

SUSANNA LAURENZI

Sapienza University of Rome
Department of Astronautic, Electrical and Energy Engineering
Via Salaria 851-881, 00138 Rome, Italy
Tel: +39 06 49919756
E-mail: susanna.laurenzi@uniroma1.it
<http://w3.uniroma1.it/slaurenzi/>

PROFILE

Assistant Professor of Aerospace Structures with ten years of hands-on experience in RD&I of process and materials engineering within industrial context

RESEARCH FIELDS

Design of aerospace structures by Resin Transfer Moulding (RTM) process
Nanotechnology and advanced composite materials for aerospace applications
Materials and structural design of solar sails and satellites
Manufacturing processes for aeronautic and space structures

EDUCATION

PhD in Aerospace Engineering, School of Aerospace Engineering, Sapienza University of Rome, December 2007. Thesis: *Liquid Composite Moulding technologies for aerospace structures. Case studied: Helicopter A109 gearbox*. Advisor: Prof. M. Marchetti. Co-advisor: Eng. E. Anamateros (AgustaWestland)

Laurea (MSc) in Astronautic Engineering, School of Aerospace Engineering, Sapienza University of Rome, May 2004. Thesis: *Liquid Composite Moulding technology for aerospace application: design and manufacturing of a helicopter component*. Advisor: Prof. M. Marchetti. Co-advisor: Eng. E. Anamateros (Agusta)

Laurea (BSc+MSc) in Aerospace Engineering, Sapienza University of Rome, December 2001. Thesis: *Design and realization by Resin Transfer Moulding of a tiltrotor BA 609 inboard flaperon*. Advisor: Prof. M. Marchetti. Co-advisors: Engs. R. Severoni and E. Anamateros (Agusta)

TEACHING EXPERIENCE

Lecturer in *Technology of Aerospace Materials* (MSc level), Sapienza University of Rome, Fall 2013 to present

Lecturer in *Nanotechnology for Aerospace* (MSc level), Sapienza University of Rome, Spring 2013

Teaching Assistant in *Aerospace Construction* (BSc level), Sapienza University of Rome, Fall 2012, Fall 2013 to present

Teaching Assistant in *Astronautic Structures* (MSc level), Sapienza University of Rome, Fall 2012, Fall 2011

Lecturer, *Master in Composites and Nanotechnology for Aerospace*, School of Aerospace Engineering, Sapienza University of Rome, Spring 2012, Spring 2011

Trainer, Post-laurea training course on manufacturing processes for advanced composite materials (ELIMAT project), Centro Sviluppo Materiali S.p.A., Italy, 2007-2008

Laboratory Tutor, Aeronautic High School "Galileo Galilei", Rome, Italy, Summer 2004

Laboratory Tutor on Composite Processes, Department of Mechanical Engineering, University of Delaware, USA, Fall 2002

PROFESSIONAL EXPERIENCE

University Lecturer, Sapienza University of Rome, Italy **Mar 2011 – Present**
Department: Astronautic, Electrical and Energy Engineering

Research Scientist, Centro Sviluppo Materiali S.p.A., Italy **Jun 2006 – Feb 2011**
Division: Aerospace and Defence

Main achievements: started-up the laboratory of polymer composites design and manufacturing, in particular logistics design of new clean room, identification and selection of instrumentations and equipments for RTM process.

Research and development activities:

Design and manufacturing of carbon nanotubes reinforced anti- ballistic protection (2008 – 2011).
Role: Project Manager. Client: Italian Ministry of Defence

- Conduct research and implement results; developed technological choices, functionalization of carbon nanotubes, process manufacturing of prototypes and testing programme; have responsibility of technological choices and testing programme

Design and prototyping of helicopter components (beanie and bracket) using RTM and IM processes; developing of product management software (2007-2011)

Role: Project Manager. Client: AgustaWestland

- Developed tooling philosophy, selected materials, characterized materials; lead team for the design components; RTM and IM process simulations for mould design
- Definition of preforming technique and identification/interface/selection of external suppliers; manufacturing of prototypes and testing programme; have responsibility of technological choices and testing programme
- Coordinator of internal team and AgustaWestland managers for the developing of management software

