

Aeronautical Engineer, PhD

RESUME

AREAS OF EXPERTISE

- Stress analysis
- Aeroelasticity
- Aerodynamics
- FEM and FEA
- Multidisciplinary Design Optimization (MDO)
- Multi-Objective Optimization (MOO)
- Pareto analysis
- Optimization Algorithms

Aerospace engineer having over 3-years' experience in aerospace consulting, with excellent communication and planning skills.

Having comprehensive knowledge of structural design, with specific expertise in Multidisciplinary Design Analysis and Optimization, gained throughout the PhD in aerospace engineering.

Currently working as stress engineering consultant with multinational companies and research centers in the aerospace.

Recently she worked at Airbus Helicopters and NASA LaRC. At NASA LaRC she has contributed to the verification of a new unconventional aircraft concept (Over-the-Wing-Nacelle), by carrying out advanced integrated analyses comprised of high-fidelity simulations and developing innovative optimization strategies (MDO-MOO).

Looking for a challenging position in a forward thinking company in Europe that offers opportunities for future career advancement.

WORK EXPERIENCE

Dates	December 2011 - present
Employer	Airworks Engineering , Rome, Italy
Occupation	<i>Design and Stress Engineer</i>
Responsibilities	Responsible for client liaison, planning project activities and assigning priorities in accordance with program requirements and deadlines, for the stress assessment of several space and aeronautical designs.
Main projects	<ul style="list-style-type: none">• Stress sizing of macrotiles and frames of CSG antennas under quasi-static, random, sine, thermoelastic loads for COSMO 2nd Generation program on behalf of <u>Thales Alenia Space</u> and ASI.• Certification of Airbus A330/A380 galleys under quasi-static loads on behalf of <u>Bucher Leichtbau AG</u>.• Large-Size Telescope (LST) and Small-Size Telescope (SST) for the Cherenkov Telescope Array (CTA) under static, wind, seismic and combined loads on behalf of <u>Max-Planck Institut für Extraterrestrische Physik</u>.• UAV Crex under operative aerodynamic loads on behalf of <u>Selex Galileo</u>.
Dates	February - October 2014
Employer	NASA Langley Research Center , Hampton, Virginia (USA)
Occupation	<i>System Engineering Consultant</i>
Responsibilities	Responsible for Multidisciplinary Design and Optimization (MDAO) for the validation of the <u>Over-the-Wing-Nacelle (OWN) concept</u> , being developed by the Systems Analysis and Concepts branch at NASA LaRC.
Main activities	<ul style="list-style-type: none">• Development of an innovative <u>Multidisciplinary computational environment</u> through modeFrontier, comprised of high-fidelity structural and aeroelastic analyses (carried out by MSC.Nastran), mission performance (carried out by FLOPS), and aerodynamic analysis (carried out by Cart3D).• <u>Statistical analysis</u> of the design space to check the numerical model and to improve the MDO process efficiency.• <u>Explicit Multi-Objective Optimization (MOO)</u> through Genetic Algorithm (MOGA) resulted in the Pareto optimal designs.

Dates	February - May 2013
Employer	AIRBUS Helicopter , Donauwörth, Germany
Occupation	<i>Stress Engineering Consultant</i>
Main activities	Door concessions <u>focal point</u> on behalf of Ruecker Aerospace GmbH. Coordinated a five-people team of external consultants for the verification of Airbus A350 doors under fatigue and damage tolerance requirements through ISAMI and JET.

