CURRICULUM VITAE

PERSONAL INFORMATION

Name **DANIELA**

Surname **RIGAMONTI**

PROFESSIONAL RÉSUMÉ

I gained, at Politecnico di Milano, first the Bachelor's Degree in Aerospace Engineering and then the specialization with a Master's Degree in Space Engineering in 2012, with a numerical and experimental thesis on the employment of Shape Memory Alloys (SMA) in optical support systems, carried out in collaboration with the then IENI now ICMATE institute of the Italian National Research Council (CNR) and the Astronomical Observatory of Brera (OAB) part of the National Institute of Astrophysics (INAF).

I then obtained the title of PhD in Aerospace Engineering, deepening the research on SMA with the optimization of a constitutive law for the finite element modeling of actuators based on the NiTi alloy, thus obtaining a global view of both the thermodynamic mechanisms of the material and the technical design aspects, especially referred to actuating mechanisms. During the PhD, I spent a period at iMSL (intelligent Material Systems Laboratory) in Germany, flanking a group with great expertise in the design and control of actuators based on shape memory alloys.

In the following years at the Department of Aerospace Sciences and Technologies (DAER), first as a research fellow and now as a member of technical staff, I extended the research field to other classes of smart materials - in particular fiber optic sensors - and smart structures in general, investigating in addition to the sensing / actuation mechanisms, also the aspects related to advanced composite materials and the embedding techniques of smart elements in the composite structures.

PROFESSIONAL EXPERIENCE

Feb. 1, 2020 – present day	**Politecnico di Milano - Aerospace Science and Technology Department**
Position/ Type of employment	Specialized technician in the Smart Materials and Structures Laboratory
Main activities and responsibilities	The work is focused on the study, manufacturing and testing of smart structures functionalized through sensors and actuators. Core activities are the development of advanced composite materials embedding actuation systems based on shape memory alloys and/or Health and Usage Monitoring Systems based on optical fiber sensors.
May 16, 2018 – Jan. 31, 2020	**Politecnico di Milano - Aerospace Science and Technology Department**
Position/ Type of employment	Research Fellow
Main activities and responsibilities	The activity is focused on the development of advanced materials for space applications. With particular reference to the design of actuation systems based on shape memory alloys, the activating methods are explored with the aim of increasing their performance and extending the usability range. Another objective is related to the development of HUMS based on optical fiber sensors. The focus is on studying and comparing different measurement techniques in order to select the most suitable for use in smart structures. All activities involve technological/experimental work supported by numerical evaluations.
June 10, 2016 - Sep. 30, 2016	**iMSL (intelligent Material Systems Laboratory) - Universität des Saarlandes**
Position/ Type of employment	Internship
Main activities and responsibilities	In the context of a laboratory with expertise in the design and control of actuators based on shape memory alloys, I worked on a parametric constitutive model – developed by Prof. Seelecke, director of the laboratory – for such materials. In particular, my task was the model calibration for subsequent validation on a real application, with the definition of a characterization protocol needed to obtain the parameters for the constitutive law.
March 01, 2016 - Aug. 31, 2017	**MOBIL TECH di Barin Luca & C. s.a.s.**
Position/ Type of employment	Consultant under an independent contractor agreement
Main activities and responsibilities	Object of the collaboration is the managing and preparation of reporting documentation required by the European Commission and related to the project 'Cost-effective combined Heat and Power generator for camping vans' (CHeaP) within the SME-Instrument phase II call of the Horizon 2020 programme. This includes the monitoring of deadlines, the writing of intermediate and final reports and deliverables (both technical and financial) and the managing of the Commission's participant portal.
June 01, 2012 - April 30, 2014	**CNR-IENI, Institute for Energetics and Interphases, Lecco unit**
Position/ Type of employment	Research Fellow
Main activities and responsibilities	My main activity was the thermo-mechanical characterization of shape memory alloys, in particular NiTi and NiTiCu alloys, and the design and

development of devices based on these alloys with CAD modeling and manufacturing through rapid prototyping.

