PERSONAL INFORMATION

Francesco Lupi

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- https://scholar.google.com/citations?user=BNRQHVYAAAAJ&hl=pt-PT&oi=ao
- https://www.researchgate.net/profile/Francesco-Lupi-2
- https://www.scopus.com/authid/detail.uri?authorId=57223198595

Driving licence: B
CF: LPUFNC95B09D403Y

Sex Male | Date of birth 09/02/1995 | Nationality Italy

EDUCATION

November 2021-Present

PhD in Smart Industry

University of Pisa, Italy
First ranked for XXXVII PhD Cycle. Grant in Smart Industry.
Main research topic: Industrial engineering, quality control and engineering education.
Keywords: Vision Inspection System (VIS), Industry 4.0/5.0 (I4.0/5.0), Sustainability, Human-machine interaction, Flexible and Reconfigurable production, CAD-based and digital manufacturing

2017-2020

MEng in industrial and management (2-year university degree)

University of Pisa, Italy
Fields of study: Design and management of systems/processes and data analysis.
Exams and final score (attached certificate): **110/110 cum laude**
Exams and final thesis average score: 30.2/33

2014-2017

BEng in industrial and management (3-year university degree)

University of Pisa, Italy
Fields of study: Engineering basics.
Final score (attached certificate): **110/110**

2009-2014

Five years secondary school diploma in scientific studies

Liceo Scientifico il Pontormo, Empoli (FI), Italy
Fields of study: traditional orientation
Final score: **96/100**

ACADEMIC FELLOWSHIP/ AWARDS

February 2024 – June 2024

FONDO GIOVANI - 20 hours teaching support at UNIPI DESTEC courses

Received University of Pisa DICI fellowship for “tutoring; integrative teaching; and others” for the following courses affiliated to the Department of Energy, Systems, Land and Constructions Engineering (DESTEC).
- DESTEC-15, TECNOLOGIA MECCANICA, 20 hours INGEGNERIA DELL’ENERGIA

November 2023

Best Student Paper Award, International Conference on Industry 4.0 and Smart Manufacturing, Iscte - University Institute of Lisbon, Portugal

Monetary prize of 300 CHF and publication of the extended version of the best student paper awarded **Lupi, F.,** Maffei, A., & Lanzetta, M. (2024). CAD-based autonomous vision inspection systems. Procedia Computer Science **2024**, 232, 2127-2136 on the Journal of Manufacturing and Materials Processing (MDPI).

August 2023 – March 2024

Faculty of Sciences and Technology (FCT), NOVA University of Lisbon

Received Erasmus+ Traineeship program fellowship for a 7-month PhD period abroad to join the research group at Faculty of Sciences and Technology (FCT), Departamento de Engenharia Eletrotécnica e de Computadores (DEEC), led by Prof. José A. Barata de Oliveira. The aim of this period was to design and develop a Flexile Vision Inspection System (FVIS), core of the PhD thesis. Certificate here.

October 2022 – February 2023

FONDO GIOVANI - 40 hours teaching support at UNIPI DICI courses

Received University of Pisa DICI fellowship for "tutoring; integrative teaching; and others" for the following courses affiliated to the Department of Civil and Industrial engineering (DICI).
- DICI/53, OTTIMIZZAZIONE DEI PROCESSI PRODUTTIVI, 10 hours INGEGNERIA MECCANICA WMELM
- DICI/25, TECNOLOGIA MECCANICA, 30 hours INGEGNERIA GESTIONALE IGE-L

September 2020-October 2021

Erasmus+ MAESTRO project, Pisa

Received University of Pisa DICI fellowship for "Manufacturing technologies, I4.0, sustainability and education" focused on the Erasmus+ project "MAnufacturing Education for a SusTainable fourth industrial RevOlution" (MAESTRO). The aim of the project is to design and develop more sustainable engineer courses using the I4.0 technologies according to Constructive Alignment (CA) framework.

