PERSONAL INFORMATIONS   Giuseppina Monteverde

EDUCATION

September 2024 - Actual

Percorso universitario abilitante per la scuola secondaria di secondo grado

Sapienza, University of Rome (Rome, IT)

▪ *Curriculum*: 60 CFU "A026 - Matematica"
▪ *High School Internship*: Liceo Scientifico Statale "CAVOUR"

April 2021 - March 2024

PhD in Mathematical Models for Engineering, Electromagnetics and Nanosciences

Sapienza, University of Rome (Rome, IT)

▪ *Curriculum*: Mathematical Models for Engineering
▪ *Thesis*: Transform-based signal representations for efficient AI-based hyperspectral imaging (MAT/08)
▪ *Project*: HYPERspectral imaging through Artificial intelligence for Building Control (HYPER ABC)
▪ *Thesis Supervisor*: prof. Vittoria Bruni

The PhD project aims to the study and development of innovative methodologies based on Artificial Intelligence, in Matlab and Python, for the control of vertical wall structures through the processing of hyperspectral images. In particular, the thesis concentrates on formulating transform-based signal representations to enable efficient AI-based classification of multiresolution multispectral and hyperspectral images.

June 2022

Advanced School in Artificial Intelligence (ASAI)

University of Ferrara (Ferrara, IT)

80 hours of lectures - 16 CFU
Further information is provided at: https://asai.unife.it

October 2018 - July 2020

MSc in Management Engineering

Sapienza, University of Rome (Rome, IT)

▪ *Final Mark*: 110/110 cum Laude with mention of excellence
▪ *Curriculum*: Optimization models and algorithms to support strategic and operational decision making
▪ *Thesis:* Defects detection and classification of PCB using image processing operations and machine learning

Development of an automatic defect detection and classification model in Python on printed circuit boards. Image processing and subtraction operations are applied for defect detection. Then, machine learning methods that use pre-trained convolutional neural networks are applied for the classification of defects.

March 2020 - July 2020

Honours Program

Sapienza, University of Rome (Rome, IT)

Honours Program provided by the University to the ten most deserving students of the faculty.

September 2017- February 2018

Erasmus +, Escuela de Ingenierías Industriales

Universidad de Málaga (Málaga, ES)

| October 2015 - July 2018 | **BSc in Management Engineering** |
| | Sapienza, University of Rome (Rome, IT) |

- *Final Mark:* 110/110 cum Laude
- *Thesis*: Operations Research Laboratory: realization of an optimization model in Ampl language

| September 2010 - July 2015 | **Scientific High School** |
| | I.I.S.S. Francesco de Sanctis (Caposele, IT) |

- *Final Mark:* 100/100

OTHER RELEVANT EDUCATIONAL EXPERIENCES

| September 2023 | **Machine Learning and Artificial Intelligence Methods Summer School** |
| | University of Trento (Trento, TN) |

- 32 hours of lectures - 4 CFU
- Further information is provided at: *https://edu.eledia.org/courses/phd-school-2023-machine-learning/*

| Jan 2023- Apr 2023 | **Course "Motion Picture Engineering"** |
| | Trinity College Dublin (Dublin, IE) |

- MPhil in Music and Media Technology
- Provided by Prof. Anil Kokaram

| Nov 2022 - Dec 2022 | **Course "Introduzione alla trasformata wavelet e sue applicazioni"** |
| | Sapienza, University of Rome (Rome, IT) |

- 1 CFU - MAT/08

| July 2022 | **International Computer Vision Summer School (ICVSS 2022)** |
| | University of Catania (Catania, IT) |

- Further information is provided at: *https://iplab.dmi.unict.it/icvss2022/*

| Feb 2022 - June 2022 | **Course "Deep Learning and Applied Artificial Intelligence"** |
| | Sapienza, University of Rome (Rome, IT) |

- MSc in Computer Science
- 6 CFU - INF/01

| Oct 2021- Dec 2021 | **Course "Metodi Numerici per l'Ingegneria Biomedica"** |
| | Sapienza, University of Rome (Rome, IT) |

- MSc in Biomedical Engineering
- 6 CFU - MAT/08

| July 2021 | **Mathematical Methods in Data Science Summer School - MMDS 2021** |
| | University of Bari "Aldo Moro" (Bari, IT) |

- 40 hours of lectures - 6 CFU
- Further information is provided at*: https://alumnimathematica.org/summer-school-in-data-science/*

May 2021 - June 2021	**"Data Sciences: an algorithmic approach" Summer School**

University of Campania "Luigi Vanvitelli" (Naples, IT)

