

# Alice Plebe

E-mail: [alice.plebe@unitn.it](mailto:alice.plebe@unitn.it)

Website: [www.aliceplebe.com](http://www.aliceplebe.com)

## CURRENT POSITION

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### Postdoctoral researcher

Dept. of Industrial Engineering, University of Trento, Italy

2021 – present

## EDUCATION

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### PhD in Information and Communication Technology

University of Trento, Italy

Thesis: “Cognitively guided modeling of visual perception in intelligent vehicles”

Supervisor: Mauro Da Lio

2017 – 2021

### Master’s degree in Computer Science, 110/110 cum laude

University of Catania, Italy

Thesis: “Multi-objective genetic algorithm for interior lighting design”

Supervisor: Mario Pavone

2016

### Bachelor’s degree in Computer Science, 110/110 cum laude

University of Catania, Italy

Thesis: “Fast computation of minimum separation distance between polyhedra in 3D”

Supervisor: Vincenzo Cutello

2014

## RESEARCH EXPERIENCE

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### Research visit

TU Delft, Netherlands

Developed cognitive-inspired visual perception systems for autonomous driving using deep autoencoder-like neural networks.

Supervisor: Julian Kooij

02/2020 – 06/2020

### Research scholarship

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 Battiato

05/2017 – 10/2017

## PROJECTS

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### Horizon Europe project “Sunrise” [ccam-sunrise-project.eu](http://ccam-sunrise-project.eu)

Role: contributed as a member of the University of Trento team.

Contribution: development of artificial neural architectures with a priori knowledge and informed by biological solutions in the domain of autonomous driving.

2023 – present

### European H2020 project “Dreams4Cars” [www.dreams4cars.eu](http://www.dreams4cars.eu)

Role: contributed as a member of the University of Trento team.

Contribution: development of artificial neural networks generating imaginary situations for the discovery of new action possibilities in autonomous driving.

2017 – 2021

## AWARDS

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### 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”.

## TEACHING

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**Teaching assistant**, “Intelligent vehicles and autonomous driving” (10 hours).  
Graduate degree in Mechatronics Engineering, University of Trento.

2022/23

**Teaching assistant**, “C++ Programming for Numerical Analysis” (20 hours).  
Undergraduate degree in Industrial Engineering, University of Trento.

2022/23

**Teaching assistant**, “C++ Programming for Numerical Analysis” (20 hours).  
Undergraduate degree in Industrial Engineering, University of Trento.

2021/22

## SUMMER SCHOOLS AND WORKSHOPS

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### 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 autonomous vehicle applications 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, speech recognition, and language processing.

## EDITORIAL ROLES

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### Frontiers in Neurorobotics

2023 – present

Member of the Editorial Board as Review Editor.

## SKILLS

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### Programming Languages and Frameworks

Python, TensorFlow, PyTorch, C++, Wolfram Mathematica.

### CG Software and Game Engines

Blender, Unity.

### Languages

Italian: native speaker.

English: proficient.

## PROFESSIONAL EXPERIENCE

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- 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** 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** 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** 2013  
*NCE Network Consulting Engineering, Catania, Italy*  
Developed Python and XML modules for the open-source business management software OpenERP.

## VOLUNTEER WORK

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- 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.

## List of Publications

### JOURNALS

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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. 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>
3. 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>
4. 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>
5. 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>
6. 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>

7. 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>
8. 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

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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](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](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](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](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](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>