



Zhiccan Zhou

PhD Candidate, Integrated Photonics Laboratory (IPL), KAUST

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Education

King Abdullah University of Science & Technology

- ❖ Computer, Electrical & Mathematical Sciences and Engineering
- University of Texas at Austin (UT Austin)
 - ❖ Chandra Department of Electrical and Computer Engineering

PhD Candidate 2022.9 – present

Jeddah, Saudi Arabia

Visiting Student 2024.4 – 2024.7

Austin, USA

Nankai University & National Center for Nanoscience and Technology, China (NCNST)

- ❖ Photonics & Photonic Technology, top 5% of class

Joint M.Sc.

2019.9 – 2022.6

Chongqing University

- ❖ Materials science and technology, Top 10% of class

B. Eng

2015.9 – 2019.6

Chongqing, China

Technical skills

- ❖ **PIC design & tape-out:** Compute-oriented PIC layout design; SiPh foundry tape-outs (1× passive, 1× active);
- ❖ **Integrated lasers & PIC characterization:** MLL / DFB / VCSEL characterization (LIV, spectrum, RIN, linewidth), WDM high-speed optical/electrical testing (OSA, AWG, OSC, optical coupling, etc.);
- ❖ **Photonic / electronic modeling & simulation:** SiPh device & link-level simulation (Lumerical/Tidy3D), SPICE electronic simulation, physics-based opto-electronic system modeling and numerical performance analysis;
- ❖ **Programming & algorithm development:** Python neural-network design and training, hardware-aware algorithm co-design, MATLAB automated testing.

Research experience

Heterogeneously integrated quantum-dot laser driven integrated photonic neuromorphic computing system

- ❖ Designed and fabricated integrated photonic tensor core, involving Mach-Zehnder modulators and microring resonators;
- ❖ Analyzed device behavior such as EO bandwidth, insertion loss, thermal characteristics, and mode structure to guide system-level architecture design;
- ❖ Using heterogeneously integrated quantum dot mode-locked laser to drive the opto-electronic full packaged PIC system for high-precision and high-speed characterization;
- ❖ Software-hardware co-design to realize AI computation on hardware, including model quantization and compression, feedback control and adaptive tuning algorithms.

Development of chaos-based VCSEL encryption and anti-counterfeiting applications

- ❖ Engineered low-coherence VCSELs operating in chaotic regime for ultra-fast and high-complexity key generation;
- ❖ Developed AI-driven dynamic key matching and management system for automated authentication.

Project experience

Principal contributed student:

- [1] **Optoelectronic Hardware Acceleration for Variational Autoencoder**, Program from center of Excellence in Data Science and Artificial Intelligence (SDAIA), 01/01/2023-01/01/2024, budget US\$ 53,320.
- [2] **Fast and Energy-efficient Photonic Integrated Circuits Powered by Quantum Dot Lasers for Artificial Intelligence Models**, Opportunity Fund Program (OFP) in KAUST, 01/01/2024-06/01/2025, budget US\$ 200,000.
- [3] **Broadband Photonics with Quantum Dot Driven Lithium Niobate Integrated Circuits**, Competitive Research Grant (CRG) in KAUST, 01/04/2025-01/04/2028, budget US\$ 765,000.

- [4] **Unlocking AI Acceleration: Integrated Silicon Photonics with Quantum Dot Lasers**, Basic Science Grant (BSG) from Research Development and Innovation Authority (RDIA) of Saudi, from 01/06/2025, budget US\$ 350,000.
Exhibit: 2025 Future Economic Innovation Week, Riyadh (student representative)

Participating student:

- [3] **Monolithic Integration for Future Mobility**, Semiconductor Initiative 2022 project, 12/01/2022 – 11/30/2023, budget US\$ 162,500.
- [4] **Autonomous Mining: Leveraging Silicon Photonics-Integrated LiDAR for Driverless Systems**, KAUST-Translational Research Grants (TRG), 06/30/2024 – 06/30/2027, budget US\$ 1,500,000.

Publication, Services & Awards

- ❖ Over 400 citations by 2025, total journal impact factor >50 (Published, first and co-first).
- ❖ Google scholar page: <https://scholar.google.co.uk/citations?user=KL0TOIEAAAJ&hl=en>.

