Dr Alessio Xompero

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EMPLOYMENT

Queen Mary University of London, United Kingdom

Postdoctoral Research Assistant — Apr 2020 – July 2024

Research Assistant — Oct 2019 – Mar 2020

Student lab demonstrator — Sep 2018 – Mar 2020

University of Trento, Italy

Collaborator (MMLab research group) — Apr – Sep 2015

INRIA Grenoble Rhône-Alpes, France

Intern (Perception Team) — Mar – Aug 2014

EDUCATION

Ph.D. in Electronic Engineering — Sep 2015 - Sep 2020
Queen Mary University of London, United Kingdom

Master's degree in Telecommunications Engineering (2-years programme) — Sep 2012 – Mar 2015
University of Trento, Italy

Bachelor's degree in Electronics and Telecommunication Engineering — Sep 2008 – Feb 2012
University of Trento, Italy

AWARDS

- *Outstanding reviewer,* IEEE/CVF Conf. Computer Vision and Pattern Recognition (CVPR) 2024
- *Outstanding reviewer,* IEEE Int. Conf. Acoustic, Speech, and Signal Processing (ICASSP) 2023
- *Outstanding reviewer,* IEEE Int. Conf. Acoustic, Speech, and Signal Processing (ICASSP) 2022
- *Outstanding reviewer,* IEEE Int. Conf. Image Processing (ICIP) 2020

OPEN SCIENCE ACTIVITIES

Co-organiser of international challenges and workshops

- IEEE/RAS Int. Conf. Robotics and Automation 2024 [link]
- IEEE Int. Conf. Acoustic, Speech, and Signal Processing 2022 [link]
- Intelligent Sensing Winter School 2021 [link]
- Int. Conf. Pattern Recognition 2020 [link]
- Intelligent Sensing Winter School 2020 [link]
- IEEE Int. Conf. Multimedia and Expo 2020 [link]
- Duties: task and evaluation design, website, dissemination, logistics, chair, scientific reviewer, speakers invitation

REVIEWING ACTIVITIES

- *International journals*
  IEEE Trans. Multimedia, 2021-2022; IEEE Robotics and Automation Letters, 2021; IEEE Sensors, 2020; IET Computer Vision, 2019, 2022-2023; IET Image Processing, 2019; AI Perspectives, 2018
- *International conferences*
  Computer Vision and Pattern Recognition (CVPR), 2024; European Conference on Computer Vision (ECCV), 2024; IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP), 2019-2024; IEEE Int. Conf. Image Processing (ICIP), 2019-2024; IEEE Int. Conf. Pattern Recognition (ICPR), 2021-2022; IEEE Int. Conf. Robotics and Automation (ICRA), 2024; IEEE/RSJ Int. Conf. Intelligent Robots and Systems (IROS), 2022-2023; British Machine Vision Conf. (BMVC), 2022; ACM/IEEE Int. Conf. Human-Robot Interaction (HRI), 2023

RESEARCH EXPERIENCE

Novel methods, frameworks, and algorithms

- Decentralised framework to recognise view overlaps across moving cameras, 2022 [W3], software: XView
- Multi-view shape estimation of transparent containers in 3D, 2020 [C2], software: LoDE
- Compact local features that exploit temporal and scale information to be matched between cameras independently moving in an unknown environment, 2018, 2020 [J2][C7][C8], software: MORB
- Conceptualisation, design, development, evaluation, data analysis, data visualisation
- Python, C/C++, PyTorch, OpenCV, MATLAB, ZeroMQ, Bash, Linux, Git

