Pengcheng **Xu** c/o Systems Group, Stampfenbachstrasse 114, 8092 Zürich, Switzerland 🛛 +41 79 323 95 87 | 🛛 pengcheng.xu@inf.ethz.ch | 🎢 jsteward.moe

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Aut inveniam viam aut faciam. *"I'll either find a way or make one."—Hannibal*

Education

Education		
Systems Group, D-INFK, ETH Zürich	Zürich, Switzerland	
Doctorate Computer Science	Since Dec. 2023	
 Part of the <i>Direct Doctorate in Computer Science</i> degree program Thesis supervisor: Prof. Dr. Timothy Roscoe 		
D-INFK, ETH Zürich	Zürich, Switzerland	
Computer Science MSc	Sept. 2021 - Sept. 2023	
 Part of the <i>Direct Doctorate in Computer Science</i> degree program Thesis supervisor: Prof. Dr. Torsten Hoefler 		
School of EECS, Peking University	Beijing, China	
B.Sc. Computer Science and Technology	Sept. 2017 - Jul. 2021	
 "Summa cum laude"; member of the Turing Class honors program Thesis supervisor: Prof. Yun Liang		
Projects		
NetOS, Systems Group @ ETH Zürich	Zürich, Switzerland	
Doctorate (with Prof. Dr. Timothy Roscoe)	Since Dec. 2023	
• Developing LAUBERHORN, a cache-coherent RPC NIC that is part of the OS		
 Developing TXNLANG, a transaction-based intermediate language for HW formal verification Research focus: OS, networking, architecture, formal verification 		
Scalable Parallel Computing Lab (SPCL) @ ETH Zürich	Zürich, Switzerland	
Master Thesis (with Prof. Dr. Torsten Hoefler)	Mar. 2023 - Sept. 2023	
 Developed FPsPIN, an FPGA prototype of the sPIN in-network-compute paradigm Skills involved: Verilog, FPGA, systems programming in C 		
NetOS, Systems Group @ ETH Zürich	Zürich, Switzerland	
Semester Project (with Prof. Dr. Timothy Roscoe)	Oct. 2022 - Feb. 2023	
 Developed EFRI, an OS-firmware interface for the <i>Enzian</i> research computer Skills involved: systems programming in C, interface design 		
Center for Energy-efficient Computing and Applications (CECA) @ PKU	Beijing, China	
Undergraduate Research (with Prof. Yun Liang)	Dec. 2017 - Jul. 2021	
Developed a prototype RISC-V-based accelerator platform on FPGAs		
 Explored automatic compute intrinsic synthesis through MLIR and accelerator templates Skills involved: Chisel, systems programming in C, compiler design, C++, FPGA 		
Parallel Systems Architecture Lab (PARSA) @ EPFL	Lausanne, Switzerland (remote)	
Research Intern (with Prof. Babak Falsafi)	Jul. 2020 - Jan. 2021	
 Worked on a seL4 port for MIDGARD, a new virtual memory scheme for terabyte-scale memory servers Skills involved: seL4, systems programming in C 		
XG Lab @ Alibaba DAMO Academy	Beijing, China	
Academic Collaboration (with Prof. Chenren Xu & Dr. Pengyu Zhang)	Sept. 2020 - Jan. 2021	
 Developed the FPGA data capture and signal processing pipeline for a custom RFID localization system Skills involved: Verilog, FPGA, systems programming in C 		
PKU Student Supercomputing Competition Team (PKUSC)	Beijing, China	
Team Leader	Nov. 2017 - Nov. 2020	

TEAM LEADER

- Built small clusters under tight power budget to solve super-computing challenges
- Skills involved: SysAdmin, C, C++, CUDA, Fortran

Work

SenseTime

RESEARCH INTERN

- Built the prototype of an in-house tensor compiler for deep-learning applications
- Skills involved: compiler design, C++

