# Alice Plebe

(she/her or they/them)

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## CURRENT POSITION

**Postdoctoral researcher** *2021 – present*
*Department of Industrial Engineering, University of Trento, Italy*

## EDUCATION

**PhD in Information and Communication Technology** *2017 – 2021*
*Department of Information Engineering and Computer Science, University of Trento, Italy*
Thesis: "Cognitively guided modeling of visual perception in intelligent vehicles"
Supervisor: Mauro Da Lio

**Master's degree in Computer Science**, 110/110 cum laude *2016*
*Department of Mathematics and Computer Science, University of Catania, Italy*
Thesis: "Multi-objective genetic algorithm for interior lighting design"
Supervisor: Mario Pavone

**Bachelor's degree in Computer Science**, 110/110 cum laude *2014*
*Department of Mathematics and Computer Science, University of Catania, Italy*
Thesis: "Fast computation of minimum separation distance between polyhedra in 3D"
Supervisor: Vincenzo Cutello

## RESEARCH EXPERIENCE

**Research visiting** *02/2020 – 06/2020*
*Department of Cognitive Robotics, TU Delft, Netherlands*
Developed visual perception systems for autonomous driving using cognitive-inspired occupancy grid mapping.
Supervisor: Julian Kooij

**Research scholarship** *05/2017 – 10/2017*
*Department of Mathematics and Computer Science, University of Catania, Italy*
Developed simulation algorithms for hazardous fire propagation in industrial plants.
The research was part of the SafeMod project funded by the European POR-FESR program.
Supervisor: Sebastiano Battiatio

## PROJECTS

**Horizon Europe project "Sunrise"** (ccam-sunrise-project.eu) *2023 – present*
Role: member of the research team of University of Trento.
Contribution: development of machine learning algorithms for operational design domain (ODD) analysis in safety assessment of autonomous vehicles.

**European H2020 project "Dreams4Cars"** (www.dreams4cars.eu) *2017 – 2019*
Role: member of the research team of University of Trento.
Contribution: development of cognitive-inspired neural networks for prediction and generation of novel visual scenarios in autonomous driving.

## AWARDS

**Best Student Paper Award** *2019*
5th International Conference on Vehicle Technology and Intelligent Transport Systems.
Paper: *A. Plebe et al.*, "Mental Imagery for Intelligent Vehicles".

## EDITORIAL ROLES

**Frontiers in Neurorobotics** *2023 – present*
Member of the Editorial Board as Review Editor.

## TEACHING

**Lecturer**, "Vision-Language-Action models for robotics and autonomous vehicles" (12 hours). *2023/24*
Course from the Doctoral School in Materials, Mechatronics and Systems engineering,
University of Trento.

**Teaching assistant**, "Intelligent vehicles and autonomous driving" (10 hours). *2022/23*
Course from the Graduate Degree in Mechatronics engineering, University of Trento.

**Teaching assistant**, "C++ programming for Numerical Analysis" (20 hours). *2022/23*
Course from the Undergraduate Degree in Industrial engineering, University of Trento.

**Teaching assistant**, "C++ programming for Numerical Analysis" (20 hours). *2021/22*
Course from the Undergraduate Degree in Industrial engineering, University of Trento.

## SUMMER SCHOOLS AND WORKSHOPS

**CapoCaccia Workshop for Neuromorphic Intelligence** *2023*
*Institute of Neuroinformatics, University of Zurich and ETH Zurich*
Attended a 2–week workshop program on neuromorphic engineering, covering the biological foundations
and the hardware implementations.

**International Summer School on AI and Games** *2018*
*University of Crete, Chania, Greece*
Attended a 40–hour school program on artificial intelligence techniques for automatic content generation
and player modeling in video games.

**Training on Deep Learning for Autonomous Vehicles – Perception** *2018*
*NVIDIA Deep Learning Institute, Munich, Germany*
Attended a 8–hour intensive course on the development of perception applications for autonomous vehicles using deep neural architectures and specialized NVIDIA computing platforms.

**International Summer School on Deep Learning** *2017*
*University of Deusto, Bilbao, Spain*
Attended a 40–hour school program covering fundamentals of deep learning and its applications, including computer vision, machine translation, and language processing.

**Character Animation in Blender** *2016*
*Associazione HackSpace Catania, Catania, Italy*
Attended a 30–hour training program on fundamental techniques of 3D character animation using the
software Blender.

**Architectural Rendering in Blender** *2014*
*Architecture Academy, blenderguru.com*
Attended a 40–hour training program on advanced techniques of 3D architectural visualization using the
software Blender.