September 2019-December 2019

University of Hawaii at Manoa, Oahu, Honolulu (HI), USA

Received University of Pisa fellowship to join the US research group at UH Manoa lead by Prof. Monique Chyba and Doc. Sonia Rowley:

- Master thesis project: Photogrammetry and 3D reconstruction of Mesophotic Coral Ecosystem (MCEs) of the Senyavin Islands, Federal States of Micronesia, info here and certificate here.
- Proof classes: 40 hours as student at 'Proof' classes by Doc. Monique Chyba, UH Math's Department.
- Teaching experience: 1 day as a teacher at the Molokai high school for math challenge project related to Kaho'olawe protection (60+ students). Event organized by UH Math's Department with the collaboration of Protect Kaho'olawe 'Ohana (PKO).
- Laboratory for advanced visualization and application (LAVA lab): testing of some 3D meshes corals for visualization project.
- Joined conferences and talks at the Math's department at UH.

September 2017-January 2018

GKN Driveline Firenze SpA, Campi Bisenzio (FI), Italy

Received University of Pisa DICI fellowship for consulting activities on:

- AutoCAD Mechanical software instructor (12 hours/week). Three types of courses based on the different levels of skills (30+ students).
  Collaborator for production plant re-layout and cells optimization project. Analysis and modeling of constant-velocity joints production process. Workflow analysis, cycle time and other efficiency metrics collection and improvement.

COMPETITIVE PROJECTS

January 2024 - March 2025

Regional Project Digital Enterprise EB Metal srl, Monte San Savino AR, Italy

Research and development of a flexible HW/SW system based on a robotic arm for the autonomous unloading of laser cutting machines guided by artificial vision.

- Role: Ph.D researcher
- Funding: k€ 50
- Duration: 15 months

September 2022 - August 2025

Erasmus+ TET

The Evolving Textbook (TET) project addresses the need for a more flexible and learners-centred approach to higher education textbooks (official website).

- Role: Ph.D researcher
- Partners: University of Ljubljana (SLOVENIA), coordinator, Rzeszow University of Technology (POLAND), Royal Institute of Technology (SWEDEN), DICI University of Pisa
- Funding: k€ 250 (University of Pisa k€ 60)
- Erasmus+ Programme, Strategic Partnerships Key Action KA2 - Cooperation for innovation and the exchange of good practices, Action Type KA220 - Cooperation Partnership in Higher Education, Call 2022, Round 1
- Duration: 36 months
- Contract No. KA220-HED-00ABA996

February 2022 - January 2025

Erasmus+ MarbleTECH

New educational approach of innovative technologies and eco-advances in the marble industry (official website).

- Role: Ph.D researcher
- Partners: Institute for Technology Transfer and Innovations (BULGARIA), Creative Thinking Development (GREECE), Bogazici Universitesi (TURKEY), Virtual Campus lda (PORTUGAL), Asociación Empresarial de Investigación Centro Tecnologico del Marmol y la Piedra (SPAIN), Desinope 323 s.l. (SPAIN), C.G.S. di Coluccia Michele & C. s.a.s. (ITALY), Internazionale Marmi e Macchine Carrara Spa (ITALY), CAFRE DICI University of Pisa (COORDINATOR)
- Funding: k€ 375 (University of Pisa k€ 61)
- EU Erasmus+ Programme, Strategic Partnerships Key Action KA2 - Cooperation for innovation and the exchange of good practices, Action Type KA202 - Strategic Partnerships for vocational education and training, Call 2021, Round 1
- Duration: 36 months
- Score: 88/100 (eligible, funded)

September 2020-December 2022

Erasmus+ MAESTRO

MAnufacturing Education for a suSTainable fourth industRial revolution focused on the production of university teaching modules on Industry 4.0 and sustainability (official website)

