# Alessandro **Simoni**

**PhD Student @ Department of Engineering "Enzo Ferrari"**

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## Summary

I'm a PhD student under the tutorship of Prof. Roberto Vezzani at the International Doctorate School in ICT (Unimore, Italy) with the following research topic: "Computer Vision and Artificial Intelligence for Collaborative Robotic Environments".

My main interests are in Human-centric AI and Robotics exploiting deep learning and computer vision techniques applied to the 3D world. My research skills are related to 3D pose estimation of articulated objects and 3D object reconstruction through neural rendering techniques. I am also collaborating on a project related to the 3D reconstruction of vehicles through NeRF approaches.

## Knowledge and computer skills

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|---|---|
| **Programming languages** | Python (proficiency), C++, JavaScript |
| **Libraries and Tools** | PyTorch, NumPy, OpenCV, PyCharm |
| **Domains** | Deep Learning, 2D/3D Computer Vision, 3D Human/Robot Pose Estimation, 3D Reconstruction |
| **Spoken languages** | Italian mothertongue, English C1 (certifed ESOL Cambridge) |

## Working experiences

**AImageLab - University of Modena and Reggio Emilia**  *Modena, Italy*
Research grant  *July 2023 - (July 2024)*
**Supervisor**: Prof. Roberto Vezzani
**Project**: *"AI platform with digital twins of interacting robots and people"*

**AImageLab - University of Modena and Reggio Emilia**  *Modena, Italy*
Research grant  *June 2022 - June 2023*
**Supervisor**: Prof. Roberto Vezzani
**Project**: *"Study of recent combinations of CNN and Vision Transformer architectures"*

**AImageLab - University of Modena and Reggio Emilia**  *Modena, Italy*
Research grant  *May 2020 - May 2022*
**Supervisor**: Prof. Roberto Vezzani
**Project**: *"PREVUE - Prediction of Activities and Events by Vision in an Urban Environment"*

**AImageLab - University of Modena and Reggio Emilia**  *Modena, Italy*
Student internship for master's degree thesis  *July 2019 - Feb. 2020*
**Supervisor**: Prof. Rita Cucchiara
*"Future urban scene generation: a deep learning approach for a 3D temporal vehicle reconstruction starting from monocular images"*

## Education

**University of Modena and Reggio Emilia**  *Modena, Italy*
PhD student - Curriculum "Computer engineering and science"  *Nov. 2020 - (Mar. 2024)*
**Supervisor:** Prof. Roberto Vezzani

**University of Modena and Reggio Emilia**  *Modena, Italy*
Master's degree in computer engineering  *Sep. 2017 - Feb. 2020*
- GPA: 27.806/30. Final grade: 108/110

**University of Modena and Reggio Emilia**  *Modena, Italy*
Bachelor's degree in computer engineering  *Sep. 2013 - Feb. 2017*
- GPA: 23.607/30. Final grade: 91/110

## Certifications

**First Certificate in English (FCE)**

Grade A (Score 180, C1), University of Cambridge ESOL Examinations *Dec. 2020*

**Italian State certification exam for Engineer Profession**

Association of Engineers *2021*

$4^{th}$ **Advanced Course on Data Science and Machine Learning (ACDL 2021)**

Participation certificate with final exam *July 2021*

$16^{th}$ **International Computer Vision Summer School (ICVSS 2022)**

Participation certificate with final exam *July 2022*

**ELLIS Summer School on Large-Scale AI for Research and Industry**

Participation certificate with final project (NeRF-based camera optimization) *Sept. 2023*

## Additional information

**Citizenship**  Italian, German
**Travelling**  Passport, B license, own car

## Speaker at conferences

$35^{th}$ **IEEE/RSJ International Conference on Intelligent Robots and Systems** *Kyoto, Japan*

$21^{st}$ **International Conference on Image Analysis and Processing** *Lecce, Italy*

