Marcel Hussing

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Cambridge, MA, USA

MIT postdoctoral researcher developing reliable sequential decision-making methods for scientific discovery

Research Interests

Reliable sequential decision making for scientific discovery and control in the physical world; Science for AI (replicability, stability, auditing) and AI for Science (knowledge discovery, lab automation); emphasis on compositional structure, world-model planning, and compute-optimized learning.

Education

Ph.D. in Computer & Information Science — Jan 2021 – Aug 2026
University of Pennsylvania — *Philadelphia, PA, USA*

- GRASP Lab — Lifelong Learning Lab; *Advisor*: Eric Eaton
- Formalized **replicable** RL to enable auditing, cross-run consistency toward reliable cross-paper comparisons
- Designed **stability-focused** training methods for deep RL in high-dimensional settings, improving convergence
- Built **modular** representations to accelerate learning across large task families

M.Sc. in Computer Science — Oct 2016 – Mar 2020
Technical University of Darmstadt — *Darmstadt, Germany*

- Focus on machine learning, deep learning, and reinforcement learning; secondary subject: Physics
- Master's thesis: *Object-Aware State Representation Learning*

B.Sc. in International Business Administration & IT — Aug 2013 – Jul 2016
University of Applied Sciences Ludwigshafen — *Ludwigshafen, Germany*

- Curriculum spanning business administration, economics, and computer science

Experience

Postdoctoral Researcher and MIT–Novo Nordisk AI Fellow — Sep 2026 – Present
Massachusetts Institute of Technology, Improbable AI Lab — *Cambridge, MA, USA*

- Developing sequential decision-making learning algorithms for scientific problems

Research Intern — May 2025 – Dec 2025
Meta Fundamental AI Research (FAIR) — *Montréal, QC, Canada*

- Prototyped goal-conditioned value functions with world-model-based MPC for zero-shot robotic control

Research Intern — Oct 2024 – Feb 2025
Microsoft Research — *New York, NY, USA*

- Developed transformer-based algorithms for efficient high-to-low-level planning and goal-conditioned reasoning

Digitalization Research Scientist — Jan 2019 – Dec 2020
BASF SE — *Ludwigshafen, Germany*

- Partnered with chemists and ML engineers to embed machine learning into R&D workflows
- Proposed and managed projects and budgets; shipped production-ready ML solutions across departments
- Built and deployed CNNs for large-scale visual inspection in manufacturing, improving analysis throughput.
- Consulted on a quantum chemistry–ML collaboration with TU Berlin

Junior Business Solution Consultant — Next Generation Business Architecture — Sep 2017 – Dec 2018
BASF Business Services GmbH — *Ludwigshafen, Germany*

- Led development of a company-wide project-tracking/reporting platform adopted by up to 70,000 users
- Conducted requirements engineering, created testing structures, and scheduled tasks and deadlines

Junior Business Solution Consultant — Advanced Business Analytics — Sep 2016 – Aug 2017
BASF Business Services GmbH — *Ludwigshafen, Germany*

- Evaluated emerging data/ML technologies and supported delivery of production solutions
- Built a social-media analytics tool and interactive dashboards for internal stakeholders

Dual Studies, International Business Administration & IT Aug 2013 – Aug 2016
BASF Business Services GmbH *Ludwigshafen, Germany*

Teaching

Guest Lectures, CIS625: Theory of Machine Learning Fall 2023
- Delivered two lectures on reinforcement learning theory

Teaching Assistant, CIS625: Theory of Machine Learning Fall 2022
- Held office hours; created homeworks and solutions; graded assignments; advised final projects

Teaching Assistant, CIS522: Deep Learning Spring 2022
- Led a 12-person study group; clarified course content; graded worksheets; advised final projects; held office hours

Lecture Series: Machine Learning for Chemists Winter 2020
- Developed a 6-lecture introductory ML series for non–computer scientists

Service

Conference Reviewing

- Conference on Neural Information Processing Systems (NeurIPS): 2025, 2024, 2023
- International Conference on Machine Learning (ICML): 2025, 2024, 2023
- International Conference on Learning Representations (ICLR): 2026, 2025, 2024

Honors & Awards

Fellowships

- MIT–Novo Nordisk Artificial Intelligence Postdoctoral Fellowship, 2026

Conference Reviewer Awards

- ICML 2026 — Gold Reviewer
- ICML 2024 — Best Reviewer
- ICLR 2024 — Outstanding Reviewer
- NeurIPS 2023, 2024, 2025 — Top Reviewer