Collaborations

- Coordinated and managed the release of data, software, and machine/deep learning models under Open Science practices, making the project CORSMAL be the 2022 CHIST-ERA Open Science Success Story
- Led the organisation of a series of 6 local and international challenges on *human-to-robot collaborations*; leading author of two publications related to the challenges [J1][C1]
- Coordinated a team of 3 people to collaboratively design and develop a framework that benchmarks *Graph Neural Networks* for *image privacy* and breast cancer detection (private repo) and an interface to visualise the graphs; Programming skills: Python, PyTorch, PyTorch Geometric
- Coordinated the benchmarking of models for image privacy and their explainability [W1], software: IG-Privacy
- Collaborated on Adversarial Training for Image Classification, co-authored [C3]
- Collaborated on benchmarking human-to-robot handovers, co-authored [J3]:
- Co-authored a book chapter on *Visual Adversarial Attacks and Defenses* (suitable for self-learning or as a text for graduate courses) [B1], website design and management:
- Co-authored a publication on *annotating audio-visual streams* in 3D [C6]
- Collaborated on the design and implementation of *audio-visual speaker tracking* algorithms (C/C++, MATLAB) [C9]
- Co-designed and developed a probabilistic graphical model for multiple object tracking (MATLAB) [J4]

Datasets (multimodal, multi-view, audio-visual, video, image)

- CORSMAL Containers Manipulation, 2020: author, design, collection, annotation, curation
- CORSMAL Containers, 2020: author, design, collection, annotation, curation
- X-view, 2022: design, collection, reconstruction, annotation, curation
- CAV3D, 2019: collaborated on collection and annotation
- Spring Party Salesiani 2015 and Tour de France 2014 for MediaEvalSEM 2015: collection and curation
- London Olympics 2012 and Vancouver Olympics 2010 for MediaEvalSEM 2014: collection and curation

Other

- Duties: ethical application, data management plan, reporting, chair of meetings and workshops, meeting minutes, dissemination, website maintenance, presentation of the projects and achievements at annual project conference, international and local conferences/events (projects CORSMAL, GraphNEx, NCNR)
- Visitor at Idiap Research Institute, Switzerland, May 2023
- Visitor at Fondazione Bruno Kessler (Technologies of Vision team), Trento, Italy, April 2017 – June 2018
- Co-written business plan and co-prepared elevator pitch (CoNeed, 3 people) for 2013 Intel Business Challenge Europe

TEACHING AND SUPERVISION EXPERIENCE

- Delivered 2 lectures for the under- and postgraduate module *Introduction to Computer Vision* (2022, Lecturer: Prof. Andrea Cavallaro, number of students: ~30); designed new material for both lectures
  - *Deep learning models for computer vision*
  - *Interest Points (from classic methods to recent deep learning models)*
- Delivered tutorial/seminar titled *"The reviewer doesn't understand & is wrong! Transitioning into the reviewer's shoes"*
  - 2-session tutorial on the reviewing process and guidelines towards the preparation of high-quality reviews for PhD students (internal to the research group, 9 people)
  - Designed content and reviewing activity, assessed and provided personalised feedback to each student
- Lab demonstrator for under- and postgraduate module: *Introduction to Computer Vision* (Lecturer: Prof. Andrea Cavallaro), number of students: 35 (2018), 66 (2019)
  - Assisted the students, assessed and marked the coursework (report + software in MATLAB)
  - Prepared tutorial on fundamental programming for image processing and computer vision (MATLAB)
- Co-advised and collaborated with a PhD student on Affordance Segmentation [W2]
- Collaborated with a PhD student on Safe Human-to-Robot Handovers [C3]
- Co-advised MSc student/research assistant on Audio Classification [C4]
- Co-advised MSc student/research assistant on Object Pose Estimation [P1]

PUBLICATIONS

Thesis

PhD "Local features for view matching across independently moving cameras" (2020)
Primary supervisor: Prof. Andrea Cavallaro (Queen Mary University of London, U.K.)
Second supervisor: Dr. Oswald Lanz (Fondazione Bruno Kessler, Italy)

Master "ViProT: A visual probabilistic model for moving interest point clusters tracking" (2014)
Supervisors: Dr. Nicola Conci (University of Trento, Italy), Dr. Radu Horaud (INRIA Rhône-Alpes, France)
Co-advisors: Dr. Xavier Alameda-Pineda, Dr. Sileye Ba (INRIA Rhône-Alpes, France)

Book chapters

[B1] C. Oh, **A. Xompero**, A. Cavallaro, "Visual adversarial attacks and defenses", *In Advanced Methods And Deep Learning In Computer Vision, 2021*

