# Matteo Bortoletto

Ph.D. Student at the University of Stuttgart

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## EDUCATION

**University of Stuttgart, Germany**  Ph.D. in Computer Science                    *2022 - Present*
Advisor: Andreas Bulling

**University of Padua, Italy**  M.Sc. in Physics of Data, *110/110 cum laude*                    *2019 - 2021*
Advisor: Marco Baiesi

**University of Padua, Italy**  B.Sc. in Physics                    *2016 - 2019*
Advisor: Samir Suweis

## RESEARCH & WORK EXPERIENCE

**University of Stuttgart, Stuttgart, Germany**                    *02/2022 - Present*
*Scientific Researcher, Collaborative AI Lab* – Conducted research on Machine Theory of Mind, multi-modality, large foundation models, and interpretability.

**Johns Hopkins University, Baltimore, USA**                    *04/2025 – 07/2025*
*Visiting Graduate Scholar, Social Cognitive AI Lab* – Led a project on Bayesian Theory of Mind for prosocial feedback communication in multi-agent systems.

**Piratech, Kingston Upon Thames, London, England**                    *03/2021 – 06/2021*
*Intern* – Worked in a team to create and deploy AWS infrastructures "as code" via Pulumi. Contributed to CI/CD integration.

## PEER-REVIEWED PUBLICATIONS

1. M. Bortoletto, C. Ruhdorfer, A. Bulling. "ToM-SSI: Evaluating Theory of Mind in Situated Social Interactions." **EMNLP 2025**.

2. M. Bortoletto, C. Ruhdorfer, L. Shi, A. Bulling. "Brittle Minds, Fixable Activations: Understanding Belief Representations in Language Models." **EMNLP 2025 Findings** and **ICML 2024 Workshop on Mechanistic Interpretability**.

3. C. Ruhdorfer, M. Bortoletto, A. Penzkofer, A. Bulling. "The Overcooked Generalisation Challenge." **TMLR**, 2025.

4. C. Ruhdorfer, M. Bortoletto, A. Bulling. "The Yokai Learning Environment: Tracking Beliefs Over Space and Time." **IJCAI 2025 Worshop on Theory of Mind**. (Oral)

5. M. Bortoletto, C. Ruhdorfer, L. Shi, A. Bulling. "Explicit Modelling of Theory of Mind for Belief Prediction in Nonverbal Social Interactions." **ECAI 2024**. (Oral)

6. M. Bortoletto, C. Ruhdorfer, A. Abdessaied, L. Shi, A. Bulling. "Limits of Theory of Mind Modelling in Dialogue-Based Collaborative Plan Acquisition." **ACL 2024**.

7. M. Bortoletto, L. Shi, A. Bulling. "Neural Reasoning About Agents' Goals, Preferences, and Actions." **AAAI 2024**.

8. E. Sood, L. Shi, M. Bortoletto, Y. Wang, P. Müller, A. Bulling. "Improving neural saliency prediction with a cognitive model of human visual attention." **CogSci 2023**.

9. G. Zhang, M. Bortoletto, Z. Hu, L. Shi, M. Bâce, A. Bulling. "Exploring Natural Language Processing Methods for Interactive Behaviour Modelling." **INTERACT 2023**. ⚐ **Best Student Paper Nomination**

## PREPRINTS

1. M. Bortoletto, Y. Zhou, L. Ying, T. Shu, A. Bulling. "ProToM: Promoting Prosocial Behaviour via Theory of Mind-Informed Feedback." *arXiv:2509.05091*, 2025.

2. C. Ruhdorfer, M. Bortoletto, V. Oei, A. Penzkofer, A. Bulling. "Unsupervised Partner Design Enables Robust Ad-hoc Teamwork." *arXiv:2508.06336*, 2025.

## Teaching Experience

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|---|---|
| **Course Organiser**, Machine Perception and Learning | *WS 2024* |
| **Course Organiser and Lecturer**, Computational Theory of Mind and Cognition | *SS 2024* |
| **Teaching Assistant**, Machine Perception and Learning | *SS 2022, WS 2022, WS 2023* |

## Mentoring

**Mohamed Youssef**, M.Sc. Thesis: "Ontology-Guided Diffusion for Zero-Shot Sim-to-Real Transfer"

**Levi Otterbach**, B.Sc. Thesis: "Neural Reasoning with Cognitively-Inspired Representations"

**Jonas Allali**, M.Sc. Thesis: "Probing for Theory of Mind in the Multi-Agent Cooperation Game Yokai"

**Jann-Philipp Thewes**, M.Sc. Thesis: "Multimodal LLM for Theory of Mind Modelling in Collaborative Tasks" ⚲
*Bürkert University Prize*

**Ruben Werbke**, B.Sc. Thesis: "Inferring Other Agents' Goal in Collaborative Environments Using Graphs"

**Constantin Ruhdorder**, M.Sc. Thesis: "Into the Minds of the Chefs: Using Theory of Mind for Robust Collaboration with Humans in Overcooked" ⚲ *Rul Gunzenhäuser Award*

**John Pravin Arockiasamy**, M.Sc. Research Project: "Transformer Based Architecture for Belief Prediction in Object-Context Scenarios"

**Michael Erdemann**, M.Sc. Thesis: "Recreating False-Belief Tests as Visual Question Answering Tasks"

## Work Experience

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| **University of Stuttgart**, Scientific Researcher | *2022 - Present* |
| **University of Padua**, Research Fellow | *2021* |
| **Piratech**, Intern | *2021* |

## Services

**Evaluator**: ELLIS PhD Program, IMPRS-IS PhD Program

**Reviewer**: CHI'24, CHI'25, ACL ARR'25, TOCHI, UIST'25, AAAI'26, EACL'26 SRW

**Student Volunteer**: AAAI'24, ACL'24, EMNLP'25

## Awards

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| **Volunteer Scholarship** AAAI'24, ACL'24, EMNLP'25 | |
| **Best Student Paper Nomination** INTERACT'23 | |
| **StartCup Veneto** Startup competition winner, TooBusy | *2021* |
| **Research Grant**, University of Padua, "Urban Big Data for Economic Development" (€ 4.3K) | *2021* |

## Events and Presentations

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| EMNLP 2025 poster presentation | *2025* |
| Invited talk at the SCAI Lab, Johns Hopkins University | *2025* |
| ECAI 2024 oral presentation | *2024* |
| ACL 2024 poster presentation | *2024* |
| ICML 2024 poster presentation | *2024* |
| ELLIS CoGenAI Summer School (Aalto University, Finland) | *2024* |
| ELLIS Unit Stuttgart Summer Symposium | *2024* |
| AAAI 2024 poster presentation | *2024* |
| ELLIS Unit Stuttgart Kickoff Symposium | *2023* |
| Dagstuhl Seminar on Anticipatory Human-Machine Interaction | *2022* |

## Skills

**Languages**: English (fully proficient), Italian (native), Spanish (basic), German (basic)

**Software & Tools**: Python, Julia, Numpy, Pandas, Scikit-learn, Linux, Git, LaTeX, HTML

**Deep Learning Frameworks**: PyTorch, transformers, NNsight, LangChain, ChromaDB, Ollama, Weights & Biases

**Hobbies and activities**: Watercolour painting, guitar, running