▪ 16 hours of lectures - 4 CFU
▪ Further information is provided at: *https://www.matfis.unicampania.it/dipartimento/convegni-seminari-appuntamenti/113*

16 November 2020	**License to practice as Information Engineer, section A**

Sapienza, University of Rome (Rome, IT)

October 2020 - December 2020	**Course "The road to Project Management"**

PMI Central Italy Chapter (Rome, IT)

▪ 24 hours of lectures

RELEVANT WORK & RESEARCH EXPERIENCE	

16 September 2024- Actual	**PostDoctoral Researcher- AR-B prot. n. 1732 - 17/06/24**

Sapienza, University of Rome (Rome, IT)

▪ *Project Title*: "Sviluppo di metodi computazionali e algoritmi per l'elaborazione di segnali multidimensionali"
▪ *Scientific coordinator*: Vittoria Bruni

14 June 2024 - 8 July 2024	**Research contract - Bando ICE 11/2024, prot. n. 1216 - 07/05/24**

Sapienza, University of Rome (Rome, IT)

▪ *Project Title*: "Valutazione metodologica e sperimentale di algoritmi, sviluppati in ambiente Matlab, per l'individuazione di elementi di interesse in segnali a più dimensioni"
▪ *Scientific coordinator*: Vittoria Bruni

Jan 2023 - Feb 2023	**Visiting research student**

Trinity College Dublin (Dublin, IE)

▪ Visiting research period at Electronic and Electrical Engineering Department, Trinity College Dublin.

April 2021 - March 2024	**Scientific research collaborator**

Superelectric S.r.l. (Rome, IT)

Collaboration with the company Superelectric S.r.l. as a PhD student for the "HYPERspectral imaging through Artificial intelligence for Building Control" project, which is placed in the context of the development of high-resolution monitoring systems of cultural heritage by the use of hyperspectral and multispectral drones and sensors.

November 2020 - April 2021	**Stage Customer Care Analyst intern**

Enel X (Rome, IT)

With the main purpose of improving the customer experience, I have worked on identifying process improvements to optimize operational performance, while aiming for innovation and digitalization.

February 2019 - July 2020	**Library assistant**

Sapienza, University of Rome (Rome, IT)

RESEARCH INTERESTS

My research interests span over the following topics:
- mathematical processing of multidimensional data, in particular, hyperspectral images; radiometric calibration and atmospheric correction;
- representation of data complexity and dimensionality reduction, using multiscale representations such as wavelet scattering;
- Artificial Intelligence methodologies, in particular Deep Learning with Convolutional Neural Networks;
- methodologies and algorithms in Matlab and Python for computer-aided monitoring: cultural heritage, defense and security, forensics, and environment.

IMPLEMENTATION PROJECTS

- *Continuous Optimization field*: Newton's method for local optimization (Python); Filled Function method for global optimization (Python)
- *Artificial Intelligence field*: Multilayer Perceptron (MPL) and Radial Basis Functions (RBF) for regression problems (Python); Support Vector Machine (SVM) and Convolutional Neural Network (CNN) models for regression and classification problems (Python and Matlab); object detection models (Python)
- *Image processing field*: algorithm for radiometric calibration of multispectral and hyperspectral images (Python); algorithm for registration of different resolution images (Matlab)

PUBLICATIONS

Abstracts in International Conferences

- V. Bruni, G. Monteverde, D. Vitulano, "Sustainability-focused AI solutions and data-driven methods for dimensionality reduction of hyperspectral images", in MATCHES 2024 (2nd Workshop on MAThematical CHallenges to and from new technologiES) Book of Abstracts (Session: Posters), Rome, Italy, Sept. 2024.

- V. Bruni, S. Marconi, G. Monteverde, D. Vitulano, "Contrast-based Image Enhancement for Source Camera Identification", in IMACS Series in Computational and Applied Mathematics, vol. 23, (Session: Modeling Human Perception of Visual Information), Rome, Italy, Sept. 2023.

International Journals

- V. Bruni, S. Marconi, G. Monteverde, D. Vitulano, "Radon transform of image monotonic rearrangements as feature for noise sensor signature", Journal of Computational and Applied Mathematics, Elsevier, vol. 457, 2023.

International Conferences

- V. Bruni, G. Monteverde, D. Vitulano, "3D CNN filters size setting inspired by Heisenberg principle for hyperspectral data classification", submitted to IEEE International Workshop on Machine Learning for Signal Processing, London, UK, Sept. 22–25, 2024.