Journal articles

[J1] **A. Xompero**, S. Donaher, V. Iashin, F. Palermo, G. Solak, C. Coppola, R. Ishikawa, Y. Nagao, R. Hachiuma, Q. Liu, F. Feng, C. Lan, R. H. M. Chan, G. Christmann, J. Song, G. Neeharika, C. K. T. Reddy, D. Jain, B. U. Rehman, A. Cavallaro, "The CORSMAL benchmark for the prediction of the properties of containers", *IEEE Access, 2022*

[J2] **A. Xompero**, O. Lanz, A. Cavallaro, "A spatio-temporal multi-scale binary descriptor", *IEEE Transactions on Image Processing, 2020*

[J3] R. Sanchez-Matilla, K. Chatzilygeroudis, A. Modas, N. Ferreira Duarte, **A. Xompero**, P. Frossard, A. Billard, A. Cavallaro, "Benchmark for Human-to-Robot Handovers of Unseen Containers with Unknown Filling", *IEEE Robotics and Automation Letters, 2020*

[J4] S. Ba, X. Alameda-Pineda, **A. Xompero**, R. Horaud, "An On-line Variational Bayesian Model for Multi-Person Tracking from Cluttered Scenes", *Computer Vision and Image Understanding, 2016*

Conference papers

[C1] **A. Xompero**, Y. L. Pang, T. Patten, A. Prabhakar, B. Calli, A. Cavallaro, "Audio-Visual Object Classification for Human-Robot Collaboration", *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP), 2022*

[C2] Y. L. Pang, **A. Xompero**, C. Oh, A. Cavallaro, "Towards safe human-to-robot handovers of unknown containers", *IEEE Int. Conf. Robot and Human Interactive Communication (RO-MAN), 2021*

[C3] A. Modas, **A. Xompero**, R. Sanchez-Matilla, P. Frossard, A. Cavallaro, "Improving filling level classification with adversarial training", *IEEE Int. Conf. Image Processing (ICIP), 2021*

[C4] S. Donaher, **A. Xompero**, A. Cavallaro, "Audio classification of the content of food containers and drinking glasses", *European Signal Processing Conf. (EUSIPCO), 2021*

[C5] **A. Xompero**, R. Sanchez-Matilla, A. Modas, P. Frossard, A. Cavallaro, "Multi-view shape estimation of transparent containers", *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP), 2020*

[C6] O. Lanz, A. Brutti, **A. Xompero**, X. Qian, M. Omologo, A. Cavallaro, "Accurate target annotation in 3D from multimodal streams", *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP), 2019*

[C7] **A. Xompero**, O. Lanz, A. Cavallaro, "MORB: a multi-scale binary descriptor", *IEEE Int. Conf. Image Processing (ICIP), 2018*

[C8] **A. Xompero**, O. Lanz, A. Cavallaro, "Multi-camera Matching of Spatio-Temporal Binary Features", *Int. Conf. Information Fusion (FUSION), 2018*

[C9] X. Qian, **A. Xompero**, A. Brutti, O. Lanz, M. Omologo, and A. Cavallaro, "3D Mouth Tracking from a Compact Microphone Array Co-located with a Camera", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018*

Conference workshop papers

[W1] **A. Xompero**, M. Bontonou, J. Arbona, E. Benetos, A. Cavallaro, "Explaining models relating objects and privacy", *The 3rd Explainable AI for Computer Vision (XAI4CV) Workshop at the IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR), 2024*

[W2] T. Apicella, **A. Xompero**, E. Ragusa, R. Berta, A. Cavallaro, P. Gastaldo, "Affordance segmentation of hand-occluded containers from exocentric images", *Int. Workshop on Assistive Computer Vision and Robotics at Int. Conf. Computer Vision (ICCV), 2023*

[W3] **A. Xompero**, A. Cavallaro, "Cross-Camera View-Overlap Recognition", *Int. Workshop on Smart Distributed Cameras at European Conf. Computer Vision (ECCV), 2022*

Pre-prints

[P1] X. Weber, **A. Xompero**, A. Cavallaro, "A Mixed-Reality Dataset for Category-level 6D Pose and Size Estimation of Hand-occluded Containers", ArXiv, Computer Science, Computer Vision and Pattern Recognition, 2023