First/Co-first authored:

- [1] **Zhican Zhou**, Xiangpeng Ou, Yuetong Fang, Emad Alkhazraji, Renjign Xu, Yating Wan, and John E. Bowers, “Prospects and applications of on-chip lasers”, *elight*, 2023, 3(1), pp.1-25. Cover paper, 2024 IF = 32.1.
- [2] **Zhican Zhou**, Xuhao Wu, William He, Xinhai Wang, Xiangpeng Ou, Hanguang Liao, Yuxuan Xie, Ying Shi, Di Wang, Atif Shamim, Duanni Huang, Haisheng Rong, John E. Bowers and Yating Wan, “Integrated Quantum Dot Laser for Photonic Driven Parallelized Edge Computing”, Under review, Advanced Photonics.
- [3] **Zhican Zhou**, Hang Lu, Nakul Nandhakumar, Omar Alkhazraji, Xiangpeng Ou, Heming Lin, Tien Khee Ng, Boon S. Ooi, and Yating Wan, “Low-Latency Security System Utilizing Photonic Physical Unclonable Functions with Dynamic Deep Learning-Enhanced Authentication”, Under Review, Nature Electronics. Preprint version: doi.org/10.21203/rs.3.rs-6484421/v1.
- [4] **Zhican Zhou**, Hanguang liao, William He, Xiangpeng Ou, Qipeng Yang, Xuhao Wu, Xinhai Wang, Ying Shi, Atif Shamim, Xingjun Wang, Yan Yang and Yating Wan, “Multi-User Wireless Health Monitoring System Using an Integrated Photonic Tensor Core”, In preparation.
- [5] Hang Lu, **Zhican Zhou**[†], Juan M. Mosquera, Heming Lin, Omar Alkhazraji, Yating Wan, and Boon S. Ooi, “Optical Multi-Key Authentication Leveraging VCSEL Far-Field Patterns and Deep Learning”, Submitted, Light: Science & Applications.
- [6] Xiaowen Zhang[†], Xiangpeng Ou[†], **Zhican Zhou**[†], Han Xiao, Yuxuan Huang, Chen Liu, Yujia Zhai, Xiaofeng Liu, Xixiang Zhang, Yating Wan, “Integrated van der Waals Waveguides for All-Optical Nonlinear Photonic Circuits”, Under review, Nature Photonics.
- [7] **Zhican Zhou**, Fengyou Yang, Shu Wang, Lei Wang, Xiaofeng Wang, Cong Wang, Yong Xie, and Qian Liu, “Emerging of Two-dimensional Materials in Novel Memristor”, *Frontiers of Physics*, 2022, 17(2), 23204. 2024 IF = 5.3.
- [8] Shu Wang[†], **Zhican Zhou**[†], Fengyou Yang, Cong Wang, and Qian Liu, “All-atomristor logic gates”, *Nano Research*, 2023, 16(1): 1688-1694. 2024 IF = 9.0.
- [9] Shu Wang[†], **Zhican Zhou**[†], Bo Li, Cong Wang, and Qian Liu, “Progress on New-Ge LDW technique based on Laser-matter interaction,” *Materials Today Nano*, 2021, 16, 100142. 2024 IF = 8.2.

Co-authored:

- [10] Yuxuan Xie, Corey A. McDonald, Theodore J. Morin, **Zhican Zhou**, Jonathan Peter, John E. Bowers, and Yating Wan “Tunable Lasers Hybrid Integrated with Silicon Photonics at 2.0-μm”, *Photonic Research*, 2025, 550770, 2024 IF = 7.2.
- [11] Maolin Chen, Yinchang Ma, Nabeel Aslam, Chen Liu, Yiqiang Chen, Linqu Luo, Xiaowen Zhang, Kairan Mai, Han Xiao, Kaichen Zhu, Osamah Alharbi, Dongxing Zheng, Xiangming Xu, Hanguang Liao, Yiming Yang, Heng Wang, **Zhican Zhou**, et. al “Opto-reconfigurable wafer-scale hBN/Si mixed-dimensionalmemristors with an ultrawide bandwidth”, *Nature Nanotechnology*, 2025, 1-8. 2025 IF = 35.1.
- [12] Junqi Wang, Shengyao Chen, Huan Liu, Yusong Qu, You Li, Lijun Ma, Xiaoshan Du, Shu Wang, **Zhican Zhou**, Cong Wang, Junjie Qi, Qian Liu. “High-performance self-powered MoS1. 2Se0. 8 lateral homojunction photodetector with broadband spectrum response.” *Applied Physics Letters* 127, 2025, no. 14. 2024 IF = 3.6.
- [13] Meng Wang[†], Xiaofeng Wang[†], **Zhican Zhou**, Feng Xia, Haoran Zhang, Artem Shelaev, Xinzhen Zhang, Chuanfei Guo, Jingjun Xu, Qian Liu, “High-spatial-resolution composition analysis of micro/nano-structures with a nanoscale compositional variation,” *Nano Research*, 2023, 16.1: 1090-1095. 2024 IF = 9.0.
- [14] Yueqi Li, Zhuxue Chen, Xuanping Zhou, Xianxin Wu, **Zhican Zhou**, Zhangqiang Li, Liuyang Xiao, Qian Liu, Xinfeng Liu, and Yong Zhang. "Nanopore/Nanosphere-Induced Optical Enhancement of Monolayer MoS₂." *Advanced Optical Materials*, 2023,

