Sigmund Hennum Høeg

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Nationality: Norwegian, Born: Nov 17th, 1997

Education

2022– **Ph.D. in Engineering**, *Norwegian University of Science and Technology (NTNU)*, Trondheim
In the Robotics and Automation group, supervised by Olav Egeland and Lars Tingelstad. Focus on generative modeling for robotic manipulation. Expected defence in 2025.

2021–2022 **Exchange**, *ETH Zürich*, Switzerland
With the SEMP Scholarship. Completed graduate-level courses, including 3D Vision, Probabilistic Artificial Intelligence, Autonomous Mobile Robots, Vision Algorithms for Mobile Robots, and Computational Models of Motion.

2017–2022 **Master of Technology**, *ICT and Mechanical Engineering*, NTNU, Trondheim
Average grade: B. Joint program with Computer Science and Mechanical Engineering. Specializing in Robotics and Machine Learning, specifically Computer Vision and Reinforcement Learning.

Professional Experience

2020–2021 **Application developer**, *Eltorque AS*, Trondheim, Norway
Software application development using WXPython, with CAN and USB interfaces to hardware, increasing functionality and user experience. Automated acceptance testing using the Robot Framework. 20% part-time position.

2019 **Autonomy Engineer**, *Saga Robotics*, Ås, Norway
4 weeks fo full time. Improved navigation solution for an autonomous agricultural robot in demanding outdoor conditions. Used ROS, C++, and Python.

2018–2019 **Instructor**, *NTNU*, Trondheim, Norway
Exected educational program introducing programming to middle school students. Part-time position.

Academic Results

- "Streaming Diffusion Policy: Fast Policy Synthesis with Variable Noise Diffusion Models," Sigmund Hennum Høeg, Yilun Du, Olav Egeland, Accepted to 2025 International Conference on Robotics and Automation (ICRA)
- "Using Diffusion Ensembles to Estimate Uncertainty for End-to-End Autonomous Driving," Florian Wintel, Sigmund H. Høeg, Gabriel Kiss, Frank Lindseth (Under Review)
- "Temporally Entangled Diffusion Models for Fast Robotic Control," Sigmund H. Høeg, Poster at Generative Modeling meets HRI Workshop at Robotics: Science and Systems (RSS) 2024
- "More Than Eleven Thousand Words: Towards Using Language Models for Robotic Sorting of Unseen Objects into Arbitrary Categories," Sigmund H. Høeg, Lars Tingelstad, Poster at Workshop on Language and Robot Learning at Conference on Robot Learning (CoRL) 2022
- "Learning to grasp: A study of learning-based methods for robotic grasping," Sigmund H. Høeg, NTNU Open, 2022

Projects

Learning to grasp: A study of learning-based methods for robotic grasping

Master thesis. Trained and evaluated RL algorithms for visuomotor control in a simulated Mujoco environment using Robosuite. Grade: A. Supervised by Lars Tingelstad.

Masked Autoencoders Improve Image Classification

Reesearch project for the course Deep Learning, Advanced Course at KTH. Conducted several ablations with a Masked Visual Transformer for an image classification task.

Semester project on RL-based grasping

A review of MDPs, Classical Reinforcement Learning, Deep Reinforcement Learning, and its application to robotic grasping. Supervised by Lars Tingelstad.

Augmented Reality Dataset for Egocentric Action Recognition

Project for the course *3D Vision* at ETH Zürich, consisting of the collecting of a dataset for action recognition from images, object poses, and head, eye, and hand tracking. Used Microsoft Hololens as a collection platform. Tracked objects with ArUco markers and OpenCV. Supervised by Taein Kwon.

Voluntary Work

2019–2020 **Propulsion and levitation lead**, *Shift Hyperloop NTNU*, Trondheim, Norway
Voluntary board position and founding member of a technical student organization. Led a team performing research and development of a linear induction motor with industrial partners for a Hyperloop Pod prototype.

2018–2019 **Team Member**, *Vortex NTNU*, Trondheim, Norway
Development of an Autonomous Underwater Vehicle to compete in RoboSub in San Diego. Experience with ROS and C++.

2017–2018 **Volunteer**, *Studentsamfundet*, Trondheim, Norway
Executed live, multi-camera concert recording, mixing, and broadcasting during Norway's largest cultural festival, UKA.

Co-Supervisor of Master Students

- Simen Marentius Saxegaard, "Autonomous Vehicle Control through Diffusion Models, 2024
- Niilo Emil Isosomppi, "Robot Environment for Development of Diffusion-based Imitation Learning Policies," 2024
- Hedvig Skorge, "Accelerating robotic action inference with consistency models," 2024
- Jakob Eckermann Eikeland, "Untrained Yet Effective Robot Control: Using Large Language Models for Task Decomposition and Policy Generation," 2024

Technical Skills

Programming	Python, Java, C++
Tools & Technologies	PyTorch, Mujoco, PyBullet, JAX, OpenGL, MATLAB and Simulink, SQL, Julia, Scikit-learn, OpenCV, Microsoft HoloLens, ROS, Git, Blender

Research Interests

General-purpose robotics, Imitation Learning, Reinforcement Learning, Generative Models, Diffusion Models, Manipulation, Language-conditioned Manipulation, Vision-Language-Action Models (VLAs), Vision-Language Models (VLMs)

Conference Participation

- Robotics: Science and Systems (RSS), 2022, New York, USA
- Conference on Robot Learning (CoRL) 2022 , Auckland, New Zealand
- International Conference on Intelligent Robots and Systems (IROS) 2023, Detroit, USA
- Robotics: Science and Systems (RSS), 2024, Delft, Netherlands

Memberships

- Member of the Norwegian Society of Graduate Technical and Scientific Professionals (Tekna)
- Member of IEEE and the Robotics and Automation Society

References

- **Lars Tingelstad** *Co-Founder & CTO at T-robotics*
  Phone: (+47) 97736854, Email: lars.tingelstad@t-robotics.ai
- **Olav Egeland** *Professor, Department of Mechanical and Industrial Engineering, NTNU*
  Phone: (+47) 90160008, Email: olav.egeland@ntnu.no

Personal Interests and Skills

Music, lead climbing, ski touring, driver's license

Languages	Norwegian (Native Speaker), English (Fluent), German (Good)