## VOLUNTEER WORK

**Voxel Community** (`www.voxel.community`)                                     *2021 – present*
*Trento, Italy*
Organized and provided mentoring for courses within Voxel Community, the first transqueer-inclusive community in Trento, aimed at supporting and empowering women for a career in tech.


## PROFESSIONAL EXPERIENCE

**Virtual forensic reconstructions**                                             *2014 – 2021*
Produced animated 3D reconstructions of criminal events for multiple criminal proceedings commissioned by Italian Public Prosecutor's offices and Defense Attorneys.

**Virtual demo of smart–home device**                                          *09/2017 – 11/2017*
*Morpheos Srl, Catania, Italy*
Produced an animated 3D demo presenting the design and components of a smart–home hub.

**Virtual demo of surveillance system**                                         *05/2015 – 07/2015*
*Temix Communication Engineering, Catania, Italy*
Produced an animated 3D demo presenting a homeland security system with communication and surveillance features.

**Internship on software development**                                          *03/2013 – 06/2013*
*NCE Network Consulting Engineering, Catania, Italy*
Developed Python and XML modules for the open-source business management software OpenERP.


## SKILLS

**Programming languages and Frameworks**
Python, TensorFlow, PyTorch, C/C++, Wolfram Mathematica.

**Computer graphics software and Game engines**
Blender, Unity.

**Languages**
Italian, native speaker.
English, proficient.
French, beginner.


# List of Publications

## JOURNALS

1. Alice Plebe, Henrik Svensson, Sara Mahmoud, and Mauro Da Lio. Human-inspired autonomous driving: A survey. *Cognitive Systems Research*, 83:101169, 2024. ISSN 1389-0417. URL `https://doi.org/10.1016/j.cogsys.2023.101169`

2. Alice Plebe and Mauro Da Lio. Bio-inspired circular latent spaces to estimate objects' rotations. *Frontiers in Computational Neuroscience*, 17, 2023. ISSN 1662-5188. URL `https://doi.org/10.3389/fncom.2023.1268116`

3. Mauro Da Lio, Antonello Cherubini, Gastone Pietro Rosati Papini, and Alice Plebe. Complex self-driving behaviors emerging from affordance competition in layered control architectures. *Cognitive Systems Research*, 79:4–14, 2023. URL `https://doi.org/10.1016/j.cogsys.2022.12.007`

4. Alice Plebe, Gastone Pietro Rosati Papini, Antonello Cherubini, and Mauro Da Lio. Distributed cognition for collaboration between human drivers and self-driving cars. *Frontiers in Artificial Intelligence*, 5:910801, 2022. URL `https://doi.org/10.3389/frai.2022.910801`

5. Mauro Da Lio, Riccardo Donà, Gastone Pietro Rosati Papini, and Alice Plebe. The biasing of action selection produces emergent human-robot interactions in autonomous driving. *IEEE Robotics and Automation Letters*, 7(2):1254–1261, 2022. URL `https://doi.org/10.1109/LRA.2021.3136646`

6. Gastone Pietro Rosati Papini, Alice Plebe, Mauro Da Lio, and Riccardo Donà. A reinforcement learning approach for enacting cautious behaviours in autonomous driving system: Safe speed choice in the interaction with distracted pedestrians. *IEEE Transactions on Intelligent Transportation Systems*, 23(7):8805 – 8822, 2021. URL `https://doi.org/10.1109/TITS.2021.3086397`

7. Alice Plebe and Mauro Da Lio. On the road with 16 neurons: Towards interpretable and manipulable latent representations for visual predictions in driving scenarios. *IEEE Access*, 8:179716–179734, 2020. URL `https://doi.org/10.1109/ACCESS.2020.3028185`

8. Alice Plebe, Mauro Da Lio, and Daniele Bortoluzzi. On reliable neural network sensorimotor control in autonomous vehicles. *IEEE Transactions on Intelligent Transportation Systems*, 21:711–722, 2020. URL `https://doi.org/10.1109/TITS.2019.2896375`

9. Alice Plebe and Giorgio Grasso. Conceptual integrity without concepts. *International Journal of Software Engineering and Knowledge Engineering*, 28(7):955–981, 2018. URL `https://doi.org/10.1142/S0218194018400120`