EDUCATION and RESEARCH ACTIVITIES

Dates	November 2011 - 10 April 2015
University	University of Rome "La Sapienza" , Italy
Title of qualification awarded	<i>Ph.D. in Aeronautical and Space Technologies</i>
Doctoral Thesis	The major aim of the thesis is an investigation of MDO methodologies for aircraft design, with particular emphasis on explicit Multiobjective approach to optimization (MOO). Such methods have been applied to demonstrate the efficiency of the overall methodological framework for solving practical design problems. This work has been partially supported by NASA LaRC under the Environmentally Responsible Aviation (ERA) Project. Title: <i>"Multi- and Single-Objective Multidisciplinary Optimization for the Preliminary Design of Aircraft"</i>
Research activities	<ul style="list-style-type: none"> • Development of multidisciplinary computational environments to facilitate the <u>integration of disciplinary analyses</u> of various fidelities and optimization algorithms; • Optimization using gradient-based (SQP, BFGS based) and population-based (MOGA) algorithms; proposal of <u>interactive and hybrid approaches to optimization</u>; • <u>Development of design tools</u> in Fortran language for the geometry and mesh generation and <u>High-Fidelity</u> analyses (static and dynamic structural, static aeroelastic, gust, flutter, quasi-static aerodynamics) for the structural and shape optimization of aircraft-like systems.
Dates	January 2008 - July 2011
Title of qualification awarded	Master degree in Aeronautical Engineering (110/110 cum laude)
University	University of Rome "La Sapienza", Italy
Dates	September 2004 - December 2007
Title of qualification awarded	Bachelor degree in Aerospace Engineering
University	University of Rome "La Sapienza", Italy

SKILLS AND COMPETENCES

Mother tongue	Italian
Other(s) language(s)	English fluent (C1) French basic (A1)

Technical Skills	<ul style="list-style-type: none"> • Sound knowledge of FEM analysis softwares (MSC.Nastran, MSC.Patran, HyperMesh, Hyperview, Radioss) • Sound knowledge of the Optimization softwares SNOPT and ModeFrontier • Good Knowledge of the Fatigue softwares ISAMI, JET • Good Knowledge of the aircraft design software FLOPS • Basic knowledge of Fluidynamics softwares (Fluent, Gambit) • Excellent programming skills in Fortran, VBA, and Matlab
Personal Skills	<ul style="list-style-type: none"> • Pragmatic, multitasking and creative thinking. • Problem finding and solving skills. • Excellent planning and coordination skills. • Excellent communication and relational skills. Able to interact productively with people from diverse background. • Team spirit. Able to enthusiastically motivate and lead work groups.
Other experiences	<ul style="list-style-type: none"> • Manage the work of students for their master theses as co-advisor. • Give lectures in the framework of post-graduate classes (Aeronautical Structures, Aeroelasticity, Finite-Element Analysis). • Trained hydrobike and aquagym classes.
Interests and hobbies	<p>Interest in motoring and motorcycling.</p> <p>Enjoy riding motorbike and cycling outdoor.</p> <p>Involved in many sports (cycling, swimming, skiing).</p>
Driving licenses	A (motorbike), B (car)
PUBLICATIONS	<ul style="list-style-type: none"> • Mastroddi, F., Gemma, S., "Analysis of Pareto Frontiers for Multidisciplinary Design Optimization of Aircraft," <i>Aerospace Science and Technology</i>, Vol. 28, pp. 40-55, DOI 10.1016/j.ast.2012.10.003, 2012. • Mastroddi, F., Gemma, S., "<i>Analysis of Pareto-Frontier for Multidisciplinary Design Optimization of Aircraft</i>," proceedings of 3rd CEAS Air&Space Conference, XXI AIDAA Congress, Venezia, Italy, 24-28 October 2011, pp. 1418-1427. • Mastroddi, F., Gemma, S., "<i>Multi-Objective Optimization Strategies for Aircraft Multi-Disciplinary Design</i>," pp. 1-14, proceedings of 3rd Aircraft Structural Design Conference, Delft, The Netherlands, 9-11 October 2012. • S. Gemma, F. Mastroddi, "<i>Nonlinear modelling for Multi-Disciplinary and Multi-Objective Optimization of a complete aircraft</i>", proceedings XXII National Congress AIDAA, Napoli, Italy, 9-12 September, 2013. (Winner of the Best Young Paper award). • S. Gemma, F. Mastroddi, "<i>Multi-Disciplinary and Multi-Objective Optimization of an Unconventional Aircraft Concept</i>", proceedings of 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Dallas, Texas, 22-26 June 2015. • S. Gemma, F. Mastroddi, "<i>Genetic and Gradient-based Algorithms for the Multi-objective Optimization of Aircraft Design with Aeroelastic Constraints</i>", proceedings of IFASD-2015, Saint Petersburg, Russia, June 28-July 2, 2015.