ACADEMIC CURRICULUM VITAE

PERSONAL DATA

Name	**Federico Scalzo**
Date of birth	December 17th 1988
E-mail	federico.scalzo@uniud.it
LinkedIn	https://it.linkedin.com/in/federico-scalzo

Proficient in product and process optimization, with particular attention to Selective Laser Melting of metals, techniques for designing high-performance mechanical components, and the characterization of static and dynamic properties of mechanical structures through experimental modal analysis. Expert in the design, optimization, and production of structures with controlled porosity. Has acquired skills for the development of monitoring systems, data collection, and processing of mathematical models for Digital Twin applications. Proficient in the use of equipment for LPBF and FDM 3D printing, 5-axis machining centers, contact and optical measurement systems.

PROFESSIONAL TITLES AND QUALIFICATIONS

2022 **Subject Expert and Teaching Assistant (Cultore della materia) in Manufacturing Technology And Systems (ING-IND/16)**
University of Udine - Polytechnic Department of Engineering and Architecture

2020 **Qualification to the Industrial Engineering profession - section A**
University of Udine

ACADEMIC QUALIFICATIONS

2020 **PhD in Industrial and Information Engineering**
University of Udine
Thesis title: Advanced lattice and porous structures for AM product optimization
Supervisor: Prof. Marco Sortino (ING-IND/16)

2016 **Master's degree in mechanical engineering**
University of Udine
Thesis title: Nonlinear thermo-mechanical simulations of phase change systems (PCM) for energy recovery from an electric arc furnace
Supervisor: Prof. Denis Benasciutti (ING-IND/14)

2012 **Bachelor's degree in mechanical engineering**
University of Udine
Thesis title: Injection systems and strategies for compression ignition engines
Supervisor: Prof. Gianmario Arnulfi (ING-IND/08)

TRAINING COURSES, WORKSHOPS, AND SPECIALIZED SCHOOLS

- Workshop: The specification of dimensional and geometric tolerances in the ISO GPS system., Udine, Italy, February 7th and 8th 2023.
- Basic and Advanced MSC Adams Course (July 21st, 22nd, and 25th, 2022), ALMATEC S.R.L.
- AlphaSTAR GEONOA 3DP Basic Course (February 14th, 2022), AlphaSTAR Corp.
- Workshop: Metal Additive Manufacturing Scenario Research and Industrial Experience. International Centre for Mechanical Sciences (CISM), Udine, Italy, March 25th-29th, 2019.
- AITeM School: Materials for Additive Manufacturing, Te.Si. Laboratory, University of Padua, Rovigo, Italy, June 26th-29th, 2018.
- Seminar: Industry 4.0: Operational Tools, Technologies, and Support Services for Companies, Confindustria (LAMA FVG), Udine, Italy, March 2nd, 2018.
- Course: Numerical Simulation of Metal Forming Processes with Simufact, Advanced Mechatronics Laboratory LAMA FVG, Udine, Italy, June 1st and 8th, 2017.
- Seminar: LAMA FVG for the Territory: Product and Process Innovation, Advanced Mechatronics Laboratory LAMA FVG, Udine, Italy, February 23rd, 2017.
- Workshop: Re-design of Ship Components for Metallic Additive Manufacturing Processes, Maritime Technology Cluster FVG in collaboration with Advanced Mechatronics Laboratory LAMA FVG, Lloyd's Register, and the Italian Association of Additive Technologies AITA, Udine, Italy, October 25th, 2016.
- DIGIMET Conference, Danieli Automation, Buttrio, Italy, September 29th, 2016.

ACCADEMIC CAREER

Feb 2023 – **Fixed-term researcher (tipo A)**
University of Udine – Polytechnic Department of Engineering and Architecture
ING-IND/16, Manufacturing technology and systems
Research Project Title: Green and Digital Transition for Advanced Manufacturing Technologies - iNEST Ecosystem

Sep 2021 – Aug 2022 **Holder of the Research grant ex art. 22 law 240/2010 entitled "Digital twin development for the FVG SMACT live demo"**
University of Trieste – Engineering and Architecture Department
Research activities:
- Product and process simulation and optimization
- Development of monitoring and data collection systems
- Development and application of Digital Twins.

Oct 2016 – Aug 2021 **Holder of the Research grant ex art. 22 law 240/2010 entitled "Research and application of additive manufacturing for the production of mechanical components.**
University of Udine – Polytechnic Department of Engineering and Architecture
Research activities:
- Simulation and optimization of the Selective Laser Melting (SLM) process.
- Static and dynamic properties of controlled porosity structures (FE simulations and experimental modal analysis): development of materials with variable density and mechanical properties, as well as good vibration damping capacity.
- Structural optimization techniques and Design for Additive Manufacturing (DfAM).

