-up rize: Lloyd's prize in Science of Risk 2013. This research convinced Mitsubishi Heavy Industries to sponsor 1 PhD students and 2 Wind Tunnels at the Univ. of Cambridge, PI (research from UQLab)
62. **Montomoli F**, Massini M., H. Yang, J.C. Han: "The Benefit of High-Conductivity Nozzle Material" International Journal of Heat and Fluid Flow, 2012, doi: 10.1016/j.jheatfluidflow.2011.12.005, **PI** (research from UQLab)
63. Salvadori S, **Montomoli F**, Chana K, Martelli F, Povey T., Qureshi I., "Analysis of the Effect of a Non-uniform Inlet Profile on Heat Transfer and Fluid Flow in Turbine Stages" Journal of Turbomachinery, 2011, doi: 10.1115/1.4003233. Output: 4<sup>th</sup> of top 10 list most downloaded papers June 2011, 6<sup>th</sup> of the top 10 Jan 2012
64. **Montomoli F.**, H.P. Hodson, L. Lapworth: "RANS-URANS in axial compressors, a design methodology", J. of Power and Energy, Volume 225 Issue 3, May 2011, IMECHE, doi: 10.1177/2041296710394267
65. Salvadori S, **Montomoli F**, Martelli F, Adami P, Chana K., Castillon L.: "Aero-thermal study of the unsteady flow field in a transonic gas turbine with inlet temperature distortions", Journal of Turbomachinery, 2011, Vol. 133. doi: 10.1115/1.4002421

66. **Montomoli F.**, Hodson, H.P., Haselbach, F.: "Effect of roughness and unsteadiness on the performance of a new LPT blade at low Reynolds numbers", J. of Turbomachinery, 132, 2010, doi: 10.1115/1.3148475. Output: 3<sup>rd</sup> of top 10 list most downloaded papers April 2010, research applied to RR Trent1000 Engine
67. **Montomoli F.**, Eastwood S.: "Implementation of Synthetic Turbulence Inlet for Turbomachinery LES": International Journal of Computer and Fluids, Elsevier, 2010, doi: 10.1016/j.compfluid.2010.11.019, **PI** (research from UQLab)
68. **Montomoli F.**, M. Massini, S. Salvadori: "Geometrical Uncertainty in Turbomachinery": International Journal of Computer and Fluids, Elsevier, 2010, doi: 10.1016/j.compfluid.2010.11.031, **PI** (research from UQLab)
69. **Montomoli F.** Massini M., Maceli N., Cirri M., Lombardi L., De Prosperis R., Ciani A., D'Ercole M.: "Interaction of Wheel Space Coolant and Main Flow in a New Aeroderivative LPT", Journal of Turbomachinery 2010, Vol.132, doi: 10.1115/1.3195036. Output: recipient of "GE author incentive program" (award), **PI**
70. **Montomoli F.**, Massini M., Adami P., Martelli F.: "Effect of Incidence Angle with Wake Passing on a Film Cooled Leading Edge: a Numerical Study", International Journal for Numerical Methods in Fluids, Wiley, 2009, Vol. 63, doi: 10.1002/fld.2131
71. **Montomoli F.**, Adami P., Martelli F.: "A finite volume method for the conjugate heat transfer in film cooling devices", Journal of Power and Energy, 2009, 223(A2), 191-200, doi: 10.1243/09576509JPE640

#### PATENT

**Montomoli F** 2011: for Mitsubishi Heavy Industries. New coolant geometry (DBFS): number 2012-066163, publication number, JP,2013-194713,A, registration number, JP,5696080,B, <https://www.j-platpat.inpit.go.jp/>