Selected Talks

Reliable Reinforcement Learning

- Aug. 2025: Mila RL Seminar
- Nov. 2025: Talk hosted by RL Group at Princeton

Replicable Reinforcement Learning

- Sep. 2025: New York RL Workshop Oral
- Oct. 2025: Columbia University Theory Student Seminar

Publications

*The * symbol indicates (co-)first authors; α–β order indicates alphabetical author ordering.*

Preprints

[1] M. Lamparth, D. Fein, A. Haupt, **MH**, and M. J. Kochenderfer, "Reward bias substitution: Single-axis bias mitigations redirect optimization pressure," *arXiv preprint arXiv:2605.27996*, 2026.

[2] **MH***, L. G. d'Aliberti*, C. Voelcker, B. Eysenbach, and E. Eaton, "Behavior-consistent deep reinforcement learning," *arXiv preprint arXiv:2605.21214*, 2026.

[3] E. Zhang, **MH**, T. Tandon, S. Kannapiran, J. Hughes, Y. Wang, J. Caswell, A. Kratimenos, Y. F. Li, M. Manoj, E. Sanchez, S. Shrote, C. J. Taylor, D. A. Hashimoto, and E. Eaton, "Limitations of synthetic data generation in specialized data-scarce domains," *arXiv preprint arXiv:2608.13729*, 2026.

Conference Publications

[4] E. Eaton, S. Goel, **MH**, M. Kearns, A. Roth, S. B. Sengupta, and J. Sorrell, "Model agreement via anchoring," in *Conference on Learning Theory*, 2026, pp. 5625–5661.

[5] (α–β) E. Eaton, **MH**, M. Kearns, A. Roth, S. B. Sengupta, and J. Sorrell, "Replicable reinforcement learning with linear function approximation," in *International Conference on Learning Representations*, 2026.

[6] C. Voelcker, A. Brunnbauer, **MH**, M. Nauman, P. Abbeel, E. Eaton, R. Grosu, A.-m. Farahmand, and I. Gilitschenski, "Relative entropy pathwise policy optimization," in *International Conference on Learning Representations*, 2026.

[7] (α–β) E. Eaton, **MH**, M. Kearns, A. Roth, S. B. Sengupta, and J. Sorrell, "Intersectional fairness in reinforcement learning with large state and constraint spaces," in *International Conference on Machine Learning*, 2025.

[8] G. Liao, M. Jogan, **MH**, E. Zhang, E. Eaton, and D. A. Hashimoto, "Future slot prediction for unsupervised object discovery in surgical video," in *International Conference on Medical Image Computing and Computer-Assisted Intervention*, 2025.

[9] C. A. Voelcker*, **MH***, E. Eaton, A.-m. Farahmand, and I. Gilitschenski, "MAD-TD: Model-augmented data stabilizes high update ratio RL," in *International Conference on Learning Representations*, **Spotlight**, 2025.

[10] (α–β) **MH**, M. Kearns, A. Roth, S. B. Sengupta, and J. Sorrell, "Oracle-efficient reinforcement learning for max value ensembles," in *Conference on Neural Information Processing Systems*, 2024.

[11] **MH***, J. Mendez-Mendez*, A. Singrodia, C. Kent, and E. Eaton, "Robotic manipulation datasets for offline compositional reinforcement learning," in *Reinforcement Learning Conference*, 2024.

[12] **MH***, C. A. Voelcker*, I. Gilitschenski, A.-m. Farahmand, and E. Eaton, "Dissecting deep RL with high update ratios: Combatting value divergence," in *Reinforcement Learning Conference*, 2024.

[13] (α–β) E. Eaton, **MH**, M. Kearns, and J. Sorrell, "Replicable reinforcement learning," in *Conference on Neural Information Processing Systems*, 2023.

[14] J. A. Mendez, **MH***, M. Gummadi, and E. Eaton, "Composuite: A compositional reinforcement learning benchmark," in *Conference on Lifelong Learning Agents*, 2022.

[15] J. Kossen*, K. Stelzner*, **MH**, C. Voelcker, and K. Kersting, "Structured object-aware physics prediction for video modeling and planning," in *8th International Conference on Learning Representations*, 2020.

Journal Publications

[16] A.-Q. Pham, **MH**, S. P. Patankar, D. S. Bassett, J. Mendez-Mendez, and E. Eaton, "Iterative compositional data generation for robot control," *Transactions on Machine Learning Research*, 2026.