

TIM VERBELEN

Minimizing Free Energy since 1986 | 

ABOUT ME

I'm a passionate researcher working on self-learning robots that develop new perception and control skills using deep learning. My goal is to push the boundaries of computer science in the domain of representation learning and reinforcement learning, inspired by cognitive neuroscience theories such as active inference.

EXPERIENCE

- 2021 - Now** Lecturer, *Ghent University*
- I teach the specialist course on "Deep Generative Models", covering current state-of-the-art generative models, such as variational autoencoders, generative adversarial networks, normalizing flows, diffusion models and the active inference framework.
- 2016 - Now** Senior Researcher, *Ghent University - imec*
- I bootstrapped a robotics lab and lead a team working on learning algorithms for robots. Currently mentoring 5-6 PhD students focusing on active inference and robotics.
- 2014 - 2016** Research Engineer, *Ghent University - iMinds*
- Within the iMinds strategic IoT program I worked on core technologies for distributed machine learning for IoT applications.
- 2013 - 2014** Postdoctoral Researcher, *Ghent University*

EDUCATION

- 2009 - 2013** Ph.D. Computer Science, Ghent University, Dissertation: *Adaptive Offloading and Configuration of Resource Intensive Mobile Applications*
- 2004 - 2009** M.Sc. Computer Software Engineering, Ghent University, *Magna cum laude*

OTHER

- Initiator and co-organizer of the International Workshop on Active Inference (IWAi)
- Member of the Scientific Advisory Board of the Active Inference Institute
- Invited Researcher (2014 - 2020) for the OSGi Alliance working on specifications for distributed systems

PUBLICATIONS

I have co-authored over 20 articles in international peer-reviewed journals and contributed to over 50 conference articles, among which some at leading ML (Neurips, AAI) and Robotics (ICRA, IROS) venues.

A few selected papers are listed below, for a full list have a look at <https://scholar.google.be/citations?user=G86XVPEAAAAJ>

- Adam Safron, Ozan Çatal, **Tim Verbelen**, *Generalized Simultaneous Localization and Mapping (G-SLAM) as unification framework for natural and artificial intelligences*, Frontiers in Systems Neuroscience, 2022.
- Pietro Mazzaglia, Ozan Çatal, **Tim Verbelen**, Bart Dhoedt, *Curiosity-Driven Exploration via Latent Bayesian Surprise*, AAI, 2022.
- Pietro Mazzaglia, **Tim Verbelen**, Bart Dhoedt, *Contrastive Active Inference*, NeurIPS, 2021.
- Ozan Çatal, **Tim Verbelen**, Toon Van de Maele, Bart Dhoedt, Adam Safron, *Robot navigation as hierarchical active inference*, Neural Networks, 2021.
- Ozan Çatal, Wouter Jansen, **Tim Verbelen**, Bart Dhoedt, Jan Steckel, *LatentSLAM: unsupervised multi-sensor representation learning for localization and mapping*, ICRA, 2021.
- Ozan Çatal, Samuel Wauthier, Cedric De Boom, **Tim Verbelen**, Bart Dhoedt, *Learning generative state space models for active inference*, Frontiers in Computational Neuroscience, 2020.
- Elias De Coninck, **Tim Verbelen**, Pieter Van Molle, Pieter Simoens, Bart Dhoedt, *Learning to grasp arbitrary household objects from a single demonstration*, IROS, 2019.
- Steven Bohez, **Tim Verbelen**, Elias De Coninck, Bert Vankeirsbilck, Pieter Simoens, Bart Dhoedt, *Sensor fusion for robot control through deep reinforcement learning*, IROS, 2017.