OTHER RELEVANT PROFESSIONAL EXPERIENCES

2016 **Mechanical designer**
SIMAT S.r.l. - Machines & Robotics
Zona ind. Via Enore Tosi 1 - 33034 Fagagna

Special tube bending, tube forming, and tube cutting machines.

TEACHING ACTIVITY AT UNIVERSITY LEVEL

2017 – 2023 **Integrative and laboratory teaching activities** carried out within the Bachelor and Master degree courses provided by the Manufacturing Technology and Systems Research Group (ING-IND/16) of the University of Udine.

– Manufacturing Technology I and II (ING-IND/16)
– Innovative Manufacturing Systems (ING-IND/16)
– Advanced Manufacturing Technology (ING-IND/16)
– Additive Manufacturing and Digital Process Innovation (ING-IND/16)

OTHER TEACHING ACTIVITIES

2022 **Adjunct Professor** of the Additive Manufacturing course - Advanced Technician for Automation and Mechatronic Systems at Istituto Tecnico Superiore Nuove Tecnologie Per Il Made In Italy, Viale L. Da Vinci 10, 33100, Udine (UD), Italy.

2017 – 2020 **Teaching and laboratory** activities carried out within the courses offered by the Research Group in Manufacturing Technologies and Systems (ING-IND/16) at the University of Udine for Higher Education Institutes (ITS Malignani - Udine, ITS Kennedy - Pordenone), and private companies.

THESIS TUTORING

Co-supervisor in the following Theses:

- Applicazione di strutture reticolari per lo sviluppo di un dinamometro innovativo ottenuto per stampa 3D SLM. University of Udine, Master Degree in Mechanical Engineering. 2017. Supervisor: Prof. G. Totis (ING-IND/16).
- Applicazioni di Digital Twin in Ambito Manifatturiero. University of Udine, Bachelor Degree in Mechanical Engineering. 2022. Supervisor: Prof. M. Sortino (ING-IND/16).
- Analisi modale di strutture meccaniche mediante shaker elettromagnetico. University of Udine, Bachelor Degree in Mechanical Engineering. 2020. Supervisor: Prof. G. Totis (ING-IND/16).
- Tecniche di progettazione e produzione di strutture cellulari metalliche per AM. University of Udine, Bachelor Degree in Mechanical Engineering. 2020. Supervisor: Prof. G. Totis (ING-IND/16).
- Ottimizzazione di lavorazioni meccaniche complesse su moderne fresatrici CNC. University of Udine, Bachelor Degree in Mechanical Engineering. 2019. Supervisor: Prof. G. Totis (ING-IND/16).
- Progettazione preliminare di un dinamometro con approccio Generative Design. University of Udine, Bachelor Degree in Mechanical Engineering. 2019. Supervisor: Prof. G. Totis (ING-IND/16).
- Metodologie per l'ottimizzazione del comportamento dinamico di macchine utensili a controllo numerico. University of Udine, Bachelor Degree in Mechanical Engineering. 2018. Supervisor: Prof. G. Totis (ING-IND/16).

- Ottimizzazione topologica di un dinamometro per la misura delle forze di taglio in fresatura. University of Udine, Bachelor Degree in Mechanical Engineering. 2018. Supervisor: Prof. G. Totis (ING-IND/16).
- Progettazione di un piano sperimentale per la caratterizzazione del comportamento dinamico di strutture reticolari ottenute da processo di stampa 3D SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2018. Supervisor: Prof. G. Totis (ING-IND/16).
- Tecniche CAM per la programmazione assistita di lavorazioni meccaniche complesse su macchine utensili CNC a 3-5 assi. University of Udine, Bachelor Degree in Mechanical Engineering. 2017. Supervisor: Prof. G. Totis (ING-IND/16).
- Collaudo di un moltiplicatore di giri per fresatura ad alta velocità. Università degli Studi di Udine, University of Udine, Bachelor Degree in Mechanical Engineering. 2017. Supervisor: Prof. G. Totis (ING-IND/16).
- Sistemi PDM-PLM per l'Additive Manufacturing. University of Udine, Bachelor Degree in Mechanical Engineering. 2017. Supervisor: Prof. M. Sortino (ING-IND/16).
- Progettazione di una attrezzatura di fissaggio per la separazione di pezzi SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2017. Supervisor: Prof. M. Sortino (ING-IND/16).
- Studio di fattibilità di provini per prove di trazione, ottenuti mediante tecnologia SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2017. Supervisor: Prof. M. Sortino (ING-IND/16).
- Trasformazione digitale di prodotto: progetto di una cerniera intelligente. University of Udine, Bachelor Degree in Mechanical Engineering. 2016. Supervisor: Prof. M. Sortino (ING-IND/16).
- Aspetti tecnologici del Bionic Design. University of Udine, Bachelor Degree in Mechanical Engineering. 2016. Supervisor: Prof. M. Sortino (ING-IND/16).
- Applicazione di tecniche di ottimizzazione topologica su pezzi da produrre con tecnologia SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2016. Supervisor: Prof. G. Totis (ING-IND/16).
- Studio sperimentale sulle proprietà smorzanti di strutture reticolari ottenute mediante tecnica SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2016. Supervisor: Prof. G. Totis (ING-IND/16).
- Caratterizzazione di strutture reticolari prodotte mediante SLM. University of Udine, Bachelor Degree in Mechanical Engineering. 2016. Supervisor: Prof. M. Sortino (ING-IND/16).