$9^{th}$ **International Conference on 3D Vision** *Virtual, Online*

$16^{th}$ **VISIGRAPP** *Virtual, Online*

$25^{th}$ **International Conference on Pattern Recognition** *Virtual, Online*

## Journals and conferences activities

$2^{nd}$ **T-CAP 2022 Workshop at ICPR2022** *Montreal, Canada*

Technical Program Committee *21-25 Aug. 2022*

$1^{st}$ **T-CAP 2021 Workshop at ICIAP2021** *Lecce, Italy*

Technical Program Committee *23-27 Mag. 2022*

$16^{th}$ **VISIGRAPP** *Virtual, Online*

Session chair *8-10 Feb. 2021*

## Reviewing activities

**IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)**

**IEEE International Conference on Pattern Recognition (ICPR)**

**IEEE Robotics and Automation Letters (RA-L)**

**Towards a Complete Analysis of People: From Face and Body to Clothes (T-CAP)**

**International Workshop and Challenge on People Analysis (WCPA)**

## Teaching activities

**School in AI: Deep Learning, Vision and Language for Industry - first edition** *Modena, Italy*

Laboratory Lecturer - 3D Computer Vision *Feb. 2022*

**School in AI: Deep Learning, Vision and Language for Industry - second edition** *Modena, Italy*

Laboratory Lecturer - 3D Computer Vision *Sept. 2022*

# Thesis supervision

**MSc Thesis (G. Doganieri)**
*"3D Multi-Person Pose Estimation and Skeleton tracking by a single RGB camera"*                    *Feb. 2022*

# Publications

More info on Google Scholar.

### Journals

**Pattern Recognition Letters (PRL)**
A.D'Eusanio, A. Simoni, S. Pini, G. Borghi, R. Vezzani, R.Cucchiara
"Depth-based 3D human pose refinement: Evaluating the refinet framework"              *Mar. 2023*

**Computers & Graphics**
A. Caputo, A. Giacchetti, S. Soso, D. Pintani, A. D'Eusanio, S. Pini, G. Borghi, A. Simoni, R. Vezzani,
R. Cucchiara, et al.                                                                  *Oct. 2021*
"SHREC 2021: skeleton-based hand gesture recognition in the wild"

**Informatics**
A. D'Eusanio, A. Simoni, S. Pini, G. Borghi, R. Vezzani, R. Cucchiara
"Multimodal hand gesture classification for the human-car interaction"               *Aug. 2020*

### Conferences

$23^{rd}$ **International Conference on Image Analysis and Processing**              *Udine, Italy*
D. Di Nucci, A. Simoni, M. Tomei, L. Ciuffreda, R. Vezzani, R. Cucchiara
"CarPatch: A Synthetic Benchmark for Radiance Field Evaluation on Vehicle Components"  *11-15 Sept. 2023*

$35^{th}$ **International Conference on Intelligent Robots and Systems + RA-L**      *Kyoto, Japan*
A. Simoni, S. Pini, G. Borghi, R. Vezzani
"Semi-Perspective Decoupled Heatmaps for 3D Robot Pose Estimation from Depth Maps"    *23-27 Oct. 2022*

$21^{st}$ **International Conference on Image Analysis And Processing**              *Lecce, Italy*
S. Pini, G. Borghi, A. D'Eusanio, A. Simoni, R. Vezzani
"Unsupervised detection of dynamic hand gestures from leap motion data"              *23-27 Mag. 2022*

$9^{th}$ **International Conference on 3D Vision**                                    *Virtual, Online*
A. Simoni, S. Pini, R. Vezzani, R. Cucchiara
"Multi-category mesh reconstruction from image collections"                          *1-3 Dec. 2021*

$16^{th}$ **VISIGRAPP**                                                              *Virtual, Online*
A. Simoni, A. D'Eusanio, S. Pini, G. Borghi, R. Vezzani
"Improving car model classification through vehicle keypoint localization"           *8-10 Feb. 2021*

$16^{th}$ **VISIGRAPP**                                                              *Virtual, Online*
L. Bergamini, S. Pini, A. Simoni, R. Vezzani, S. Calderara, R. B. D'Eath, R. B. Fisher
"Extracting accurate long-term behavior changes from a large pig dataset"            *8-10 Feb. 2021*

$25^{th}$ **International Conference on Pattern Recognition**                         *Virtual, Online*
A. Simoni, L. Bergamini, A. Palazzi, S. Calderara, R. Cucchiara
"Future urban scene generation through vehicle synthesis"                            *10-15 Jan. 2021*

$8^{th}$ **International Conference on 3D Vision**                                    *Virtual, Online*
A. D'Eusanio, A. Simoni, S. Pini, G. Borghi, R. Vezzani, R. Cucchiara
"A transformer-based network for dynamic hand gesture recognition"                   *25-28 Nov. 2020*