

Hans-Nikolai Vießmann

Imminent PhD in Computer Science, with specialisation in Software Engineering, Compiler Development, and High-Performance Computing (HPC). I have practical problem-solving and effective communicating skills, and am experienced with working on large software projects. I can program effectively in C and Python, with some experience with C++. I have some experience with different paradigms, such as imperative/OOP/array programming/functional. I have extensive experience with computer systems and computing hardware, especially with GPUs. Native speaker in English and German. Can re-locate. I am interested in the areas of scientific computing and HPC, and would like to work as a system engineer.



Education

- 08/2019 – 04/2023 **Radboud University**, Nijmegen, NL
Relocated from Edinburgh, UK with supervisor, brought my work with me.
- 09/2015 – 08/2019 **University of Edinburgh** and **Heriot-Watt University**, Edinburgh, UK
Imminent Ph.D. in Computer Science, supervised by Sven-Bodo Scholz
- Focus on array programming language compiler development for heterogeneous systems, with a special interest in GPU programming and HPC.
 - TA'd courses with focus on parallel computing and system programming
 - Thesis title: On Effective GPU Programming through Compiler Generated Code.
- 05/2014 – 05/2016 **University of Edinburgh** and **Heriot-Watt University**, Edinburgh, UK
M.Sc. in Robotics and Autonomous Systems (joint degree), supervised by Sven-Bodo Scholz & Subramanian Ramamoorthy
- Studied software engineering, with a focus on robotics and AI.
 - Research topic: Performance Portability of Multi-threaded Frameworks on Heterogeneous Systems.
- 09/2010 – 04/2014 **Heriot-Watt University**, Edinburgh, UK
B.Sc. Hon. in Computer Science, Supervised by Monica Farrow & Peter King
- Strong focus on software engineering, C and C++, Python, and Java
 - Honours project: Peer-to-peer Mesh Network for Android using WiFi-Direct.
- 09/2008 – 05/2010 **International School of Basel**, Basel, CH
IB Diploma, HL in Mathematics, Economics, and Physics

Experience

- 07/2022 – present **Paul Scherrer Institut**, Villigen, CH
Scientific Computing System Engineer
- In High-Performance Computing and Emerging Technologies (HPCE) group
 - DevOps with focus on sysadmin workflows and tools maintenance
 - Working on project TransAlps in cooperation with Swiss National Computing Centre (CSCS)
 - Migration of HPC process and workflows from PSI to CSCS in Lugano, CH
 - Designing and implementing system infrastructure (both for bare-metal and Kubernetes)
- 10/2014 – present **Single-Assignment C Project**, Remote
Researcher and Contributor
- OSS compiler and functional array programming language
 - Written in C99/C++/Python with pthreads, MPI, and CUDA

- CMake/CTest, Gitlab/Github CI with Docker
 - OSS stdlib and many other packages
- 11/2015 – 01/2022 **Edinburgh Centre of Robotics**, Edinburgh, UK
HPC Cluster Administrator
- Responsible for maintenance and support of facility and users
 - Setup and management of SLURM queue-system, NFS/Ceph filesystems, LDAP databases, networking (including InfiniBand), nVidia GPUs and Intel Xeon Phi, software packages (compilation and install), and the RHEL Linux ecosystem.
- 05/2014 – 10/2014 **British Geological Survey**, Edinburgh, UK
Internship, Software Engineer, supervised by Brian Bainbridge
- Developed solutions to resolve a performance bottleneck in a legacy Fortran HPC application using compiler technologies.
 - This work is part of an academic publication: see below [6].
- 05/2012 – 07/2012 **CloudReach**, Edinburgh, UK
Internship, DevOps
- Supported operations, facilitated migrating customers to cloud-services
 - Helped maintain Docker and AWS-based containers.

Skills

LANGUAGES	<ul style="list-style-type: none"> • English: Native speaker; technical proficiency • German: Native speaker
PROGRAMMING	<ul style="list-style-type: none"> • C (and some C++), some Fortran, Python, SH/BASH scripting, and others • Debugging (gdb, strace, perf), Performance analysis • OpenCL and NVIDIA CUDA, OpenACC, and OpenMP • GitHub Actions, GitLab CI, Docker • Autotools/CMake, version control (git and svn)
SYSTEMS ADMIN	<ul style="list-style-type: none"> • managing servers: hardware and OS, RHEL, Linux, MacOS • virtualised environments: KVM, VirtualBox, Docker • networking: IPv4/IPv6, InfiniBand, SNMP/IPMI
INVESTIGATOR	<ul style="list-style-type: none"> • Practical experience in analysis and profiling of software applications • Knowledge of low-level tools to manipulate and monitor computer hardware • Effective communicator, can produce reports and give presentations

Interests and Hobbies

ELECTRONICS	I like to build audiophile equipment; I also work with embedded systems like Raspberry Pi or Arduino.
PHILOSOPHY	I focus mainly on epistemology, understanding knowledge and truth; I've studied political science and was in a debating society.
CYCLING	Race/trekking, recently began MTB. I also build my own bicycles.

Publications

- [1] A. Šinkarovs, *H.-N. Vießmann* and S.-B. Scholz. 2021. "Array Languages Make Neural Networks Fast". ARRAY'21 @ PLDI'21. Short DOI: 10/gpds
- [2] *H.-N. Vießmann* and S.-B. Scholz. 2020. "Effective Host-GPU Memory Management Through Code Generation". IFL'20. Short DOI: 10/gpwx
- [3] *H.-N. Vießmann*, A. Šinkarovs, and S.-B. Scholz. 2018. "Extended Memory Reuse". IFL'18. Short DOI: 10/c476
- [4] A. Šinkarovs, R. Bernecky, *H.-N. Vießmann*, and S.-B. Scholz. 2018. "A Rosetta Stone for Array Languages". ARRAY'18. Short DOI: 10/c477

- [5] A. Šinkarovs, S.-B. Scholz, R. Stewart, and *H.-N. Vießmann*. 2017. “Recursive Array Comprehensions in a Call-by-Value Language”. IFL’17. Short DOI: 10/c474
- [6] *H.-N. Vießmann*, S.-B. Scholz, A. Šinkarovs, B. Bainbridge, B. Hamilton, and S. Flower. 2015. “Making Fortran Legacy Code More Functional”. IFL’15. Short DOI: 10/c475