- V. Bruni, G. Maiello, G. Monteverde, A. Paglialunga, D. Vitulano, "A wavelet-based band selection method for hyperspectral image classification", in Proceedings of Workshop on Hyperspectral Image and Signal Processing: Evolutions in Remote Sensing (WHISPERS), Athens, Greece, Nov. 2023.

- V. Bruni, G. Monteverde, D. Vitulano, "An entropy-based speed up for hyperspectral data classification via CNN", in Proceedings of Workshop on Hyperspectral Image and Signal Processing: Evolutions in Remote Sensing (WHISPERS), Rome, Italy, Sept. 2022.

Posters in International Conferences

- V. Bruni, G. Monteverde, D. Vitulano, "Sustainability-focused AI solutions and data-driven methods for dimensionality reduction of hyperspectral images", in "2nd Workshop on MAThematical CHallenges to and from new technologiES" (MATCHES), Rome, Italy, 2024.

- V. Bruni, G. Monteverde, D. Vitulano, "Data-driven non-linear approximation methods for dimensionality reduction of hyperspectral images", in "Calcolo scientifico e modelli matematici: alla ricerca delle cose nascoste attraverso le cose manifeste" (CSMM), Naples, Italy, Jan. 2024.

- G. Monteverde, "Deep learning and machine learning for hyperspectral imaging", in "Workshop on MAThematical CHallenges to and from new technologiES" (MATCHES), Rome, Italy, 2022.

- G. Monteverde, "Deep learning for hyperspectral imaging", in "International Computer Vision Summer School" (ICVSS), Sicily, Italy, 2022.

PARTICIPATION IN CONFERENCES

2024 MATCHES 2024

Poster presentation "Sustainability-focused AI solutions and data-driven methods for dimensionality reduction of hyperspectral images" at 2nd Workshop on MAThematical CHallenges to and from new technologiES.

2024 CSMM 2024

Abstract and poster presentation "Data-driven non-linear approximation methods for dimensionality reduction of hyperspectral images" at "Calcolo scientifico e modelli matematici: alla ricerca delle cose nascoste attraverso le cose manifeste".

2023 WHISPERS 2023

Paper and poster presentation "A wavelet-based band selection method for hyperspectral image classification" at IEEE GRSS Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing.

2022 Dia Nacional de Espaço- Embassy of Italy and Brazil

Talk "Un approccio entropico per un incremento delle performance di reti neurali profonde nella classificazione di immagini satellitari" at "Desenvolvimento de parcerias entre Itália e o Brasil no seitor espacial: a analise das imagens satellitares, a teoria e a prática".

2022 WHISPERS 2022

Paper presentation "An entropy-based speed up for hyperspectral data classification via CNN" at IEEE GRSS Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing.

2022 MATCHES 2022

Poster presentation "Deep Learning and Machine Learning for hyperspectral imaging" at 1st Workshop on MAThematical CHallenges to and from new technologiES.

2022 ICVSS 2022

Poster presentation "Deep learning for hyperspectral imaging" at "International Computer Vision Summer School".

PARTICIPATION IN RESEARCH
PROJECTS AND CONTRACTS

2023 Research project

- *Project Title*: "Advanced Numerical-Statistical Methods for Disease Classification Using Raman Spectra"
- *Funding Program*: Sapienza Research Funding Program
- *Scientific coordinator:* Francesca Pitolli
- *Role*: Participant

2023 Research project

- *Project Title*: "IMAGO– Imaging Multispettrale per l'Arte, Gamification e realtà Aumentata"
- *Funding Program*: Regione Lazio - MUR (APQ6 – DTC – Centro di Eccellenza prot. n. 305-2020-35551 del 20/05/2020 CUP F85F21001090003)
- *Scientific coordinator:* Anna Candida Felici
- *Role*: Participant

2022 Research project

- *Project Title*: "Metodologie di elaborazione di immagini iperspettrali basate su reti neurali convoluzionali per il monitoraggio di strutture murarie"
- *Funding Program*: Sapienza Research Funding Program
- *Role*: Scientific coordinator

2021 Research project

- *Project Title*: "Wavelets, frames e basi multiscala. Nuove costruzioni, sviluppi e applicazioni nell'analisi numerica, nella probabilità e nella statistica"
- *Funding Program*: Sapienza Research Funding Program
- *Scientific coordinator:* Claudio Durastanti
- *Role*: Participant

2021 Research contract

- *Topic:* Sensor Model-based image registration: a feasibility study
- *Funding Program*: "Provision of Consultancy Services for Exploiting Motion Imagery Content" SATCEN-NP-16/21
- *Contract holder*: Superelectric Srl
- *Scientific coordinator:* Vittoria Bruni
- *Role*: Participant

