

Olaf Lipinski

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Artificial Intelligence (AI) Ph.D. specialising in multi-agent systems and deep learning. Expertise in designing and implementing novel neural network architectures using large scale compute infrastructure. Strong publication track record in AI research, with extensive knowledge of both theoretical and practical aspects of machine learning.

EDUCATION

University of Southampton | *Ph.D. in Artificial Intelligence* 2020 – 2025

- **Thesis:** Temporal Dynamics in Emergent Communication
- Supervised by Prof. Timothy Norman, Prof. Adam Sobey, and Prof. Federico Cerutti.
- Investigated the effect of time on communication protocols, improving agents' strategy development, and convergence speed by up to 50%.
- Designed an architecture necessary for the emergence of temporal referencing in agent communication, enabling efficient communication.
- Developed human-interpretable measures for an emergent language containing local spatio-temporal relationships.
- Built end-to-end ML pipelines for agent training and evaluation.
- **Expertise:** AI/ML, Python, PyTorch (Lightning), Ray (RLlib).
- **Professional Skills:** Research impact, research communication, academic collaboration.

University of Liverpool | *B.Sc. in Computer Science* 2016 – 2020

- **First Class Honours**
- **Thesis:** Feasibility of Quantum Computers with Regards to Defeating Cryptographic Hashes
- **Expertise:** Java, SQL, Assembly, C, and PROLOG.
- **Professional Skills:** Module on IT professionalism and industry standards.

EXPERIENCE

University of Southampton Feb 2025 – Present Research Fellow Southampton, UK

- Working with industry partners on car carrier design optimization through ML.
- Implementing neural networks to estimate wave-induced power requirements.
- Building custom loss functions for maritime experimental data analysis.
- Initial models accelerate added power predictions for car carrier hulls by **100x** vs semi-empirical methods.
- **Expertise:** AI/ML, Python, PyTorch, MLOps (MLflow), Scientific ML

Intel Corporation Jul 2018 – Aug 2019 HPC Technical Engineer Intern Swindon, UK

- Managed client-facing HPC and Cloud facilities, ensuring optimal performance.
- Collaborated on pre-production hardware projects, developing technical solutions.
- Created deployment documentation and automation scripts to improve system efficiency.
- **Expertise:** HPC, Cloud, Bash, Linux, Server Hardware.

VLDB Solutions Jun 2017 – Apr 2018 Technical Consultant Liverpool, UK

- Developed Bash and SQL scripts for customer data analysis using AWS services.
- Progressed from intern to part-time role across multiple projects.
- **Expertise:** Big Data, Amazon AWS (EC2, S3, Redshift), SQL, Bash.

PUBLICATIONS

1. **Olaf Lipinski**, Adam J. Sobey, Federico Cerutti, and Timothy J. Norman. *Speaking Your Language: Spatial Relationships in Interpretable Emergent Communication*. In **Neural Information Processing Systems (NeurIPS)**, December 2024
2. **Olaf Lipinski**, Adam J. Sobey, Federico Cerutti, and Timothy J. Norman. *It's About Time: Temporal References in Emergent Communication*. In **arXiv:2310.06555 (Under review)**, October 2023
3. **Olaf Lipinski**, Adam J. Sobey, Federico Cerutti, and Timothy J. Norman. *Emergent Password Signalling in the Game of Werewolf*. In **Emergent Communication Workshop at ICLR 2022**, April 2022

CONFERENCES AND TALKS

Interpretable Emergent Communication Poster **NeurIPS 2024** Vancouver, CA | Dec 12, 2024
Emergent Communication Workshop **The Alan Turing Institute** London, UK | Oct 24, 2023
Emergent Password Signalling **Boldrewood** Southampton, UK | Feb 28, 2022

PUBLIC ENGAGEMENT

What is emergent communication? **ABC Radio Melbourne** Virtual, Australia | Dec 4, 2024
Could we ever decipher an alien language? **The Conversation UK** Virtual, UK | Nov 7, 2024
Path to a career in science **Coopernicus Foundation** Virtual, Poland | Jun 29, 2024

OPEN - SOURCE PROJECTS

- Contributed to high-impact open-source projects such as **TensorFlow**, **Ray**, **RLLib**, and OpenAI **Gym/Farama Gymnasium**.
- Developed and maintained a Python package, **emlangkit**, which provides tools for analysing the emergent language of agents. The package features a full automation pipeline, continuous integration/continuous deployment (CI/CD), and automated releases to PyPI.
- Developed **NobelGPT**, based on llama 3.1 and GPT-2/3, trained to reproduce the writing style of Polish Nobel laureates.

SKILLS

Programming Python | Bash | Git | GitHub | PyCharm | Jupyter Notebook

Artificial Intelligence PyTorch | RLLib | Reinforcement Learning | Multiagent Systems | Machine Learning | RNNs | Pandas | NumPy | Scikit-learn | Data Visualization | MLFlow | Experiment Tracking

Cloud & HPC Enterprise Linux | HPC | SLURM | Docker | Automation (Salt)

Languages English (Native/C2) | Polish (Native/C2) | Portuguese (Basic/A2)

INTERESTS

Homelabbing

- Designed and managed a personal homelab, using self-hosted infrastructure.
- Set up a private GitLab server, integrated with node monitoring.
- Automated infrastructure provisioning using Salt and MAAS.
- Built real-time monitoring system for IoT sensor network.
- Currently implementing Kubernetes-based microservices architecture.

Other Interests

Reading science fiction, Sourdough baking, Developing own PCBs