- Role: Fellowship Researcher and Ph.D researcher
- Partners: Royal Institute of Technology (SWEDEN), coordinator, Polytechnic University of Rzeszow (POLAND), University of Loughborough (UK), University of Ljubljana (SLOVENIA), NOVA University of Lisbon (PORTUGAL), Polytechnic University of Turin, DICI University of Pisa
- Funding: k€ 301 (University of Pisa k€ 42)
- EU Erasmus+ Programme, Strategic Partnership Key Action KA2 - Cooperation for innovation and the exchange of good practices, Action Type KA203 - Strategic Partnerships for higher education, Call 2019, Round 1
- Duration: 40 months
- Contract No. 2019-1-SE01-KA203-060572

INDUSTRIAL RESEARCH PROJECTS

May 2024 - February 2025

Semar srl Project, Badia al Pino (AR), Italy

Research and development of a flexible HW/SW system based on a high-precision robotic arm for assembly, machining and welding of small components guided by artificial vision.

- Role: Ph.D researcher and 3-months stage (stage formative project)
- Funding: k€ 40 (materials, machinery and equipment)
- Duration: 24 months

September 2022 - August 2025

SVI Spa Project, Lucignano (AR), Italy

Research: development of an HW/SW system based on an autonomous robotic inspection arm guided by machine vision for railway infrastructures.

- Role: Ph.D researcher
- Funding: k€ 98
- Duration: 18 months

February 2022 - July 2022

Cumdi srl Project, Germignaga (VA), Italy

Research and development of a low-impact recycling method for tungsten carbide grinding chips

- Role: Ph.D researcher
- Funding: k€ 54
- Duration: 6 months

WORKING EXPERIENCE

November 2020-August 2021

Consortium QUINN, Piazza Carrara, Pisa

University Consortium in Engineering for Quality and Innovation (QUINN) is a non-profit making consortium recognized by the Italian Ministry of Education, University and Research. Among several activities, below the two most significant leaded projects:

- Smart Data Dashboard (SDD) software development (Nov 2020-Aug 2021).
- University of Pisa Centers and Systems processes mapping and optimization (Gen 2021-Aug 2021).

September 2020-January 2021

Agenzia PER-corso, Via del Brennero, Lucca

Selected by Regione Toscana as Junior teacher for yacht designers in the fully financed by POR FSE TOSCANA 2014-2020 "TENDER" program:

- The 45 hours course entitled "3D modeling and Rendering" offered theoretical as well as practical skills on industrial drawing theory, standards, yacht design using Rhinoceros software (9 students).
- The course has been carried out through hybrid learning approach due to the COVID-19 restrictions (hybrid education: distance and in presence).
- Supervisor for a final project on 39-feet yacht 3D-2D design.

PERSONAL SKILLS

Mother tongue(s): Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	B2/C1	C1

English C1 certificate. English for Research Publication and Presentation Purposes PhD course 2022

English B2 certificate. LanguageCert Level 1 Certificate in ESOL International (Listening, Reading, Writing) (Communicator B2) 603/1961/6 2021

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Data analysis: Rule-based and Machine Learning-based supervised and unsupervised learning techniques focused on function fitting, classification, dimensionality reduction, clustering, and time series analysis. Notions about optimization problems with some experiences in heuristic techniques (e.g., genetic algorithms).

Data driven decision-making strategies: Highly skilled on company's metrics monitoring systems and decision-making processes. Fields of study: quality and HSE systems management, planning and control, integrated logistics and business organization.

