Alessandro Masullo
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https://www.alessandromasullo.com

Alessandro Masullo

I'm currently working as a lecturer at the University of Bristol, UK. My research and experience cover: Computer Vision, Machine Learning, Multi-sensory Fusion, Algorithms, Signal Processing and Digital Health.

EMPLOYMENT

06/2021 – Present **Lecturer at University of Bristol**
School of Engineering Mathematics and Technology, University of Bristol, Bristol

- → Managing and mentoring postdoctoral researchers to develop novel Computer Vision and Deep Learning algorithms;
- → Teaching two MSc-level units in Digital Health, catering to a diverse audience of students with varying background: highly technical individuals from computer science/engineering and medical students/nurses. Effectively simplifying complex concepts to ensure understanding and engagement;
- → Supervising and mentoring PhD and MSc students in Computer Science, Engineering and Digital Health;
- → Working in multidisciplinary teams to lead workshops with internal and external partners, managing research projects and developing new ideas;
- → Leading the admission process for the MSc in Digital Health, conducting interviews, assessing candidates and planning market strategies to enhance the program.

Skills: Computer Vision, Machine Learning, Digital Health, People Management, Plain Language Communication.

08/2017 – 06/2021 **Research Associate, SPHERE**
Department of Computer Science, University of Bristol, Bristol

- → Developing and deploying a fully autonomous multi-sensory platform for health monitoring in home environment;
- → Investigating Computer Vision algorithms for the analysis of human motion and behaviour for health monitoring;
- → Extensively employing Deep Learning and Pattern Recognition techniques to estimate medically relevant measurements from video and inertial data;
- → Designing and developing a novel annotation tool for video monitoring (*MuViLab*, publicly available on GitHub). Currently starred 159 times and forked 35 times on GitHub.

Skills: Computer Vision, Deep Learning, Pattern Recognition, Signal Processing, Multidisciplinary Teamwork

09/2014 – 08/2017 **Teaching Assistant**
Department of Aerospace Engineering, University of Bristol, Bristol

- → Demonstrating laboratories, theoretical classes, marking reports, helping students with coding assignments;
- → Improving my communication skills and ability to exemplify complex concepts;
- → Solve problems under pressure in a quick and efficient manner.

Modules taught: Computer programming (C, Matlab), Aerospace labs (Fluid Dynamics, Aerodynamics, PIV), Mechanics labs (Engines, Thermodynamics)

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11/2014 – 05/2017 **Individual Explanatory Project (IXP) mentor**
Department of Aerospace Engineering, University of Bristol, Bristol

→ Guiding students during their final year projects, helping them to develop plans and research strategies.
→ Improving my ability to creatively solve problems and communicate with individuals and groups.

08/2014 – 09/2015 **Research Assistant**
Department of Aerospace Engineering, University of Bristol, Bristol

→ EPSRC-funded project within University of Bristol's Fluid and Aerodynamics Research group to develop CFD meshing techniques applied to experimental image-based measurement algorithms.
→ Enabling me to do research autonomously, presenting and comparing results in a clear and detailed way.

TEACHING

06/2021 – Present **Sensing Technologies for Diagnostics and Monitoring (EENGM0031)**
University of Bristol, Bristol

→ Topics covered: Sensor system development, Machine Learning, Multisensory fusion, Wireless medium, Data reliability.
→ Responsibilities: Creating the lectures material, directing the unit, engaging with students, marking/exams.

06/2021 – Present **Digital Health Project (EENGM0035)**
University of Bristol, Bristol

→ Topics covered: Product development, Quantitative Data Analysis, Regulatory submission, Post market management.
→ Responsibilities: Creating the lectures material, supervising and mentoring students, engaging with industry partners, marking/exams.

02/2015 – 02/2017 **Experiments Fluids 1-2 Lab (AENG11101)**
University of Bristol, Bristol

→ Introduction to Fluid Dynamics.
→ Introduction to drag, lift and pressure measurements.

02/2016 – 02/2017 **Combustion Engine Lab (MENG11202)**
University of Bristol, Bristol

→ Working principles of combustion engines.
→ Measurements and evaluation of engines efficiency.

02/2016 – 02/2017 **Compressible Flow Lab (AENG21100)**
University of Bristol, Bristol

→ Working principles of a supersonic wind tunnel.
→ Basic flow visualization concepts.
→ Understanding of different types of shockwaves and their behaviour.

