Miguel Vasco

Postdoctoral Research Fellow | miguelsv@kth.se | miguelvasco.com
Division of Robotics, Perception and Learning (RPL)
KTH Royal Institute of Technology, Stockholm, Sweden

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