## CONFERENCES, WORKSHOPS, BOOK CHAPTERS

1. Antonello Cherubini, Gastone Pietro Rosati Papini, Alice Plebe, and Mauro Da Lio. Energy costs of safe speed policies in a pedestrian-crossing scenario. In *Proceedings of the 35th IEEE Intelligent Vehicles Symposium (IV)*, pages 1–6. IEEE, 2023. URL `https://doi.org/10.1109/IV55152.2023.10186594`

2. Sara Mahmoud and Alice Plebe. A critical look into cognitively-inspired artificial intelligence. In *8th International Workshop on Artificial Intelligence and Cognition (AIC)*, 2022. URL `https://www.diva-portal.org/smash/record.jsf?pid=diva2:1700578`

3. Alice Plebe, Julian FP Kooij, Gastone Pietro Rosati Papini, and Mauro Da Lio. Occupancy grid mapping with cognitive plausibility for autonomous driving applications. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, pages 2934–2941, 2021. URL `https://doi.org/10.1109/ICCVW54120.2021.00328`

4. Alice Plebe and Mauro Da Lio. Neurocognitive-inspired approach for visual perception in autonomous driving. In *Smart Cities, Green Technologies and Intelligent Transport Systems*, pages 113–134. Springer International Publishing, Cham, 2021. URL `https://doi.org/10.1007/978-3-030-68028-2_6`

5. Alice Plebe and Mauro Da Lio. Visual perception for autonomous driving inspired by convergence–divergence zones. In *Proceedings of the 11th International Symposium on Image and Signal Processing and Analysis (ISPA)*, pages 204–208. IEEE, 2019b. URL `https://doi.org/10.1109/ISPA.2019.8868473`

6. Alice Plebe and Mauro Da Lio. Variational autoencoder inspired by brain's convergence-divergence zones for autonomous driving application. In *Proceedings of the 20th International Conference on Image Analysis and Processing (ICIAP)*, volume 11751 of *Lecture Notes in Computer Science*, pages 367–377. Springer, Cham, 2019a. URL `https://doi.org/10.1007/978-3-030-30642-7_33`

7. Alice Plebe, Riccardo Donà, Gastone Pietro Rosati Papini, and Mauro Da Lio. Mental imagery for intelligent vehicles. In *Proceedings of the 5th International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS)*, pages 43–51. Science and Technology Publications, 2019b. URL `http://doi.org/10.5220/0007657500430051`

8. Alice Plebe, Gastone Pietro Rosati Papini, Riccardo Donà, and Mauro Da Lio. Dreaming mechanism for training bio-inspired driving agents. In *Proceedings of the 2nd International Conference on Intelligent Human Systems Integration (IHSI)*, pages 429–434. Springer, Cham, 2019c. URL `https://doi.org/10.1007/978-3-030-11051-2_65`

9. Alice Plebe, Vincenzo Cutello, and Mario Pavone. Optimizing costs and quality of interior lighting by genetic algorithm. In *Computational Intelligence: 9th International Joint Conference, IJCCI 2017 Funchal-Madeira, Portugal, November 1-3, 2017 Revised Selected Papers*, pages 19–39. Springer International Publishing, Cham, 2019a. URL `https://doi.org/10.1007/978-3-030-16469-0_2`

10. Mauro Da Lio, Alice Plebe, Daniele Bortoluzzi, Gastone Pietro Rosati Papini, and Riccardo Donà. Autonomous vehicle architecture inspired by the neurocognition of human driving. In *Proceedings of the 4th International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS)*, pages 507–513. Science and Technology Publications, 2018. URL `http://doi.org/10.5220/0006785605070513`

11. Alice Plebe, Vincenzo Cutello, and Mario Pavone. Evolving illumination design following genetic strategies. In *Proceedings of the 9th International Joint Conference on Computational Intelligence (IJCCI)*, pages 289–296. Science and Technology Publications, 2017. URL `http://dx.doi.org/10.5220/0006501902890296`

12. Alice Plebe and Mario Pavone. Multi-objective genetic algorithm for interior lighting design. In *Proceedings of the 3rd International Workshop on Machine learning, Optimization, and Big Data (MOD)*, volume 10710 of *Lecture Notes in Computer Science*, pages 222–233. Springer, Cham, 2017. URL `https://doi.org/10.1007/978-3-319-72926-8_19`

13. Alice Plebe and Giorgio Grasso. Particle physics and polyedra proximity calculation for hazard simulations in large-scale industrial plants. In *Proceedings of the 12th International Conference of Computational Methods in Sciences and Engineering (ICCMSE)*, pages 090003–1–090003–4. American Institute of Physics Publishing, 2016. URL `http://dx.doi.org/10.1063/1.4968690`