Software (proficient in the use of)

- 3D/2D CAD modeling software:
  - AutoDesk packages: AutoCAD Mechanical, Inventor Pro and Fusion;
  - Dassault packages: Solidworks;
  - McNeel: Rhinoceros;
- Meshing software: MeshLab;
- Rendering: V-Ray; Rhino;
- Photogrammetry: Agisoft Photoscan PRO, Autodesk ReCap Photo; Meshroom;
- Casting and solidification simulation software: Click2Cast; Inspire Cast;
- Statistical software: R, Python, Matlab;
- Programming languages: Python;
- Windows operating systems and office 365 packages.
- Cloud collaborative software: OneDrive, Gdrive, Miro, LucidChart, Overleaf

PUBLICATIONS

Full list of publications and bibliometric indicators:
- https://scholar.google.com/citations?hl=pt-PT&user=BNRQHVYAAAAJ&view_op=list_works&sortby=pubdate
- https://www.researchgate.net/profile/Francesco-Lupi-2

- **Lupi, F.,** Maffei, A., & Lanzetta, M. (2024). CAD-based autonomous vision inspection systems. Procedia Computer Science **2024**, 232, 2127-2136. https://doi.org/10.1016/j.procs.2024.02.033

- **Lupi, F.,** Biancalana, M., Rossi, A., & Lanzetta, M. (2023). A framework for flexible and reconfigurable vision inspection systems. The International Journal of Advanced Manufacturing Technology **2023**, 1-27. https://doi.org/10.1007/s00170-023-12175-6

- **Lupi, F.,** Pacini, A., Lanzetta, M. Laser powder bed additive manufacturing: A review on the four drivers for an online control. Journal of Manufacturing Processes **2023**, 103, 413-429. https://doi.org/10.1016/j.jmapro.2023.08.022

- **Lupi, F.**, Mabkhot, M. M., Boffa, E., Ferreira, P., Antonelli, D., Maffei, A., Lohse, N., Lanzetta, M. Automatic definition of engineer archetypes: A text mining approach. Computers in Industry **2023**, 152, 103996. https://doi.org/10.1016/j.compind.2023.103996

- **Lupi, F.**, Cimino, M. G., Berlec, T., Galatolo, F. A., Corn, M., Rožman, N., Rossi, A. Lanzetta, M. Blockchain-based shared additive manufacturing. Computers & Industrial Engineering **2023**, 183, 109497. https://doi.org/10.1016/j.cie.2023.109497

- Pacini, A.; **Lupi, F**.; Rossi, A.; Seggiani, M.; Lanzetta, M. Direct Recycling of WC-Co Grinding Chip. Materials **2023**, 16, 1347. https://doi.org/10.3390/ma16041347

- Maffei, A., Boffa, E., **Lupi, F**., & Lanzetta, M. "On the Design of Constructively Aligned Educational Unit". Education Sciences, **2022**,12(7), 438. https://dx.doi.org/10.3390/educsci12070438

- **Lupi F.**; M. Mabkhot, M.; Finžgar, M.; Minetola P.; Stadnicka D.; Maffei, A.; Litwin P.; Boffa, E.; Ferreira, P.; Podržaj P.; Chelli R.; Lohse N.; Lanzetta M. "Toward a sustainable educational engineer archetype through Industry 4.0" Computers in Industry, Volume 134, **2022**,103543, ISSN 0166-3615, https://doi.org/10.1016/j.compind.2021.103543

- **Lupi, F.**, Rowley, S. J., Chyba, M., & Lanzetta, M. "Reconstruction of tubular structures from 2.5 D point clouds: A mesophotic gorgonian coral case study". ANZIAM Journal, **2022**, 63, C1-C14, ISSN 1445-8810. https://doi.org/10.21914/anziamj.v63.17151

- **Lupi, F.**, & Lanzetta, M. "A novel approach for cooperative scientific literature search and socialization". Communications in Computer and Information Science (pp. 31-45), **2022** Springer, Cham. https://dx.doi.org/10.1007/978-3-030-96060-5_3

- Boffa, E., **Lupi, F.**, Lanzetta, M., & Maffei, A. "The Digitalization of Engineering Curricula: Defining the Categories that Preserve Constructive Alignment". Communications in Computer and Information Science (pp. 333-346), **2022** Springer, Cham. https://dx.doi.org/10.1007/978-3-030-96060-5_24