Moreover, as a part of the activity for the Spider@Lecco project of which IENI-Lecco was partner, I have dealt with the revision of the website of the project and I coordinated the organization of a congress that regarded the innovation in the rehabilitation field, target of the project, and the linked ECM (*Educazione Continua in Medicina*) accreditation.

Sept. 05, 2008 – Dec. 31, 2008
March 02, 2007 – Dec. 31, 2007

Politecnico di Milano - Aerospace Science and Technology Department

Position/ Type of employment: Part-time contract for student contribution.

Main activities and responsibilities: Management of the fruition, functioning and storage of library material. My job comprised both the administration of the material (manuals, books, magazines, etc.) and the assistance to the library users.

June 05, 2006 – Sept. 30, 2006

Assystembrime Italia S.p.A.

Position/ Type of employment: Stage

Main activities and responsibilities: Design of equipment for the manufacturing of aircraft components. Creation of the FE model, starting from the 3D CAD model of the equipment in carbon fiber composite material. Performance of the FEM static analysis, investigation of results and editing of the report.

EDUCATION AND TRAINING

Nov. 01, 2014 - Jan. 17, 2018

Politecnico di Milano

Degree: PhD in Aerospace Engineering

Graduation thesis: Discussion date: 01/17/2018

Title of the thesis: "*Finite Elements for actuation of composite shell structures through shape memory alloys*"

Thesis summary: The PhD thesis topic was the use of NiTi shape memory alloys for actuation devices. In particular, the focus was on the possibility to adapt the FEM computer-aided design to different material conditions, both deriving from initial treatments and cycle life (functional fatigue). This resulted in the reformulation of a constitutive law based on the experimental study of the transformation mechanism. Key issue of the project was the collaboration between material scientists and engineering designers that was fulfilled in the partnership with the unit of Lecco of CNR-ICMATE, which has a long and well-established experience in SMA characterization and development.

March 21, 2007 - April 24, 2012

Politecnico di Milano

Degree: Master's Degree in Space Engineering

Final evaluation: 96/110

Graduation thesis: Discussion date: 04/24/2012

Title of the thesis: "*Design and Characterization of Shape Memory Alloys for Optomechanical Mounting*"

Thesis summary

The target of the thesis work was the investigation of the perspectives and possibilities offered by Shape Memory Alloys for optical support systems. The activity included the characterization of NiTi alloy samples using different experimental techniques to validate and tune the FE model, which was used to design a scaled prototype and simulate the use of different materials.

Sept. 10, 2003 - March 06, 2007 | **Politecnico di Milano**

Degree | Bachelor's degree in Aerospace Engineering

Final evaluation | 98/110

Graduation thesis | Discussion date: 03/06/2007

Title of the thesis: "*Co-cured multispar stabilizer plugs stress analysis*"

Thesis summary

In the context of a stage at Assystembrime Italia S.p.A., I worked on the validation of a tool (plug) for autoclave forming of a carbon fiber reinforced stabilizer: creation of the FE model (starting from the 3D CAD model of the equipment in carbon fiber composite material) and its analysis, analysis of results and editing of the report.

DIDACTIC ACTIVITY

October 3, 2016 - present | **Politecnico di Milano - DAER, Department of Aerospace Science and Technology**

Position/ Type of employment | Support teaching (lectures, exercises and hands-on laboratory activity).

Course, topic, level and period

AEROSPACE TECHNOLOGIES AND MATERIALS

Smart materials and systems, in particular SMA and PZT actuators design, modeling and production techniques.
Master course. First semester in academic years 2017/18, 2018/19 and 2019/20.

TECNOLOGIE E MATERIALI AEROSPAZIALI

Fundamentals of materials used in aerospace construction and related technologies of production/assembly, verification, quality control and maintenance.
Bachelor course. First semester in academic years 2017/18, 2018/19 and 2019/20.