#### CONFERENCES PROCEEDINGS

1. Raske, Ausin, Pietropaoli, Shapahr, **Montomoli**, Thermal Management for Electrification in Aircraft Engines: Optimization of Coolant System
2. Vivarelli, G, Isler J, Sherwin S, Adami P, **Montomoli F.** High-Order Spectral/hp Compressible and Incompressible Comparison of Transitional Boundary-Layers Subject to a Realistic Pressure Gradient and High Reynolds Number, ASME IGTI 2022,
3. Y Frei, A Cassinelli, S Sherwin, F **Montomoli**, R Vazquez, P Adami Development of Machine-Learnt Turbulence Closures for Wake Mixing Predictions in Low-Pressure Turbines, ASME IGTI 2022
4. R Friso, S Oliani, N Casari, M Pinelli, A Suman, F **Montomoli**, Towards a Machine Learning Based Design for Fouling of an Axial Turbine Vane, Turbo Expo: Power for Land, Sea, and Air 84928,
5. R Friso, N Casari, M Pinelli, A Suman, F **Montomoli** Uncertainty Analysis of Inflow Conditions on an HPT Gas Turbine Nozzle: Effect on Particle Deposition ASME Turbo Expo 2021: Turbomachinery Technical Conference and Exposition
6. N Pepper, F **Montomoli**, F Giacomel, G Cavazzini, M Pinelli, N Casari Uncertainty Quantification and Missing Data for Turbomachinery With Probabilistic Equivalence and Arbitrary Polynomial Chaos, Applied to Scroll Compressors Turbo Expo: Power for Land, Sea, and Air 84225, V10BT28A007
7. J Hammond, F **Montomoli**, M Pietropaoli, RD Sandberg, V Michelassi Machine Learning for the Development of Data Driven Turbulence Closures in Coolant Systems ASME Turbo Expo 2020: Turbomachinery Technical Conference and Exposition
8. M Pietropaoli, A Gaymann, F **Montomoli** Three-Dimensional Fluid Topology Optimization and Validation of a Heat Exchanger With Turbulent Flow ASME Turbo Expo 2020: Turbomachinery Technical Conference and Exposition
9. A Cassinelli, P Adami, F **Montomoli**, SJ Sherwin On the effect of wake passing on a low pressure turbine cascade using spectral/hp element methods Bulletin of the American Physical Society 64
10. A Cassinelli, P Adami, F **Montomoli**, SJ Sherwin On the effect of wake passing on a low pressure turbine cascade using spectral/hp element methods APS Division of Fluid Dynamics Meeting Abstracts, H19. 011
11. G Castiglioni, F **Montomoli**, SJ Sherwin Shock-wave boundary layer interactions in an engine intake with a spectral/hp element method APS Division of Fluid Dynamics Meeting Abstracts, L05. 002
12. Sakuma, Pepper, Kodakkal, Wuchner, Bletzinger, **Montomoli**, Multi-Fidelity Uncertainty Quantification of the Flow Around a Rectangular 5:1 Cylinder, Unccomp, Eccomas, 2019