10/2016 – 10/2017 **Thermodynamics Lab (MENG11202)**
University of Bristol, Bristol

→ Functioning of an air cooler system.
→ Introduction to basic temperature and air flow measurements.

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09/2016 – 09/2017 **Introduction to Scientific Computing Lab (AENG11600)**
University of Bristol, Bristol

→ Introduction to C programming language.
→ Fundamentals of programming and MATLAB.

02/2016 – 02/2017 **Aeronautics and Mechanics MATLAB Lab (AENG11301)**
University of Bristol, Bristol

→ Introduction to aerodynamics.
→ Evaluation of wing performances in MATLAB.

EDUCATION

09/2014 – 08/2017 **PhD in Image Analysis / Aerospace Engineering**
(achieved with Faculty of Engineering Commendation)
University of Bristol, Bristol

Thesis: *Development of Advanced Algorithms for PIV*

→ Developing advanced image processing algorithms to estimate flow velocity through PIV (Particle Image Velocimetry).
→ Experimentally validating novel algorithms with high-speed cameras in the wind tunnel.
→ Statistically analysing and assessing measurement data.

Skills developed:

- Signal processing, image filtering, background analysis.
- Motion detection, feature tracking, optical flow.
- Data statistics, outlier detection, error analysis.

02/2012 – 06/2014 **Master's Degree in Aerospace Engineering (110 Lode/110 with Honour Mention)**
Università degli Studi di Napoli Federico II, Naples (Italy)

Final Dissertation: *"The application of CFD meshing around a rotating cylinder in PIV"*

09/2008 – 01/2012 **Bachelor's Degree in Aerospace Engineering (102/110)**
Università degli Studi di Napoli Federico II, Naples (Italy)

AWARDS

05/2018 Faculty of Engineering Commendation for PhD degree

05/2018 University Research Degree Examinations Board award (nominee)

02/2017 Alumni Foundation Conference Travel Award

CODING

→ **Python (Expert).** Used on a daily basis for Machine Learning and Deep Learning. Packages used: Keras, TensorFlow, PyTorch, OpenCV, scikit-learn, NumPy, pandas.
→ **MATLAB (Expert).** Used to quickly prototype ideas and develop algorithms when performances and platforms involved do not constitute a limitation.
→ **C/C++ (Intermediate).** Mainly used to develop low level mex functions for MATLAB when high performances constitute a limitation in the of an interpreted language.
→ **PHP/MYSQL/HTML/CSS/JS (Intermediate).** Used to develop dynamics websites for research projects and as a hobby.

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LANGUAGES

ENGLISH – Full proficiency
ITALIAN – Native
SPANISH – Basic

VOLUNTEERING

03/2017 – 01/2018 **Volunteer**
At-Bristol Science Centre (We The Curious), Bristol

→ Working with 8 to 17 year old children, helping out with delivering workshops and laboratories.
→ Allowing me to confront myself with a completely different audience and to gain new skills which are usually far from my field of research.

HOBBIES

Climbing, technology, music production, synthesisers, video editing, photography.

PUBLICATIONS

Latest Research

→ Automated Real-World Video Analysis of Sit-to-Stand Transitions Predicts Parkinson's Disease Severity
Morgan C., Masullo A., Mirmehdi M., Isotalus H., Jovan F., McConville R., Tonkin E., Whone A. & Craddock I.
August 2023, Digit Biomark.

→ Toward Enhanced Clinical Decision Support for Patients Undergoing a Hip or Knee Replacement
Grant S., Tonkin E., Craddock I., Blom A., Holmes M., Judge A., Masullo A., Perello Nieto M., Song H., Whitehouse M., Flach P. & Gooberman-Hill R.
April 2023, JMIR.

→ Personalized Energy Expenditure Estimation: Visual Sensing Approach With Deep Learning
Perrett T., Masullo A., Damen D., Burghardt T., Craddock I. & Mirmehdi M.
September 2022, JMIR.

→ Inertial Hallucinations - When Wearable Inertial Devices Start Seeing Things
Masullo A., Perrett T., Burghardt T., Damen D. & Mirmehdi M.
May 2022, arXiv.

→ Temporal-Relational CrossTransformers for few-shot action recognition
Perrett T., Masullo A., Burghardt T., Mirmehdi M. & Damen D.
June 2021, Computer Vision and Pattern Recognition 2021 (CVPR).