NON-LINEAR ANALYSIS OF AEROSPACE STRUCTURES

Non–linear Finite Element modeling applications, analytical solutions and computer aided modeling with commercial software Abaqus.
Master course. Second semester in academic year 2017/18.

MODELLAZIONE DI STRUTTURE AEROSPAZIALI

Linear Finite Element modeling applications, analytical solutions and computer aided modeling with commercial software Abaqus.
Bachelor course. Second semester in academic year 2016/17.

October 3, 2016 - present	**Politecnico di Milano - DAER, Department of Aerospace Science and Technology**
Position/ Type of employment	Co-supervisor
Student, title and date	I co-supervised the following concluded theses: • GROSSO, ALBERTO – Sviluppo di un dispositivo in fibra ottica per l'identificazione dei carichi nelle strutture aeronautiche (oct-2019) • ILGAZ, OSMAN MURAT - Smart structures for morphing applications in aerospace: development of a technological demonstrator based on SMA actuators and fiber optic sensors (dec-2018) • KARACAM, GIZEM KUBRA - Tunable actuators based on SMA for morphing applications : experimental characterization of partial martensitic transformations (dec-2018) • KURTAY, KORAY - Evaluation of tilted FBG sensors for structural health monitoring applications (apr-2019) • DI PAOLO, GIULIA - Development of a fiber optic technique for process monitoring of composite structural elements (apr-2019)

PUBLICATIONS AND SUBMITTED ARTICLES

D. Rigamonti; A. Nespoli; E. Villa; F. Passaretti
Implementation of a constitutive model for different annealed superelastic SMA wires with rhombohedral phase
Mechanics of Materials 112 (2017) 88–100
June 3, 2017
DOI: 10.1016/j.mechmat.2017.06.001

A. Nespoli, D. Rigamonti, M. Riva, E. Villa, F. Passaretti
Study of pseudoelastic systems for the design of complex passive dampers: static analysis and modeling
Smart Mater. Struct. 5 (2016) 105001
September 9, 2016
DOI: 10.1088/0964-1726/25/10/105001

E. Borlandelli, D. Scarselli, A. Nespoli, D. Rigamonti, P. Bettini, M. Morandini, E. Villa, G. Sala and M. Quadrio
Design and experimental characterization of a NiTi-based, high-frequency, centripetal peristaltic actuator
Smart Mater. Struct. 24 (2015) 035008
February 3, 2015
DOI: 10.1088/0964-1726/24/3/035008

A. Nespoli, D. Rigamonti, E. Villa, F. Passaretti
Design, characterization and perspectives of SMA elements in miniature sensor proof of concept
Sensors and Actuators A: Physical, Volume 218 - 1 October 2014, Pages 142-153
Available online August 10, 2014. Published October 1, 2014
DOI: 10.1016/j.sna.2014.08.001

D. Rigamonti, F. Zanetti, M. Riva, E. Villa, F. Passaretti, F.M. Zerbi
Lagoudas model for optomechanical mountings: parametric study and characterization campaign
Proc. SPIE 8689, Behavior and Mechanics of Multifunctional Materials and Composites 2013, 868915
April 3, 2013
DOI: 10.1117/12.2009980

M. Riva; D. Rigamonti; F. Zanetti; F. Passaretti; E. Villa; F. M. Zerbi
Shape memory alloys for astronomical instrumentation: space and ground-based applications
Proc. SPIE. 8450, Modern Technologies in Space and Ground-based Telescopes and Instrumentation II, 84500E
September 13, 2012
DOI: 10.1117/12.924975

CONFERENCES

AIDAA 2019
XXV International Congress of the Italian Association of Aeronautics and Astronautics
Development of a Smart Hinge based on Shape Memory Alloys for Space applications (Oral)
09-12 September 2019; Rome, Italy

AIDAA 2019
XXV International Congress of the Italian Association of Aeronautics and Astronautics
Actuated composite corrugated laminates for Morphing aerodynamic surfaces
09-12 September 2019; Rome, Italy