13. Gaymann, Schiaffini, Massini, Corsini, **Montomoli**: Neural Network Topology for Wind Turbine Analysis, ETC 2019
14. Gauch H, Tagarielli V, **Montomoli**, F, Rossin S, Bisio V: Transient loading on turbomachinery packages due to pressure waves caused by accidental deflagration events, ASME IGTI 2019
15. Friso, R, Casari N, Suman A, Pinelli M, **Montomoli** F, A design for fouling oriented optimization of an HPT nozzle, ASME IGTI 2019
16. Cassinelli A, Xu H, **Montomoli** F, Adami P, Vazquez R, Sherwin S, ON THE EFFECT OF INFLOW DISTURBANCES ON THE FLOW PAST A LINEAR LPT VANE USING SPECTRAL/HP ELEMENT METHODS, ASME IGTI 2019
17. Gaymann A, Pietropaoli M, Crespo LG, Kenny SP, **Montomoli** F, 2018, Random Variable Estimation and Model Calibration in the Presence of Epistemic and Aleatory Uncertainties, SAE
18. Suman A, Casari N, Fabbri E, Pinelli M, Di Mare L, **Montomoli** F. Gas turbine fouling tests: Review, critical analysis and particle impact behavior map Proceedings of the ASME Turbo Expo. 2D-2018. 01 Jan 2018
19. Gaymann A, **Montomoli** F, Pietropaoli M. Robust fluid topology optimization using polynomial chaos expansions: Toffee Proceedings of the ASME Turbo Expo. 2D-2018. 01 Jan 2018
20. Sakai E, Bai M, Ahlfeld R, **Montomoli** F. Uncertainty quantification analysis of back facing steps film cooling configurations Proceedings of the ASME Turbo Expo. 5A-2018. 01 Jan 2018
21. Cassinelli A, **Montomoli** F, Adami P, Sherwin SJ. High fidelity Spectral/HP element methods for turbomachinery Proceedings of the ASME Turbo Expo. 2C-2018. 01 Jan 2018
22. Casari N, Pinelli M, Suman A, Di Mare L, **Montomoli** F. On deposit sintering and detachment from gas turbines Proceedings of the ASME Turbo Expo. 2D-2018. 01 Jan 2018
23. Ahlfeld R, Carnevale M, Salvadori S, **Montomoli** F An Autonomous Uncertainty Quantification Method for the Digital Age: Transonic Flow Simulations Using Multivariate Padé Approximations, ASME IGTI Turbo Expo 2017
24. Ahlfeld, R., Laizet, S., Geraci, G., Iaccarino, G., & **Montomoli**, F. 2016. Multi-Fidelity Uncertainty Quantification Using RANS and DNS." Proceedings of the CTR Stanford Summer Program
25. Casari N, Pinelli M, Suman A, Di Mare L, **Montomoli** F, 2017, Gas turbine blade geometry variation due to fouling, European Turbomachinery Conference
26. Gaymann A, **Montomoli** F, Pietropaoli M, 2017, Design for Additive Manufacturing: Valves Without Moving Parts, ASME IGTI Turbo Expo
27. Salvadori S, Carnevale M, Ahlfeld R, **Montomoli** F, Martelli F, 2017, Stochastic variation of the aero-thermal flow field in a cooled high-pressure transonic vane configuration, European Turbomachinery Conference
28. Ahlfeld R, **Montomoli** F, 2016, A SINGLE FORMULATION FOR UNCERTAINTY PROPAGATION IN TURBOMACHINERY: SAMBA PC, ASME Turbo Expo: Turbine Technical Conference and Exposition, Publisher: AMER SOC MECHANICAL ENGINEERS
29. Casari N, Pinelli M, Suman A, di Mare L, **Montomoli** F, 2016, AN ENERGY BASED FOULING MODEL FOR GAS TURBINES: EBFOG, ASME Turbo Expo: Turbine Technical Conference and Exposition, Publisher: AMER SOC MECHANICAL ENGINEERS
30. **Montomoli** F, Insinna M, Cappelletti A, Salvadori S, Uncertainty Quantification and Stochastic Variations of Renewable Fuels, ASME IGTI 2015
31. Salvadori, Cappelletti, **Montomoli**, Nicchio A, Martelli F, Experimental and Numerical evaluation of the NPSHR curve of an industrial centrifugal pump, Euroturbo 2015
32. **Montomoli** F, D. Amirante, N Hills, S. Shapahr, M. Massini, "Stochastic Variations of Metal Temperature During a Transient: Uncertainty Quantification, Rare Events and Mission Optimization", Journal of Gas Turbine and Power, ASME IGTI 2014
33. Carnevale, D'Ammaro, **Montomoli**, Salvadori, Film cooling and shock interaction: an uncertainty quantification analysis with transonic flows, ASME IGTI 2014
34. **Montomoli** F. Massini M: "Gas Turbines and Uncertainty Quantification: Impact of PDF Tails on UQ Predictions, The Black Swan", ASME IGTI 2013
35. **Montomoli** F., D'Ammaro A, Uchida S.: "Uncertainty Quantification and Conjugate Heat Transfer: a Stochastic Analysis", ASME IGTI 2012 (published on Journal of Turbomachinery)