→ Data labelling in the wild: annotating free-living activities and Parkinson's disease symptoms
Morgan C., Heidarivincheh F., Craddock I., McConville R., Perello Nieto M., Tonkin E., Masullo A., Vafeas A., Kim M., McNaney R., Tourte G. & Whone A.
March 2021, International Conference on Pervasive Computing and Communications Workshops (PerCom Workshops).

→ No Need for a Lab: Towards Multi-sensory Fusion for Ambient Assisted Living in Real-world Living Homes
Masullo A., Perrett T., Damen D., Burghardt T. & Mirmehdi M.
February 2021, International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP)

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→ Multimodal Classification of Parkinson's Disease in Home Environments with Resiliency to Missing Modalities
Heidarivincheh F., McConville R., Morgan C., McNaney R., Masullo A., Mirmehdi M., Whone A. & Craddock A.
January 2021, MDPI Sensors.

→ Meta-Learning with Context-Agnostic Initialisations
Perrett T., Masullo A., Burghardt T., Mirmehdi M. & Damen D.
September 2020, Asian Conference on Computer Vision

→ Person Re-ID by Fusion of Video Silhouettes and Wearable Signals for Home Monitoring Applications
Masullo A., Burghardt T., Damen D., Perrett T. & Mirmehdi M.
April 2020, MDPI Sensors.

→ Who Goes There? Exploiting Silhouettes and Wearable Signals for Subject Identification in Multi-Person Environments
Masullo A., Burghardt T., Damen D., Perrett T. & Mirmehdi M.
October 2019, International Conference on Computer Vision Workshop

→ Sit-to-Stand Analysis in the Wild Using Silhouettes for Longitudinal Health Monitoring
Masullo A., Burghardt T., Perrett T., Damen D. & Mirmehdi M.
August 2019, Lecture Notes in Computer Science (ICIAR).

→ CaloriNet: From silhouettes to calorie estimation in private environments
Masullo A., Burghardt T., Damen D., Hannuna S., Ponce-López V. & Mirmehdi M.
September 2018, British Machine Vision Conference.

→ Semantically Selective Augmentation for Deep Compact Person Re-Identification
Ponce-López V., Burghardt T., Hannunna S., Damen D., Masullo A. & Mirmehdi M.
August 2018, European Conference on Computer Vision Workshops.

PhD (Particle Image Velocimetry)

→ On dealing with multiple correlation peaks in PIV
Masullo A. & Theunissen R.
May 2018, Experiments in Fluids

→ Automated mask generation for PIV image analysis based on pixel intensity statistics
Masullo A. & Theunissen R.
May 2017, Experiments in Fluids

→ On the applicability of numerical image mapping for PIV image analysis near curved interfaces
Masullo A. & Theunissen R.
Apr 2017, Measurement Science and Technology

→ POD-based Background Removal for Particle Image Velocimetry
Mendez M. A., Raiola M., Masullo A., Discetti S., Ianiro A., Theunissen R. & Buchlin J-M.
Jan 2017, Experimental Thermal and Fluid Science

→ Improvement of PIV dynamic range in the presence of velocity gradients using multiple correlation peak analysis and self-adaptive windows
Masullo A. & Theunissen R.
Jul 2016, The International Symposia on Applications of Laser Techniques to Fluid Mechanics

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→ Near-wake analysis of perforated disks with varying hole topology
Theunissen R., Worboys R. & Masullo A.
Jul 2016, The International Symposia on Applications of Laser Techniques to Fluid Mechanics

→ Adaptive vector validation in image velocimetry to minimise the influence of outlier clusters
Masullo A. & Theunissen R.
Mar 2016, Experiments in Fluids

Research Assistant (Aerospace Engineering)

→ Improvement in universal PIV outlier detection by means of coherence adaptivity
Masullo A. & Theunissen R.
Sep 2015, 11th International Symposium on Particle Image Velocimetry

→ The feasibility of using CFD meshing in PIV image processing near curvy interfaces
Masullo A. & Theunissen R.
Sep 2015, 11th International Symposium on Particle Image Velocimetry

→ Improved and robust universal PIV/PTV outlier detection in the presence of clusters
Masullo A. & Theunissen R.
Jun 2015, 10th Pacific Symposium on Flow Visualization and Image Processing