# Bram Grooten

*PhD candidate in Deep Learning*

Passionate PhD researcher, working on dynamic sparse training of neural networks, specifically in the field of deep **reinforcement learning** and robotics. Currently a research intern at **Sony AI** working on generalization in the GT Sophy team. Expected PhD graduation date: February 2026.

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## Education

**2022 – 2026**  **PhD Candidate**, *Eindhoven University of Technology*, Netherlands
Research on dynamic sparse training in deep reinforcement learning, improving the efficiency and focus of neural networks, testing on benchmarks such as the UR5 Robotic Arm.

**2018 – 2021**  **Master Applied Mathematics**, *Eindhoven University of Technology (TU/e)*
Graduated cum laude. Thesis on multi-agent deep reinforcement learning for Hanabi.

**2018 – 2021**  **Master Science Education**, *Eindhoven University of Technology*
Acquired the official license to teach mathematics in Dutch high schools.

**2014 – 2017**  **Bachelor Applied Mathematics**, *Wentworth Institute of Technology & TU/e*
Studied abroad in Boston US, after which I continued in the Netherlands.

**2008 – 2014**  **High school**, *Sint-Joriscollege*, Eindhoven, Graduated cum laude
Bèta award: student with the highest grades in STEM courses.

## Recent Projects

**2023**  **Research Visit**, *Aug - Dec*, UAlberta
Currently visiting the University of Alberta, joining Matthew Taylor's Intelligent Robot Learning (IRL) Lab at the Alberta Machine Intelligence Institute (Amii).

**2023**  **DLRL at Mila**, *Jul*, dlrl.ca
Accepted at the Deep Learning Reinforcement Learning summer school, which is held at the Mila research institute in Montreal, Canada.

**2022**  **European Summer Schools**, *Jun - Jul*
Participated in three machine learning summer schools: MLSS, EEML, and M2L. Presented my research there (see poster) and at the Sparse Neural Networks (SNN) workshop.

**2022**  **Multi-Agent RL Competition**, *Mar - Jun*, AI Arena
Achieved a prize-winning top 10 ranking in this global contest, among universities of Alberta, Melbourne, Toronto, Yale, and others. With 4 graduate students we developed a deep RL agent to compete in their multiplayer online battle arena.

| 2020 – 2021 | **Serpentine AI**, *Sep - Aug*, serpentine.ai |
|---|---|
| | Chairman of the student team which develops AI for e-Sports. Led the team through many international AI programming competitions. Learned to work with PyTorch and TensorFlow, program in Python, Java, C++, and collaborate via Git. |
| 2020 | **Angry Birds Competition**, *Jun - Aug*, AI Birds.org |
| | Winning team in this challenging level generation contest. |
| 2020 | **AI Snakes Competition**, *Mar - May*, Technical Report |
| | Leader of the Serpentine team that finished in second place. |
| 2020 | **MIT Battlecode**, *Jan - Feb*, battlecode.org |
| | Programming competition hosted by MIT where we reached the top 30. |
| 2018 – 2020 | **Technology Ambassador**, bramgrooten.nl/gastles |
| | Bringing tech-enthusiasm to children with our guest lecture: Make your own app! |

## Work experience

| Jul – Nov 2024 | **Research Intern**, *Sony AI*, Zürich, Switzerland |
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| | Joining the Gran Turismo Sophy team to improve the agent's generalization capabilities. |
| Feb – Dec 2019 | **Math Teacher**, *Maaslandcollege & Van Maerlantlyceum*, Oss & Eindhoven |
| | During the Education master I learned the teaching craft in these two internships. |
| Jul – Oct 2017 | **Researcher**, *ThuisBaas*, Amsterdam, Netherlands |
| | I analyzed the sound level of heat pumps and improved their solar energy model. |
| Feb – May 2015 | **Tutor**, *Phillips Brooks House Association*, Cambridge, MA, United States |
| | Volunteering as a tutor for children from the rough neighborhood of Mission Hill. |