Effects of manufacturing process on carbon bonding on the final properties of refractory material (2009 – 2011). Role: Research Scientist

- Performed thermal analysis, rheology, chromatography and FT-IR analysis to investigate the mechanism formation during the process

Prototyping of wing panel for aircraft atmospheric re-entry (2006 – 2007). Role: Research Scientist

- Design by structural FEM analysis coupling thermo-mechanical of metal matrix composite (MMC) panel
- Testing of the material and Ni- Superalloy MMC at high temperatures and in aggressive environments

PhD Student, Sapienza University of Rome, Italy **Mar 2003 – Jun 2006**
Faculty: School of Aerospace Engineering. PhD scholarship sponsored by AgustaWestland

Main achievements:

- developed the transmission gearbox of helicopter A109 in composite materials by RTM process with structural design optimization of preform and inserts by FEM analysis
- evaluated solutions to match structural design and manufacturing requirements; permeability test; design of the RTM mould: tooling philosophy, optimization of injection scheme by FEM – CV analysis

- investigated the effects of the compaction phase in Liquid Composite Molding viscoelastic behaviour, effects of residual stress and strain relaxation on final product quality
- applied the RTM process to secondary helicopter components: secondary components were re-designed for RTM, realized and tested

Research Assistant, Sapienza University of Rome, Italy

Mar 2003 – Feb 2006

Department: Aerospace and Astronautic Engineering

Projects:

Development of multi-axial head deposition for filament winding (Sistema Compositi).

- Optimization of the process parameters for sample specimens; flexural testing

Development of a membrane process as replacement for the autoclave

- Manufacturing of military helmets and IVECO fender for external project partner (Sistema Compositi).

Numerical and experimental validation of multilayer and anisogrid composite structures for fuselage (National Research Programme 2004-2005)

- RTM mould design and simulation process; manufacturing of anisogrid structures by VARTM and RTM

Selection of hybrid materials and processes atmospheric re-entry vehicles

- Material selections based on the project requirements; supplier identifications

Design and realization of P180 aircraft wing in composite materials by RTM

- RTM process simulation to optimize the injection scheme; samples preparation and testing at external partner (Italian Aerospace Research Centre)

Research Assistant, Center for Composite Materials, University of Delaware, USA Aug 2002 – Feb 2003

Project: Investigation of media distribution on the resin flow behaviour in VARTM-RTM processes.

Funding: US Office of Naval Research. Supervisor: Prof. Suresh Advani

Additional Training:

Visiting Lecturer, Advanced Composite Center for Innovation and Science, University of Bristol, UK, Jul 2013 – Sep 2013

Visiting Scientist, Vesuvius Research Center, Pittsburgh, USA, Mar 2010

Visiting Scientist, Vesuvius Research Center, Pittsburgh, USA, Oct 2009

Visiting Scientist, Center for Composite Materials, University of Delaware, USA, Nov 2005 – Apr 2006. Project: Viscoelastic behaviour of preform during liquid composite molding processes, with design, calibration and testing of a new low cost IC/M workstation. Supervisor: Prof. Suresh Advani

Professional Engineer Habilitation (Chartered Engineer Status – UK Equivalent), Italy, 2003

ADDITIONAL SCIENTIFIC ACTIVITIES

Member of Local Organizing Committee and Scientific Committee of Fourth Sino-Italian Conference on Space Aerothermodynamics and Hot Structures, Capua, Italia, Nov 2012

Member of Local Organizing Committee and Scientific Committee of Third Sino-Italian Conference on Space Aerothermodynamics and Hot Structures, Shanghai, Cina, Nov 2011

Member of Advanced Materials and Enabling technologies Mindsh@re community (AM&ET) of Finmeccanica as delegate of Centro Sviluppo Materiali

Member of CFG NANO community (Community Focal Group on Nanotechnology) of Finmeccanica as delegate of del Centro Sviluppo Materiali

Member of Local Organizing Committee of XVII National Congress on Aeronautic and Astronautic AIDAA, Rome, Italy, September 2003.

Member of Local Organizing Committee of ARO Workshop on Robotics and MEMS in Vehicle Systems, Rome, Italy, June 2002.