

Miguel Vasco

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RESEARCH STATEMENT

My long-term goal is to build multimodal artificial agents that naturally **co-exist** [S1] with humans in real and virtual environments. To achieve this, I leverage reinforcement learning to design agents that act effectively [S2], while adapting to changes in perception [S3], their environment [S4], and human preferences [S5]. My research also explores the alignment between human and artificial perception [S6], investigating representations grounded in human sensory experience [S7].

Keywords: Reinforcement Learning · Multimodal Learning

SELECTED PUBLICATIONS

For a complete list of publications please refer to [Google Scholar](#).

- [S1] Hannah Kuehn[†], Joseph La Delfa[†], Miguel Vasco[†], Danica Kragic, and Iolanda Leite. *Humans Co-exist, So Must Embodied Artificial Agents*. In: arXiv preprint arXiv:2502.04809, 2025 [pdf]
- [S2] Miguel Vasco[†], Takuma Seno[†], Kenta Kawamoto, Kaushik Subramanian, Peter R. Wurman, and Peter Stone. *A Super-human Vision-based Reinforcement Learning Agent for Autonomous Racing in Gran Turismo*. In: Proceedings of the First Reinforcement Learning Conference (RLC). vol. 1. 2024 (**Outstanding Paper Award**) [pdf]
- [S3] Petra Poklukar[†], Miguel Vasco[†], Hang Yin, Francisco S. Melo, Ana Paiva, and Danica Kragic. *Geometric Multimodal Contrastive Representation Learning*. In: Proceedings of the 39th International Conference on Machine Learning. 2022, pp. 17782–17800 [pdf]
- [S4] Bernardo Esteves, Miguel Vasco, and Francisco S. Melo. *NeuralSolver: Learning Algorithms For Consistent and Efficient Extrapolation Across General Tasks*. In: The Thirty-eighth Annual Conference on Neural Information Processing Systems. 2024 [pdf]
- [S5] Daniel Marta[†], Simon Holk[†], Miguel Vasco, Jens Lundell, Timon Homberger, Finn L. Busch, Olov Andersson, Danica Kragic, and Iolanda Leite. *FLoRA: Sample-Efficient Preference-based RL via Low-Rank Style Adaptation of Reward Functions*. In: IEEE International Conference on Robotics and Automation (ICRA). 2025 [pdf]
- [S6] Miguel Vasco, Hang Yin, Francisco S. Melo, and Ana Paiva. *Leveraging hierarchy in multimodal generative models for effective cross-modality inference*. In: Neural Networks (2021 Special Issue on AI and Brain Science: Brain-inspired AI) 146, 2022, pp. 238–255 [pdf]
- [S7] Farzaneh Taleb, Miguel Vasco, Antonio H. Ribeiro, Mårten Björkman, and Danica Kragic. *Can Transformers Smell Like Humans?* In: The Thirty-eighth Annual Conference on Neural Information Processing Systems. 2024 (**Spotlight**) [pdf]

Note: The symbol [†] denotes equal contribution.

EXPERIENCE

• Postdoctoral Research Fellow KTH Royal Institute of Technology	2023–now Sweden
• Research Intern Sony AI	2023 Japan
• Teaching Assistant Instituto Superior Técnico, Universidade de Lisboa	2019–2022 Portugal
• Early Stage Researcher GAIPS, INESC-ID	2018–2022 Portugal
• Visiting Researcher KTH Royal Institute of Technology	2021–2022 Sweden
• Visiting Researcher National Institute of Informatics	2017–2018 Japan

EDUCATION

- Ph.D. Computer Science (*Summa Cum Laude*) 2018–2023
Instituto Superior Técnico, University of Lisbon, Portugal
 - Thesis Title: Multimodal Representation Learning for Agent Perception and Agency
 - Supervisors: Prof. Ana Paiva and Prof. Francisco S. Melo
- M.Sc. Engineering Physics 2013–2016
Instituto Superior Técnico, University of Lisbon, Portugal
 - Thesis Title: 3D map of the Distribution of Metals in a Cell: Applications to the Toxicity of Nanoparticles
 - Supervisors: Prof. Teresa Pinheiro and Dr. Luís Alves