CIMTEC 2016
5th International Conference "Smart and Multifunctional Materials, Structures & Systems"
Experimental Study and Modeling of Pseudoelastic Systems for the Design of a Complex Passive Damper (Poster)
5-9 June 2016; Perugia, Italy

SPIE 2013
Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring 2013
Lagoudas model for optomechanical mountings: parametric study and characterization campaign (Oral)
10–14 March 2013; San Diego, California, USA

LANGUAGE SKILLS AND ABILITIES

FIRST LANGUAGE	**ITALIAN**
OTHER LANGUAGES	
	ENGLISH
Reading	Excellent
Writing	Good
Speaking	Good
Certifications	TOEFL (Test Of English as a Foreign Language) Valuation: 257/300 Released September 21, 2005

GERMAN

Reading	Fair
Writing	Fair
Speaking	Fair

TECHNICAL SKILLS AND ABILITIES

During the period spent at CNR-IENI research lab, I have dealt with the study and characterization of shape memory alloys. In this context, I have acquired skills in the use of instruments for measurement and analysis of materials thermo-mechanical properties: mechanical (traction/compression testing machine, DMA), calorimetric (DSC) and thermo-gravimetric (TG/DTA). Moreover, I have basic knowledge also of micro-structural characterization: metallography and XRD powder diffraction.

I also gained knowledge of the use of non-linear numerical models for the finite element simulation of the behavior of such materials. The work for my doctorate has allowed me to deepen the skills started during university studies on the creation of finite element models for structural linear and non-linear analysis.

COMPUTER SKILLS AND ABILITIES

Established working experience using:

- Matlab computing, analysis and programming environment;
- software for finite element analysis and pre-post processing Femap, Patran, Nastran, Abaqus and Comsol Multiphysics;
- software for 3D-modeling Rhinoceros, Solidedge and Solidworks.

Basic knowledge of:

- software for acquisition and instrument control Labview.

OTHER SKILLS AND ABILITIES

I have acquired skill in the management of paperwork and in the drafting of bureaucratic documents. Firstly cooperating with the local healthcare organization (which was provider for ECM credits in the Spider@Lecco project above-mentioned), then managing documents for the reporting to European Commission.

Through the execution of the logistic work for conventions and meetings within the Spider@Lecco project, I have gained also expertise in the coordination and assistance of the participants in meeting/conferences.

During my studies and my work in the research and academic environment, I acquired the ability to think creatively and strategically.

I also learned to approach profitably topics never faced, starting with a thorough study of the subject and defining the problems and possible solutions in a clear, rigorous and precise manner.

In the participations to research projects in both academic and industrial environment, I have become accustomed to preparing a work schedule and managing deadlines.

VOLUNTARY ACTIVITY

From March 2008 to June 2014 I worked as licensed projectionist and managing co-director at the movie theatre Palladium in Lecco. My main tasks were to put in operation the projector, first mechanical and then digital, to manage the movie theatre as supervisor, to organize shifts of volunteers and to maintain contact with some of the suppliers.
In relation to this activity, on April 18, 2013 I passed the exam and obtained the certificate of possess of the technical capacity for cinematographic operators.

CERTIFICATIONS

Certificate of attendance to a one-day course on a specific modeling module organized by Comsol S.r.l.

Title of the course: Equation Based Modeling con COMSOL Multiphysics
Brescia, November 30, 2015
Duration: 8 hours

Certificate of attendance to a two-day course on a specific simulation case organized by Comsol S.r.l.

Title of the course: Simulazione Multifisica mediante uno scambiatore di calore con mezzo poroso con Comsol Multiphysics v4.3b
Lecco, August 27-29, 2013
Duration: 16 hours

Certificate of attendance to the six days introductive course on metallurgy organized by AIM (Italian Association for Metallurgy)

Title of the course: Metallurgia per non metallurgisti
Milan, May 8-9-15-16-22-23, 2013
Duration: 48 hours

Certificate of Computer based Test Of English as a Foreign Language

TOEFL - Computer based
Valuation: 257/300
Released September 21, 2005