36. Carnevale M., **Montomoli F.**, D'Ammaro A., "Pin Fins Heat Transfer: Coupling LES and Uncertainty Quantification", ASME IGTI 2012 (published on Journal of Turbomachinery)
37. **Montomoli F.**, Massini M., "Clocking in Multistage Compressors: Off Design Conditions", ASME ICFD10, 2010
38. **Montomoli F.**, Eastwood S.: "Implementation of Synthetic Turbulence Inlet for Turbomachinery LES": ICFD 2010
39. **Montomoli F.**, Massini M, Salvadori S., Martelli F: "Geometrical Uncertainty and Film Cooling: Fillet Radii", ASME IGTI, 2010 (published on Journal of Turbomachinery)
40. **Montomoli F.**, M. Massini, S. Salvadori: "Geometrical Uncertainty in Turbomachinery": ICFD 2010, Reading, UK
41. Salvadori S, **Montomoli F.**, Chana K, Martelli F, Povey T., Qureshi I., "Analysis of the Effect of a Non-uniform Inlet Profile on Heat Transfer and Fluid Flow in Turbine Stages" published on Journal of Turbomachinery
42. **Montomoli F.**, E. Naylor, H.P. Hodson, L. Lapworth "Unsteady effects in cantilevered axial compressors: a multistage simulation", ISABE 2009, Montreal Canada.
43. Naylor E., **Montomoli F.**, H.P. Hodson, L. Lapworth "Numerical Modelling of Cavities in Axial Compressor", ISABE 2009, Montreal Canada
44. **Montomoli F.**, H.P. Hodson, L. Lapworth: "RANS-URANS in axial compressors, a design methodology", IMECHE Seminar: Grand Review in the State-of-the-Art in the Numerical Simulation of Fluid Flow 2, London, UK, 2009.
45. **Montomoli F.**, Hodson, H.P., Haselbach, F.: "Effect of roughness and unsteadiness on the performance of a new LPT blade at low Reynolds numbers", ASME IGTI 2008, GT2008-50488, (published on Journal of Turbomachinery)
46. **Montomoli F.**, Massini M., Maceli N., Cirri M., Lombardi L., De Prosperis R., Ciani A., D'Ercole M.: "Interaction of Wheel Space Coolant and Main Flow in a New Aeroderivative LPT", ASME IGTI 2006, GT2006-90877, 8-11 May 2006, Barcelona Spain, (published on Journal of Turbomachinery)
47. Adami P., **Montomoli F.**, Belardini E., Martelli F., "Interaction between wake and film cooling jets: numerical analysis", ASME IGTI 2004, GT2004-53178, Vienna
48. **Montomoli F.**, P. Adami, S. Della Gatta, F. Martelli, "Conjugate heat transfer modeling in film cooled blades", ASME IGTI 2004, GT2004-53177, Vienna
49. **Montomoli F.**, Adami P., Della Gatta S., Martelli F., "Conjugate heat transfer approach in film cooled blades", ICFD Conference on Numerical Methods for Fluid Dynamics, Oxford 2004
50. Magi A., **Montomoli F.**, Adami P., Carcasci C., "Experimental and numerical investigation of stationary ribbed ducts", ASME IGTI 2004, GT2004-53180 Vienna
51. **Montomoli F.**, Adami P., Della Gatta S., Martelli F., "CHT in HP stage", 59° Congresso Nazionale ATI, 2004
52. Adami P., **Montomoli F.**, Belardini E., Martelli F., "Film cooling and wake passage interaction", ATI, 2004
53. Adami P., Martelli F., **Montomoli F.**, K.S. Chana, "Numerical investigation of film cooled NGV blades", ASME IGTI 2003, GT-2003-38861, Atlanta
54. Adami P., Martelli F., **Montomoli F.**, "A finite volume method for the conjugate heat transfer in film cooling devices", ISABE Cleveland, Ohio, USA, 2003.
55. Montomoli F., Adami P., Martelli F., "Analisi aerotermodinamica di pale per turbine a gas refrigerate a film", 58° Congresso Nazionale ATI, 2003, Padova, Italy
56. Pazzi S., Martelli F., **Montomoli F.**, Giachi M., Testa M., "Una procedura innovativa per l'ottimizzazione aerodinamica di giranti per compressori centrifughi", 58° Congresso Nazionale ATI, , 2003, Padova, Italy
57. **Montomoli F.**, Adami P., Martelli F., "Unsteady wake effects on a film cooled leading edge", Flucome'03, International Conference on Fluid control, Measurements and Visualization, Sorrento, Italy August 25-28 2003.
58. Adami P., Martelli F., **Montomoli F.**, "Simulazione numerica di configurazioni crossflow in sistemi di refrigerazione a film", 57° Congresso Nazionale ATI, 2002, Pisa, Italy
59. Adami P., Martelli F., **Montomoli F.**, Saumweber C., "Numerical Investigation of Internal Crossflow Film Cooling", ASME IGTI EXPO 2002, GT-2002-30171, Amsterdam

## MONOGRAPHS

1. **Montomoli F.:** "Physics of gas turbine cooling: improvement of design tools" 2005, Italian National Library, Università' of Florence, Italy, 621.042 (ed. 21), TDR 2005 5167, CF980505167, PhD thesis
2. **Montomoli F.:** "Studio di sistemi di refrigerazione film cooling per turbine", 2001, Università' of Florence, Italy, INTL2001000000031, Tesi Laurea

IL SOTTOSCRITTO DICHIARA DI ESSERE CONSAPEVOLE DELLA VERIDICITÀ DEL CONTENUTO DEL PRESENTE DOCUMENTO E DI ESSERE A CONOSCENZA DELLE SANZIONI PENALI, DI CUI ALL'ART.76 DEL D.P.R.28.12.2000, N. 445, IN CASO DI FALSE DICHIARAZIONI.

AI SENSI DEL REGOLAMENTO UE 679/2016 E DEL D.LGS. 196/2003, DICHIARA DI AVER PRESO VISIONE DELL'INFORMATIVA SUL TRATTAMENTO

DEI DATI PERSONALI NELL'AMBITO DELLE PROCEDURE DI SELEZIONE E RECLUTAMENTO DI PERSONALE

Londra 15/10/2024

Francesco Montomoli