- Gastasini, E.; Capecci, N.; **Lupi, F.**; Gagliardi, A.; Saponara, S.; Lanzetta, M. "An Instrument for the Characterization and Calibration of Optical Sensors". Sensors **2021**, 21, 5141. https://doi.org/10.3390/s21155141

- Chiera, M.; **Lupi, F.**; Rossi, A.; Lanzetta, M. "Lean Maturity Assessment in ETO Scenario". Appl. Sci. **2021**, 11, 3833. https://doi.org/10.3390/app11093833

- M. Mabkhot, M.; Ferreira, P.; Maffei, A.; Podržaj, P.; M ˛adziel, M.; Antonelli, D.; Lanzetta, M.; Barata, J.; Boffa, E.; Finžgar, M.; **Lupi F.** et al. "Mapping Industry 4.0 Enabling Technologies into United Nations Sustainability Development Goals". Sustainability **2021**, 13, 2560. https://doi.org/10.3390/su13052560

- **Lupi F.**; Dini A.; Pacini M.; Arrighini T.; Debbi N.; Ofria T.; Bindi A.; and Lanzetta M. "Cooperative scientific literature search and socialization through virtual teams" for 3rd International Workshop on Higher Education Learning Methodologies and Technologies Online (HELMeTO) **2021**.

- Boffa E.; **Lupi F.**; Lanzetta M.; and Maffei A. "The digital transformation of Engineering curricula: the categories that preserve Constructive Alignment" for 3rd International Workshop on Higher Education Learning Methodologies and Technologies Online (HELMeTO) **2021**.

- **Lupi F.** “Francesco Gaini, come essere leader alla Computer Gross”, in the book "Stories of Leadership", Pages 143-155, 451, 458, Pisa University press, ISBN 978-88-8250-215-7. December **2017**

- **Lupi F.**; Allen D.; Partenza S.; Natali S. "Casting simulation with CAE Software", in "Il progettista industriale" magazine, Pages 54-59. October **2017**

CONFERENCES

- Speaker at International Conference on Industry 4.0 and Smart Manufacturing, Iscte - University Institute of Lisbon, Portugal (ISM 2023). Best student paper award winning. Francesco Lupi, Antonio Maffei, and Michele Lanzetta. CAD-based Autonomous Vision Inspection Systems. PDF presentation. 24 Nov 2023

- Speaker at 4th International Workshop on Higher Education Learning Methodologies and Technologies Online, Palermo, Italy (HELMeTO 2022). Francesco Lupi, Mohammed M. Mabkhot, Pedro Ferreira, Niels Lohse, Dario Antonelli and Michele Lanzetta. An Archetype for Engineering Education Towards Industry 4.0 Enabled Sustainability. PDF presentation. 23 Sept 2022

- Speaker at Engineering Mathematics and Applications Conference (EMAC 2021). Lupi F.; Rowley J., S.; Chyba M.; Lanzetta M. Reconstruction of 3D models from 2.5D point clouds: A mesophotic gorgonian coral case study. PDF presentation. 30 Nov 2021

- Speaker at 3rd International Workshop on Higher Education Learning Methodologies and Technologies Online (HELMeTO 2021). Boffa E., Lupi F., Lanzetta M. and Maffei A. The digital transformation of Engineering curricula: the categories that preserve Constructive Alignment. PDF presentation. (10 Sept 2021)

- Guested at the 11th Conference Lean Learning Academy Multiplier Event of MAESTRO Project, RZESZOW UNIVERSITY OF TECHNOLOGY. Definition of new competences in the domain of Industry 4.0 for different engineering profiles – Francesco Lupi, University of Pisa, Italy, presenting by Paweł Litwin, Rzeszow University of Technology, Rzeszow, Poland. PDF presentation. (12 June 2021)

MASTER THESIS CO-SUPERVISION

2023

- University of Pisa, Department of Information Engineering, Master Thesis in ARTIFICIAL INTELLIGENCE AND DATA ENGINEERING, Title: Stigmergic Miner: A novel temporal mining approach based on computational stigmergy; Author: Hudema Francesco; Supervisors: Prof. Cimino Mario Giovanni Cosimo Antonio, Dott. Lupi, Francesco, Ing. Alfeo, Antonio Luca.