RESEARCH GROUPS

2016 – Participation in the research activities of the Manufacturing Technology and Systems (ING-IND/16) Research Group (ING-IND/16) of the University of Udine.

SCIENTIFIC PRODUCTION

- 3 papers published on international journals.
- 2 papers published in the proceedings of international conferences.
- 1 paper published in the proceedings of national conferences.
- Various presentations at conferences, workshops, and seminars.

MAIN RESEARCH AND TECHNOLOGY TRANSFER PROJECTS

Sep 2022 – Feb 2023 Characterization of the Ti6Al4V ELI alloy processed by Selective Laser Melting for use in the field of high energy physics. Activity conducted in collaboration with the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) as part of the DEMO (DEMOnstration Power Plant, nuclear fusion reactor prototype) project.

Aug 2021 – Gen 2022	Prototyping the in-vessel inboard supports mock-up of the DEMO (DEMOnstration Power Plant, nuclear fusion reactor prototype) diverting device by Selective Laser Melting and milling of forged blank, in order to evaluate the suitability of the Selective Laser Melting process for the production of parts intended for use in the DEMO project. Activity conducted in collaboration with the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) as part of the DEMO (DEMOnstration Power Plant, nuclear fusion reactor prototype) project.
Gen 2020 – Jun 2021	Product and process optimization for the manufacturing of mechanical components using Selective Laser Melting (SLM) - Feasibility analysis oriented towards the Selective Laser Melting process, development and optimization of the aesthetic and functional aspects of products, optimization of the Selective Laser Melting process for the production of complex parts, reverse engineering of mechanical components. Project conducted in collaboration with Brovedani Group S.p.A.
Dec 2020 – Apr 2021	Optimization and fabrication of a horn antenna in AlSi10Mg alloy using Selective Laser Melting. Project conducted in collaboration with PicoSaTs S.r.l. as part of an activity funded by the Ministry of Economic Development through the "Disegni+4" program.
Oct 2019 – Mar 2020	"CUBE - a new high-performance machine tool concept for advanced Industry 4.0 applications - phase 2." Project conducted in collaboration with Applyca S.r.l. High-performance fiber laser machine tools - finite element simulations and experimental modal analysis.
Nov 2018 – Aug 2019	“Wärtsilä AM library – Universal base knowledge library for AM” Development and characterization of geometrically advanced structures for the structural and thermo-fluid dynamic optimization of mechanical components. Project conducted in collaboration with Wartsila Italia S.p.A.
Mar 2019 – Jul 2019	"CUBE - a new high-performance machine tool concept for advanced Industry 4.0 applications - phase 1." Project conducted in collaboration with Applyca S.r.l. High-performance fiber laser machine tools - finite element simulations and experimental modal analysis.
Feb 2019 – Mar 2019	"BOSCH Freud Project - innovative tooling concept." Project conducted in collaboration with Freud S.p.A. Innovative cutting tools - design, optimization, and production of prototypes using SLM 3D printing.
Jul 2017 – Dec 2018	"SFS intec Project - smart window frames." Project conducted in collaboration with SFS intec S.r.l. Innovative electro-mechanical systems for smart window frames - electromechanical design, prototyping of data acquisition system, and reporting.
Apr 2018 – May 2018	Finite Element Analysis of a zygomatic implant. Project conducted in collaboration with Geass S.r.l.

Feb 2017 – May 2018 PORE-BONE (Optimized Design of Orthopedic Lattices and Biomaterials in Extremities) Optimization of the Selective Laser Melting process for the production of Ti6Al4V alloy parts in the biomedical field. Project conducted in collaboration with LimaCorporate S.p.A. and financed by the FVG Region through the PORFESR 2014-2020 program.