- [15] Fengyou Yang, Shengyao Chen, Huimin Feng, Cong Wang, Xiaofeng Wang, Shu Wang, **Zhican Zhou**, Bo Li, Lijun Ma, Haiguang Yang, Yong Xie, and Qian Liu, "High-performance optoelectronic memory based on bilayer MoS₂ grown by Au catalyst," *Journal of Materials Chemistry C*, 2020, 8(8): 2664-2668. 2024 IF = 5.2.
- [16] Xiaofeng Wang, Haiguang Yang, Huimin Feng, Lei Wang, Shengyao Chen, **Zhican Zhou**, Shu Wang, and Qian Liu, "Shape-dependent close-edge 2D-MoS₂ nanobelts," *RSC Advances*, 2020, 10 (55): 33544-33548. 2024 IF = 4.6.
- [17] Shengyao Chen, Shu Wang, Wenqi Xiong, **Zhican Zhou**, Cong Wang, Xinzhen Zhang and Qian Liu, "Laser modulation of the FePS₃-based synaptic flexible memristors," *Nanotechnology*, 2024, 36(5), 055201. 2024 IF = 2.9.

Conference paper:

- [1] **Zhican Zhou**, Yuetong Fang, Xiangpeng Ou, William He, Xuhao Wu, Renjing Xu, David Z. Pan, and Yating Wan, "On-Chip Quantum Dot Lasers Driven High-Speed Optical Neural Networks", *Conference on Lasers and Electro-Optics (CLEO) 2024*, Charlotte, North Carolina, USA. (Oral Presentation)
- [2] **Zhican Zhou**, William He, Yuxuan Xie, Xuhao Wu, Xiangpeng Ou, Xinhai Wang, and Yating Wan, "On-chip Quantum Dot Lasers for Photonic Processing Unit on Silicon-Based Heterogeneous Platform", *IEEE Photonics Conference (IPC) 2024*, Rome, Roma provincial, Italy. (Oral Presentation)
- [3] Hanqing Zhu, **Zhican Zhou**, Shupeng Ning, Xuhao Wu, Ray Chen, Yating Wan and David Z. Pan, "ENLighten: Lighten the Transformer, Enable Efficient Optical Acceleration", Accepted, Asia and South Pacific Design Automation Conference (ASP-DAC) 2025. Preprint version: arxiv.org/abs/2510.01673. (Oral Presentation)
- [4] Nakul Nandhakumar, **Zhican Zhou**, Hang Lu, Omar Alkhazraji, Boon S. Ooi, and Yating Wan, "Deep Learning-Enhanced Dynamic Security System Based on Photonic Physical Unclonable Functions", *Conference on Lasers and Electro-Optics (CLEO) 2024*, Long Beach, California, USA. (Oral Presentation)
- [5] Xiangpeng Ou, **Zhican Zhou**, William He, Ying Shi, and Yating Wan. "Advancing post-Moore performance scaling in Si photonics: heterogeneous integration of quantum dot lasers." In *Novel In-Plane Semiconductor Lasers XXIII 2023*, p. PC129050A. SPIE, Tokyo Bay, Japan. (Oral Presentation)
- [6] Xiangpeng Ou, **Zhican Zhou**, William He, Artem Prokoshin, Ying Shi, Emad Alkhazraji, and Yating Wan. "On-Chip Lasers in Silicon Photonics: Pathways to Integration and Applications." *IEEE Photonics Conference (IPC) 2023*, pp. 1-2. IEEE, Orlando, Florida, USA. (Oral Presentation)

Peer Review & Awards:

- ❖ Reviewed >10 manuscripts for Nature Communications; Light: Science & Applications; PhotoniX, Photonic Research, Journal of lightwave technology, NeurIPS and ICLR.
- ❖ KAUST CEMSE Dean's Award (Top 20%), NCNST Outstanding Graduate (Top 1%), Nankai University Outstanding M.Sc. (Top 5%), Nankai University Thesis Excellence (Top 1%), Chongqing University Outstanding Undergraduate (Top 10%).