2020 Research contract

- *Topic:* 2D/3D registration of multispectral images
- *Project Title*: "IPER3D- Procedure e sistemi per rilievi Iperspettrali 3D di Beni Culturali"
- *Funding Program*: POR FESR 2014-2020 Beni Culturali e Turismo, Regione Lazio Project
- *Contract holder*: IAC/CNR
- *Scientific coordinator:* Vittoria Bruni
- *Role*: Participant

REVIEWER AND EDITORIAL
ACTIVITY

Member of the Organizing Committee of the following International Conferences

- **MATCHES 2024**: 2nd Workshop on MAThematical CHallenges to and from new technologiES

Session technical manager for the following International Conferences

▪ **WHISPERS 2022**: IEEE GRSS Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing
▪ **MATCHES 2022**: 1st Workshop on MAThematical CHallenges to and from new technologiES

2022 - Present   ### Reviewer for the following International Journals

▪ **IET**: IET Image Processing
▪ **IEEE**: Transactions on Image Processing
▪ **Springer**: Pattern Analysis and Applications, Journal of Ambient Intelligence and Humanized Computing, Multimedia Tools and Applications, Image and Vision Computing
▪ **Elsevier**: Image and Vision Computing

TEACHING EXPERIENCE

2023 - 2024   ### Tutoring the course of "Analisi e Calcolo Numerico"- Codice BT-B2 1/2024 Prot. 899

Sapienza, University of Rome (Rome, IT)

▪ Course of study in Energy Engineering, faculty of Civil and Industrial Engineering
▪ Activity: Tutoring students in utilizing Matlab as a programming tool for implementing Numerical Methods

2022 - 2023   ### Tutoring the course of "Analisi e Calcolo Numerico"- Codice BT-B2 9/2023 Prot. 1016

Sapienza, University of Rome (Rome, IT)

▪ Course of study in Energy Engineering, faculty of Civil and Industrial Engineering
▪ Activity: Tutoring students in utilizing Matlab as a programming tool for implementing Numerical Methods

18 April 2023   ### Tutoring the "Laboratorio Multidisciplinare di Scienze Applicate"

Sapienza, University of Rome (Rome, IT)

▪ PCTO Project 88487 - Percorsi per le Competenze Trasversali e l'Orientamento

2022-2023   ### Tutoring the course of "Metodi Numerici con Elementi di Programmazione" - Codice BT-B2 5/2022 Prot. 4229

Sapienza, University of Rome (Rome, IT)

▪ Course of study in Aerospace Engineering, faculty of Civil and Industrial Engineering
▪ Activity: Tutoring students in utilizing Matlab as a programming tool for implementing Numerical Methods

12 April 2022   ### Tutoring the "Laboratorio Multidisciplinare di Scienze Applicate"

Sapienza, University of Rome (Rome, IT)

▪ PCTO Project 63740 - Percorsi per le Competenze Trasversali e l'Orientamento

2021 - 2022   ### Tutoring the course of "Analisi e Calcolo Numerico"- Codice ICE 39/2021 Prot. 287

Sapienza, University of Rome (Rome, IT)

▪ Course of study in Energy Engineering, faculty of Civil and Industrial Engineering
▪ Activity: Tutoring students in utilizing Matlab as a programming tool for implementing Numerical Methods

GRANTS & AWARDS

- Research grant "Fondi per avvio alla ricerca" funded by Sapienza, University of Rome (*2022*)
- Full scholarship provided by University of Ferrara to attend to Advanced School in Artificial Intelligence (*June 2022*)
- Full scholarship provided by Sapienza, University of Rome to attend the Honours Program (*March 2019*)

SKILLS & PERSONAL INTERESTS

Languages

Italian (native speaker), English (C1), Spanish (C1), French (A2)

Technical skills

Python, Matlab, SQL, Weka, AMPL, MiniZinc, Nuke, GitHub, Power BI, MS Office (Word, Excel, Power Point, Access)

Communication and interpersonal skills

Problem solving, team working, proactivity, team leadership

Personal interests

Strategic and logic games, travelling

Driving licence

B

PRIVACY

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

La sottoscritta dichiara di essere consapevole che il presente *curriculum vitae* sarà pubblicato sul sito istituzionale dell'Ateneo, nella Sezione "Amministrazione trasparente", nelle modalità e per la durata prevista dal d.lgs. n. 33/2013, art. 15.

Data 16/10/2024   f.to Giuseppina Monteverde