LANGUAGES

Mother tongue: Italian

Other languages	READING	WRITING	SPEAKING
English	B2	B2	B2
	First Certificate in English - Level B2 English for Academic Purposes (EAP)		
French	A1	A1	A1

CERTIFICATIONS AND ATTESTATIONS

- Certification of completion of 24 CFU for access to secondary school teaching competitions, A.Y. 2019/20, in accordance with DM 616/2017, issued by the University of Udine.
- Certificate of proficiency for the "LabVIEW Core 1" Course (December 14th - December 15th, 2017), issued by National Instruments Corp.
- Certificate of proficiency for the "Data Acquisition Using NI-DAQmx and LabVIEW" Course (December 11th - December 13th, 2017), issued by National Instruments Corp.
- Certificate of participation in the Workshop "SPECIFICATION OF DIMENSIONAL AND GEOMETRIC TOLERANCES IN THE ISO GPS SYSTEM" (February 7th - February 8th, 2023), issued by Ing. Zaffagnini | COMETPlus.
- Certificate of participation in the "PC-DMIS CAD" Course (August 6th - August 7th, 2020), issued by Hexagon AB.
- Certificate of participation in the "PC-DMIS CAD++SCANNING MESH" Course (November 26th - November 27th, 2019), issued by Hexagon AB.
- Certificate of participation in the Course "Numerical Simulation of Metal Forming Processes with Simufact" (June 1st and June 8th, 2017), issued by the University of Udine.
- Certificate of participation in the "CL WRX Advanced training" Course (February 28th - March 2nd, 2017), issued by Concept Laser GmbH.
- Certificate of participation in the "SolidCAM iMachining - The revolution in CAM" Course (April - May 2018), issued by C.S.R. SOLUTION Srl.
- Certificate of proficiency for the "English for Academic Purposes" Course, issued by the Linguistic and Audiovisual Center (C.L.A.V.) of the University of Udine on June 6th, 2018.
- Cambridge English Level 1 Certificate in ESOL International (First), issued on April 26th, 2016.
- Certificate of proficiency for the "Occupational Health and Safety" Course, compliant with the requirements of the Agreement State-Regions of December 21, 2011, issued by the University of Udine on February 2nd, 2017.

MAIN TECHNICAL COMPETENCIES

- 3D modeling and drafting:
  - SolidWorks (excellent)
  - Autodesk Inventor (excellent)
  - Solid Edge (excellent)
  - Autodesk Fusion360 (excellent)
  - AutoCAD (good)
  - FreeCAD (good)
  - nTopology Element (good)
  - MeshLab (good)
  - openSCAD (good)
  - CloudCompare (good)
  - GOM inspect (good)

- FEA:
  - ANSYS Mechanical APDL – Workbench (excellent)
  - SolidWorks Simulation (excellent)
  - MSC Patran / Nastran (good)
  - solidThinking Inspire (excellent)
  - MSC Simufact Additive (excellent)
  - MSC Simufact Forming (good)

- 3D printing:
  - Materialise Magics (excellent)
  - CURA (excellent)
  - Repetier Host (good)
  - Chitubox (good)

- CAM:
  - SolidCAM (excellent)
  - Autodesk FeatureCAM (good)

- Technical/scientific development environments:
  - MATLAB / Simulink (excellent)
  - LabVIEW (good)

- Programming languages:
  - C (fair)
  - ISO code for CNC (excellent)
  - Arduino (good)
  - LaTeX (excellent)

- Microsoft Office:
  - Word, Excel, PowerPoint e Visio. (excellent)

- Expert user of 3D printers:
  - Concept Laser M2 Cusing (SLM)
  - Ultimaker 2/2+ (FDM)
  - Elegoo Mars (LCD)

- Proficient in the use of optical measurement tools:
  - 3D optical profilometer Sensofar S neox (5 axis)
  - Laser scanner Hexagon RS5

- Able to operate the HAAS VF-2TR VMC (5 axis)

MEMBERSHIPS

- Ordinary member of the Italian Association of Manufacturing Technologies – AITeM.

Udine, 28/05/2023 Signature

Firmato digitalmente da: Federico Scalzo
Organizzazione: UNIVERSITAUDINE/01071600306
Limitazioni d'uso: Explicit Text: I titolari fanno uso del certificato solo per le finalità di lavoro per le quali esso è rilasciato. The certificate holder must use the certificate only for the purposes for which it is issued.
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