SEMINAR AND LECTURES

- Lectures for the UniPi course Optimization of Manufacturing processes to second-year MEng students at the invitation of Prof. Michele Lanzetta. Lecture artificial vision systems for defect detection, Introduction to rule-based image anlysis, colour processing, morphological analysis with Python. Register.(2022-23).

- Lectures for the UniPi course of Manufacturing processes at the invitation of Prof. Michele Lanzetta. Introduction to InspireCast for filling and solidification in casting process. Additional contribution is offered on lesson learned in the development of the manufacturing process project. Info here. Register1, Register2 and Video (2021-22)

- Lectures for the UniPi course of Manufacturing processes at the invitation of Prof. Michele Lanzetta. Introduction to Solidworks, Fusion and others for simple product 3D modelling. Register1, Register2 and Video (2021-22)

- Lectures for the UniPi course Optimization of Manufacturing processes to second-year MEng students at the invitation of Prof. Michele Lanzetta. Lecture on vision systems, image analysis, cloud points and 3D meshes by Python Colaboratory and MatLab.(2019-22)
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- Guested speaker for PCTO photogrammetry project 2 hours introduction at I.I.S. "L. da Vinci – Fascetti" organized by Ivan Venuti. Hints and guidelines for the use of Meshroom. PDF presentation (5 July 2021)
-
- Guested speaker at the process mapping and collaborative tools lecture carried out by Prof. Michele Lanzetta for the UniPi 2nd level master in Valorization of diverse ability and inclusive education directed by Prof. Michele Lanzetta (21 May 2021)
-
- Guested speaker at the "Progetto Live! CAFRE Inaugurazione Laboratorio Ingegneria Istituti Tecnici di Tecnologie Meccaniche" laboratorio Live! Tecnologie Manufatturiere in convenzione con Istituti tecnici da Pisa, Pontedera, Arezzo, con circa 200 partecipanti (4 May 2021)
- Guested speaker at the "Process mapping" lecture carried out by Ilaria Campana and Prof.Franco Failli for the UniPI 1st level master in Industry 4.0 Design directed by Prof. Gualtiero Fantoni (April 2021)

BEng and MEng PROJECTS

- Manufacturing processes: 3D modeling, casting simulation, machining-tools and cost estimation of 50cc engine component in collaboration with Piaggio Group. (Software: Fusion360 and Click2Cast).
- Management systems: Organization control system based on ISO 9001:2015 Quality management systems, ISO 9004:2018 Quality of an organization-Guidance to achieve sustained success, ISO 19011:2018 Guidelines for auditing management system and ISO 31000:2018 Risk management. (software: Excel, Visio and AutoCAD).
- Advanced Statistics: Multivariate regression technique for middle-size car emission. Time series analysis techniques for Hugh L. Carey Tunnel traffic prediction. (software: R).
- Intelligent systems: Automated recognition of different color shades in a company producing paints. (Software: MATLAB, neural networks, and fuzzy systems packages).
- Marketing: PCA and FA techniques for dimensionality reduction, clustering analysis for customer segmentations, conjoint analysis for product version selection and clusters validation in bicycle helmets market. (Software: R and SPSS).

PART TIME JOBS

June 2020 – September 2020	Tutoring: Math and Science private tutoring
September 2018-March 2020	"Agriturismo La Burra" Restaurant, Via Orbignanese, Vinci (FI) Dishwasher
July 2014- September 2016	"Quelli dei libri srl" Bookshop, Via Salvagnoli, Empoli (FI) Inventory manager

REFERENCES

Prof. Ing. Michele Lanzetta
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Vicechair of MEng and BEng Industrial and Management undergraduate and graduate program and member of the mechanical and engineering programs, University of Pisa
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