## Publications

| 2023 | **B. Grooten**, T. Tomilin, G. Vasan, M. Taylor, A. Mahmood, M. Fang, M. Pechenizkiy, D. Mocanu. *MaDi: Learning to Mask Distractions for Generalization in Visual Deep Reinforcement Learning*. Oral at AAMAS'24, arXiv |
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| 2023 | A. Nowak, **B. Grooten**, D. Mocanu, J. Tabor. *Fantastic Weights and How to Find Them: Where to Prune in Dynamic Sparse Training*. NeurIPS'23, arXiv |
| 2023 | **B. Grooten**, G. Sokar, S. Dohare, E. Mocanu, M. Taylor, M. Pechenizkiy, D. Mocanu. *Automatic Noise Filtering with Dynamic Sparse Training in Deep Reinforcement Learning*. Full-paper at AAMAS'23 & Spotlight at SNN'23, arXiv |
| 2023 | W. Wesselink, **B. Grooten**, Q. Xiao, C. de Campos, M. Pechenizkiy. *Nerva: a Truly Sparse Implementation of Neural Networks*. SNN'23, sparseneural.net #28 |
| 2022 | **B. Grooten**, J. Wemmenhove, M. Poot, J. Portegies. *Is Vanilla Policy Gradient Overlooked? Analyzing Deep Reinforcement Learning for Hanabi*. Adaptive and Learning Agents workshop at AAMAS'22, arXiv |
| 2022 | **B. Grooten**, G. Sokar, E. Mocanu, S. Dohare, M. Taylor, M. Pechenizkiy, D. Mocanu. *Towards Implementing Truly Sparse Connections in Deep RL Agents*. SNN'22, sparseneural.net #53 |
| 2021 | **B. Grooten**. *Deep Reinforcement Learning for the cooperative card game Hanabi*. Master Thesis, research.tue.nl |

2020 **B. Grooten**, B. Tulkens. *Programming in mathematics and physics classes.* Master Thesis, research.tue.nl

2020 **B. Grooten**, I. Schilstra, W. van der Hert, D. van Genuchten. *AI Snakes Competition.* Technical Report, serpentine.ai

## Invited Talks

2024 **ML Collective**, *Efficient Focus for Autonomous Agents: Generalization in Deep RL*
Online reading group "Deep Learning: Classics and Trends." Mar 15th. Website.

2024 **Leiden University**, *Efficient Focus for Autonomous Agents*
Leiden, Netherlands. Feb 13th.

2023 **University of Calgary**, *Efficient Focus for Autonomous Agents*
Calgary AB, Canada. Oct 25th. Website.

2023 **LIFE at MIT**, *MaDi: Learning to Mask Distractions from Pixels*
Online reading group "Learning in Foundation Environments." Oct 23rd.

2023 **University of Alberta**, *Efficient Focus for Autonomous Agents*
Edmonton AB, Canada. Aug 25th. Website. Recording.

2023 **PyData**, *Automatic Noise Filtering*
Eindhoven, Netherlands. Apr 26th. Announcement.

2023 **ProDrive**, *Automatic Noise Filtering*
Eindhoven, Netherlands. Feb 16th.

2022 **Jagiellonian University**, *Efficient AI for Autonomous Agents*
Kraków, Poland. Jul 5th.

## Skills

**Technical**

Python, Java, C++, Shell scripts
PyTorch, JAX, TensorFlow
Git, Slurm, Linux, HTML, LaTeX

**Social**

Teamplayer, Educator
Perseverance, Creativity
Leadership, To The Point

**Languages**

Dutch, English (fluent), Spanish, German (basic)

## Awards

2024 AAMAS Scholarship recipient

2023 Spotlight paper: Sparse Neural Networks workshop at ICLR

2023 AAMAS Scholarship recipient

2021 Cum laude MSc graduation

2014 Bèta award: student with highest grades in all STEM courses

2014 Cum laude graduation