Teaching

Teaching	
Advanced Operating Systems, ETH Zürich	Zürich, Switzerland
Assistentz (head TA), Hilfsassistenz (HA)	2022 - 2025
System Programming and Computer Architecture, ETH Zürich	Zürich, Switzerland
Assistenz (head TA)	2024
Computer Systems, ETH Zürich	Zürich, Switzerland
HILFSASSISTENZ (HA)	2022
Computer Networks (Honor Track), Peking University	Beijing, China
Teaching Assistant (TA)	Sept. 2020 - Feb. 2021
Developed a lab assignment for students to implement their own NIC on FPGAs	
Publications	
Pengcheng Xu, Timothy Roscoe. "The NIC should be part of the OS."	Banff, Alberta, Canada
The ACM SIGOPS Workshop on Hot Topics in Operating Systems (HotOS)	May 2025
Anastasiia Ruzhanskaia, Pengcheng Xu , David Cock, Timothy Roscoe. "Rethinking	Online
Programmed I/O for Fast Devices, Cheap Cores, and Conerent Interconnects"	
ARXIV	Oct. 2024

Timo Schneider, Pengcheng Xu, Torsten Hoefler. "FPsPIN: An FPGA-based Open-Hardware Research Platform for Processing in the Network" arXiv

Pengcheng Xu. "Full-System Evaluation of the sPIN In-Network-Compute Architecture" ETH LIBRARY

Pengcheng Xu. "Enzian Firmware Resource Interface" ETH LIBRARY

Zejia Fan, Yuchen Gu, Zhewen Hao, Yueyang Pan, Pengcheng Xu, Yuxuan Yan, Fangyuan Yang, Zhenxin Fu, Yun Liang. "Critique of 'MemXCT: Memory-Centric X-Ray CT Reconstruction With Massive Parallelization' by SCC Team From Peking University" IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS (TPDS)

Qingcheng Xiao, Size Zheng, Bingzhe Wu, Pengcheng Xu, Xuehai Qian, Yun Liang. "HASCO: Towards Agile HArdware and Software CO-design for Tensor Computation" INTERNATIONAL SYMPOSIUM ON COMPUTER ARCHITECTURE (ISCA)

Yihua Cheng, Zejia Fan, Jing Mai, Yifan Wu, Pengcheng Xu , Yuxuan Yan, Zhenxin Fu, Yun Liang.
"Critique of 'Planetary Normal Mode Computation: Parallel Algorithms, Performance, and
Reproducibility' by SCC Team From Peking University"
IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS (TPDS)

Online

May. 2024

ETH Zurich

Sept. 2023

ETH Zurich

Feb. 2023

Journal

Jan 2022

Worldwide

June 2021

Journal

Jan. 2021

Posters Pengcheng Xu, Jasmin Schult, Zikai Liu, Roman Meier, Timothy Roscoe. "Lauberhorn: a Rotterdam, the Netherlands Smart NIC that is part of the OS" EUROPEAN CONFERENCE ON COMPUTER SYSTEMS (EUROSYS) Apr. 2025 Pengcheng Xu, Jasmin Schult, Anastasiia Ruzhanskaia, David Cock, Timothy Roscoe. "Enzian Santa Clara, CA, USA fast RPC: merging OS and NIC on coherent interconnects" USENIX SYMPOSIUM ON OPERATING SYSTEMS DESIGN AND IMPLEMENTATION (OSDI) Aug. 2024 Honors & Awards Second Place, Virtual Student Cluster Competition at SC'20 2020 Global Event • Worked as leader in charge of cloud cluster management and the mystery task • Team ranked top on the CESM (Community Earth System Model) application 2019 First Prize, ASC Student Supercomputing Challenge 2019 Dalian, China • Worked as leader in charge of system install and administration, benchmarks, logistics, and the mystery task

2019	SenseTime Scholarship 2019	Beijing, China
2018	Award for Scientific Research, Peking University	Beijing, China
2018	Prize of Excellence, IBM OpenPOWER/CAPI and OpenCAPI Heterogeneous Computing Design Contest	Beijing, China
	Worked to build an FPGA accelerator for BCrypt on the OpenCAPI FPGA-host platform	
2018	Second Prize, Peking University Collegiate Programming Contest	Beijing, China
2018	Accepted & Passed, Google Summer of Code 2018 with Gentoo Foundation	Global Event

• Worked to modularize Android system upgrades with Portage and LXC