# Curriculum Vitae
## Rickard Karlsson

## Education

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| 2021 – 2025 | **Ph.D. Computer Science** at Delft University of Technology, the Netherlands.<br>**Dissertation topic:** Machine learning & causal inference<br>**Advisors:** dr.ir. Jesse H. Krijthe & prof.dr.ir. Marcel Reinders |
| 2019 – 2021 | **M.Sc. Engineering Mathematics** at Chalmers University of Technology, Sweden.<br>**Specialization:** Statistics & machine learning<br>**Thesis project:** Learning using privileged time-series |
| 2016 – 2019 | **B.Sc. Engineering Physics** at Chalmers University of Technology, Sweden.<br>**Thesis project:** Event reconstruction of gamma-rays using neural networks |

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## Visiting Positions

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| 2023 Fall | **Harvard University** – Cambridge, Massachusetts, USA<br>Visiting research scholar. Hosted by Prof. Issa Dahabreh in CAUSALab. |
| 2020 Spring | **Delft University of Technology** – Delft, the Netherlands.<br>Erasmus exchange M.Sc. student. |

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## Previous Research Projects

A list of publications can be found at the end of the CV.

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| 01/2021–06/2021 | **Chalmers University of Technology** – Gothenburg, Sweden.<br>*Master Thesis Project (Supervisor: dr. Fredrik D. Johansson)*<br>Studied how to use data that is only available during training time of a predictive model and not at test time to improve sample efficiency for long-term predictions. Proved that there are finite-sample theoretical guarantees for when using such data leads to improvements and worked on a case study of modeling disease progression for Alzheimer's disease and Multiple Myeloma. Led to first-author paper at AISTATS 2022 in collaboration with the MIT Clinical ML lab. |

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| 07/2020–09/2020 | **Delft University of Technology** – Delft, the Netherlands. |
| | *Part-Time Research Assistant (Supervisor: dr. Laurens Bliek)* |
| | Studied black-box optimization using surrogate models by analyzing & comparing different classes of methods for discrete variable problems. I also helped develop an open-source benchmark for testing these methods. My findings resulted in two research papers, one of them with me as the first author, and I was also involved in winning a competition about optimization at GECCO 2021. |
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| 01/2019–06/2019 | **Chalmers University of Technology** – Gothenburg, Sweden. |
| | *Bachelor Thesis Project (Supervisor: prof.dr. Andreas M. Heinz)* |
| | Developed deep learning models in TensorFlow for analysis of data from high-energy subatomic physics experiments. Our method performed better than the current state-of-art for higher gamma-ray energies of 3.5 to 10 MeV. |

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## Work Experience

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| 07/2020–12/2020 | **Apro Translation AB** – Gothenburg, Sweden. |
| | *Software Developer Consultant (part-time during studies)* |
| | Developed a program in Java to automate order confirmation and other time-consuming computer tasks at the company. This allowed the company to accept new translation jobs with a much higher success rate as they now could instantly accept new jobs that arrive on a "first come, first served" basis. |
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| 06/2019–08/2019 | **NASA Goddard Space Flight Center** – Greenbelt, Maryland, USA. |
| | *Data Analyst Intern* |
| | Developed data visualization software in Python for very long-baseline interferometry (VLBI) data with both a graphical and terminal-based interface. This tool helped VLBI scientists more easily spot anomalies in their data. |

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## Teaching & Supervision

**Courses**

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| 2022 – present | Machine Learning 2 (MSc level) at TU Delft. |
| | *Guest lecture on "Causal Machine Learning" and developing course material on causality.* |
| 2022 – present | Machine Learning 1 (MSc level) at TU Delft. |
| | *Teaching assistant.* |

| 2020 | Computational Methods in Bioinformatics (MSc level) at Chalmers Univ. of Tech. *Teaching assistant.* |
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### Supervised projects

| 2023 | *Stefan Creasta* <br> Honours Project: Falsification of Causal Assumptions in Multi-Environment Data <br> *Work was presented at Causal Representation Learning Workshop NeurIPS 2023* |
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| 2023 | *Michelle Chao Chen, Shukung Cheng, Jonathan Tjong, Jort Vincenti* <br> Bachelor Thesis Project: Evaluating Overlap using Machine Learning |
| 2022 | *Stelios Avgousti, Christof Goedhart, Hendy Liang, David van der Maas, Noyan Toksoy* <br> Bachelor Thesis Project: Predicting Outcomes in Dota 2 using Causal Inference |
| 2022 | *Zenan Guan, Jeroen Hoefland, Jochem van Lith, Anxian Liu* <br> Bachelor Thesis Project: Out-Of-Domain Generalization with Invariant Predictors |

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## Awards & Scholarships

| 2021 | 1st place on the GECCO 2021 Industrial Challenge (limited evaluation track). |
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| 2020 | Recipient of the Royal & Hvitfeldtska Foundation scholarship for my academic performances. |
| 2018 | Awarded for best independent project in experimental physics course among more than 110 students. |
| 2017 | Recipient of the Adlerbetska Foundation scholarship for my academic performance during the first year of my bachelors studies. |

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## Extracurriculars and volunteering

| 2022 – 2023 | Co-organizer in Effective Altruism Delft |
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| 2020 – 2021 | Co-organizer in the university chapter of Engineers Without Borders Sweden |
| 2018 – 2019 | Board member at university bookshop Cremona Chalmers AB |
| 2018 – 2019 | President of Chalmers Engineering Student Internship Program (CESIP) |

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## Skills

| Languages | Swedish (native), English (fluent), Dutch (intermediate), Polish (intermediate) |
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| Programming | Python, R, C, Java, PyTorch, TensorFlow, Git, Docker, Kubernetes |

# Publications

Full list of publications is also available on Google Scholar (link).

## Conference

2023   Karlsson, R., and Krijthe, J. H. Detecting hidden confounding in observational data using multiple environments. In *Thirty-seventh Conference on Neural Information Processing Systems* (2023)

2022   Karlsson, R., Willbo, M., Hussain, Z. M., Krishnan, R. G., Sontag, D., and Johansson, F. D. Using time-series privileged information for provably efficient learning of prediction models. In *International Conference on Artificial Intelligence and Statistics* (2022), PMLR, pp. 5459–5484

2020   Karlsson, R., Bliek, L., Verwer, S., and Weerdt, M. d. Continuous surrogate-based optimization algorithms are well-suited for expensive discrete problems. In *Benelux Conference on Artificial Intelligence* (2020), Springer, pp. 48–63

## Journal

2023   Bliek, L., Guijt, A., Karlsson, R., Verwer, S., and de Weerdt, M. Benchmarking surrogate-based optimisation algorithms on expensive black-box functions. *Applied Soft Computing* (2023), 110744

## Workshop Papers / Extended Abstracts

2023   Karlsson, R., Creasta, S., and Krijthe, J. H. Putting causal identification to the test: Falsification using multi-environment data. *Causal Representation Learning Workshop at NeurIPS* (2023)

2022   Bliek, L., Guijt, A., and Karlsson, R. Hospital simulation model optimisation with a random relu expansion surrogate model. In *Proceedings of the Genetic and Evolutionary Computation Conference Companion* (2021), pp. 13–14

## Theses

2021   *Learning using Privileged Time-Series*, Chalmers University of Technology.

2019   *Event reconstruction of gamma-rays using neural networks*, Chalmers University of Technology.

*[CV last updated on January 18, 2024]*