HONORS AND DISTINCTIONS

- **Best PhD Thesis in AI in Portugal** 2024
Awarded by the Portuguese Association for Artificial Intelligence (APPIA).
- Best Paper Awards
Reinforcement Learning Conference (RLC), 2024 – [S2], [link],
International Conference on Social Robotics (ICSR), 2020 – [link].
- **RSS Pioneer** 2021
Selective annual workshop in the “Robotics: Science and Systems” conference.
- **Cohort of the AAMAS Doctoral Consortium** 2020
Selective annual workshop in the “International Conference on Autonomous Agents and Multiagent Systems”.
- Excellence in Teaching Award, Instituto Superior Técnico, University of Lisbon 2020, 2021
Annual award given to “teachers who stood out for their pedagogical excellence”.
- Ph.D. Grant 2018
Awarded by ‘Fundação para a Ciência e Tecnologia’, ref. SFRH/BD/139362/2018.
- Research Grant 2017, 2022
Awarded in Project INSIDE and Project RELEVANT by INESC-ID.

TEACHING AND SUPERVISION

COURSES

- FDD3359 Reinforcement Learning Spring 2024, 2025
Doctoral Programme at the School of Electrical Engineering and Computer Science (EECS) KTH Royal Institute of Technology
- DD2430 Project Course in Data Science Fall 2023
Master Degree in Electrical Engineering and Computer Science KTH Royal Institute of Technology
- Planning, Learning and Intelligent Decision-Making 2021–2022
Master Degree in Computer Science and Engineering, Master Degree in Data Science Instituto Superior Técnico, University of Lisbon
- Computation and Society (AI Ethics) 2019–2020
Undergraduate Degree in Computer Science and Engineering Instituto Superior Técnico, University of Lisbon

PH.D. STUDENTS

- Alfredo Reichlin, “Interactive Representation Learning” 2023-now
KTH Royal Institute of Technology, co-advised with Danica Kragic and Hang Yin
- Bernardo Esteves, “Learning to Act at Scale: Algorithm Synthesis using Deep Neural Networks” 2023-now
Instituto Superior Técnico, University of Lisbon, co-advised with Francisco S. Melo
- Farzaneh Taleb, “Evaluating Representational Alignment in Natural and Artificial Intelligent Systems” 2023-now
KTH Royal Institute of Technology, co-advised with Danica Kragic and Mårten Björkman
- Nona Rajabi, “Extracting Human Intention and Perception from Physiological Signals using Data-driven Models” 2023-now
KTH Royal Institute of Technology, co-advised with Danica Kragic and Mårten Björkman

PROFESSIONAL SERVICE

ORGANIZATIONAL ROLES

- Reinforcement Learning and Video Games Workshop (RLC) – Organizer 2025
- Multimodal Representation Learning: Perks and Pitfalls Workshop (ICLR) – Organizer [website] 2023
- RSS Pioneers Workshop – Faculty Chair [website] 2022

REVIEWER

NeurIPS, ICML, ICLR, AISTATS, AAAI, IJCAI, ICRA, ECAI

RESEARCH COMMUNITY SERVICE

- RPL Summer School on Robotics, Perception and Learning 2024
Organiser of the RPL Summer School on Robotics, Perception and Learning at Stockholm, Sweden – [website]
- Talking Robotics 2020–2023
Co-founder of the online bi-weekly virtual seminars about robotics and adjacent fields – [website] [twitter] [youtube]
- Robotics Reading Group 2019–2020
Organizer of the Robotics Reading Group at Instituto Superior Técnico, University of Lisbon – [website]

MEDIA COVERAGE

- **New Scientist** – online article about our super-human vision-based racing agent for Gran Turismo 7 [S1]. 2024
- **Robohub** – online article featured multiple sessions of Talking Robotics. 2021
- **Synced Review** – online article about our **AAMAS paper**; 2019
- **Correio da Manhã** – TV report about the impact of robotics in therapy of children, referencing **Project INSIDE**; 2018
- **Diário de Notícias** – magazine article about recent developments in robotics, referencing **Project INSIDE**. 2018

REFERENCES

- Danica Kragic, *KTH Royal Institute of Technology, Sweden* dani@kth.se
- Kenta Kawamoto, *Sony AI, Japan* kenta.kawamoto@sony.com
- Ana Paiva, *Instituto Superior Técnico, University of Lisbon, Portugal* ana.paiva@inesc-id.pt
- Francisco S. Melo, *Instituto Superior Técnico, University of Lisbon, Portugal* fmelo@inesc-id.pt