Daniel Barley

Résumé

Winterstr. 40
68219 Mannheim, Germany
+49 151 57501527
daniel.barley@ziti.uni-heidelbreg.de
danielbarley

Personal Information

Date of Birth: 19 June 1995
Place of Birth: Hanau, Germany

Education

2023–2026* **Doctor of Natural Sciences**, *Heidelberg University*, Heidelberg, Germany, On the topic of resource efficient training of large-scale neural networks on GPUs with the Computing System Group
PhD Advisor: Holger Fröning

2019–2023 **MSc. Computer Engineering**, *Heidelberg University*, Heidelberg, Germany, Thesis: "Reducing the State of Large Scale MLPs by Compressing the Backward Pass", with the Computing Systems Group,
PI: Holger Fröning
online: `https://heibox.uni-heidelberg.de/f/1c3896a02a27460aa3f5/?dl=1`
GPA: 3.7

2014–2019 **BSc. Physics**, *Heidelberg University*, Heidelberg, Germany, Thesis: "Development of a Communication Framework for the Analog Network Attached Sampling Unit (ANANAS) System", with the Electronic Visions Group (Human Brain Project),
PI: Johannes Schemmel
GPA: 2.3

Publications

2024 **"Compressing the Backward Pass of Large-Scale Neural Architectures by Structured Activation Pruning"**, *Daniel Barley and Holger Fröning*, Presented at the 6th Workshop on Accelerated Machine Learning (AccML) at HiPEAC 2024, `https://accml.dcs.gla.ac.uk/papers/2024/6th_AccML_paper_8.pdf`

Previous Work Experience

Feb 2020 – Jun 2021 **Scientific Assistant**, *Baden-Wuerttemberg Cooperative State University (DHBW)*, Mannheim, Germany

Various tasks in the context of a mechanical engineering laboratory

- Design, assembly, and integration of a robotics demo/teaching system consisting of:
  - 5 axis gripper robot (IGUS robolink-RL DcI)
  - Host computer for simulation and programming
  - IFM O2D vision sensor
  - RaspberryPi for custom extensions
  - Arduino for gripper control (conversion from 24 V control to 5 V)
- Network/system administration tasks:
  - Remote desktop access to Nvidia Jetson systems for students during COVID
  - Backup policy for laboratory computers using Clonezilla
- Minor repairs of machinery.

External Lecturer, *Baden-Wuerttemberg Cooperative State University (DHBW)*, Mannheim, Germany

Supervision of student work using aforementioned demo system:

- Winter term 2021/22: "Design and Implementation of an External Control Interface for the IGUS robolink-RL DcI Gripper Arm Robot"
- Winter term 2021/22: "Classification and Manipulation of the Rotational Position of Parts Using a Camera-Robot-System"
- Winter term 2022/23: "Extension of an External Control Interface for the IGUS robolink-RL DcI Gripper Arm Robot"

Teaching Assistant, *Heidelberg University*, Heidelberg, Germany

Grading of student work and tutorials for the following lectures:

- Winter term 2019/20: Python for Physicists
  - Basics of Python and Numpy
  - Data fitting using SciPy
  - Plotting using Matplotlib
- Summer term 2022: Parallel Computer Architecture:
  - Flynn's Taxonomy
  - Multithreading with pthreads and OpenMP
  - Shared memory programming
  - Basics of interconnection networks
- Winter term 2022/23: Introduction to High Performance Computing
  - Messaging with MPI
  - Workload characterization (Matmul, Stencil, n-Body)
  - Scaling rules
  - Partitioning

Skills

Administration: Experienced Linux user, cluster computing using slurm

Hardware: Basics in electronics and microcontrollers, soldering skills

Programming Languages

CUDA: Intimate knowledge of GPU architecture, code optimization with profiling tools NSight Compute, source- and PTX/SASS level debugging with cuda-gdb

C/C++: Standard library, STL, and Boost, Multithreading with pthreads and OpenMP, parallel computing with MPI

Python: Good data analysis and visualization skills, machine learning frameworks (PyTorch)

LaTeX: Avid user with tikz and pgfplots experience

Machine Learning

Deep Neural Networks	Familiar with common architectures like MLPs, CNNs, and Transformers mostly in the context of image classification	Resource Efficiency	Combining GPU architecture with machine learning demands with a strong focus on hardware-aware pruning of DNNs during training.

Languages

German	Native	
English	Excellent	*Bilingual certificate*
French	Basics	*School grades 5–10*

Hobbies and Interests

- 8/16-Bit computers and consoles
- Aviation
- Mountainbiking
- Designing and building computer keyboards