HAOZHI ZHANG

Tel: (872) 724-9468 | haozhi.b.zhang@outlook.com | LinkedIn | Google Scholar | GitHub

SUMMARY

Ph.D. photonics engineer with 5+ years of experience in silicon photonic device design, testing, and automation. Skilled in developing passive and active components (MMIs, couplers, modulators, detectors) using Lumerical FDTD/COMSOL, and translating designs into validated PDK-compatible layouts in KLayout. Experienced in high-precision optical/electrical testing, instrument automation (Python, MATLAB), and data-driven performance optimization for photonic components and subsystems

SKILLS

Photonic Design & Simulation

- Lumerical FDTD/Mode, COMSOL, (component & system-level design)
- Passive/active device: AWGs, MMIs, couplers, photodetectors, modulators
- PIC schematic/layout design: KLayout, Cadence Virtuoso

Testing & Automation

- Optical testing of photonic devices with lasers, VNAs, and probe stations
- Automated data collection and control via Python & MATLAB
- Optical coupling optimization, fiber alignment, device characterization

Data Analysis & Process Interaction

- Statistical data analysis, parameter extraction, and test correlation for PDK validation
- Experience with foundry collaboration, DFM optimization, and MPW process runs

WORK EXPERIENCE

Ligent Technologies — South Plainfield, NJ
Process R&D Engineer — Jul 2024 – Present

- Developed custom FDTD and lithography co-simulation frameworks (GitHub-linked) to validate silicon photonic component and system-level designs (couplers, gratings), enhancing CD uniformity by 10% and reducing feature variability by 20 nm
- Designed and implemented optical test setups and automated measurement workflows to validate component performance and coupling efficiency, reducing manual measurement time by 50% and improving data accuracy across multiple device lots
- Validated PDK device libraries (MMIs, couplers, grating couplers) across 3 MPW runs and 200+ test structures, correlating simulation and measurement within ±5% accuracy, and collaborated with foundries to refine design-rule parameters
- Supported qualification of photonic components for LiDAR and 800G datacom programs, coordinating 100+ device-level tests and reliability analyses, and providing data-driven feedback that reduced retest cycles by ~30% across successive wafers

University of Chicago — Chicago, IL
Doctoral Researcher — Sep 2017 – Jun 2023

- Designed and characterized high-density optoelectronic detector arrays (>80k pixels, 300 nm features) using Lumerical MODE/FDTD for mask layout and performance validation; achieved 100 A/W responsivity and >10^8 Jones detectivity
- Engineered photonic crystal and plasmonic metal nanostructures to enhance electric field coupling between semiconductor nanocrystals and infrared light, achieving up to 100× improvement in device performance at 4-5 micron
- Developed automated Python-based testing and data-analysis pipelines, reducing manual analysis time by 85%
- Mentored 40+ graduate students on photolithography and nanofabrication techniques, establishing lab-wide process training

Oliver Wyman — Boston, MA
Senior Consultant — Apr 2023 – May 2024

- Developed an automated competitor analysis tool for clients by web scraping to track oncology drug and biomarker targets

EDUCATION

University of Chicago — Chicago, IL
Ph.D. in Molecular Engineering | GPA: 3.9 — Sep 2017 – Jun 2023

- **Relevant Focus**: Design, fabrication, and testing of photonic and optoelectronic devices
- **Publications**: Four first-author papers in top nanomaterials journals

University of Oxford — Oxford, England
M.Sc. and B.Sc. in Chemistry | GPA: 4.0 — Oct 2013 - Jun 2017

- Awarded Academic Distinction Scholarship (Top 10%), received academic excellence award for dissertation

SELECTED PROJECTS

- **Silicon Photonics Testing Automation:** Developed Python and MATLAB scripts to automate optical/electrical test routines for couplers and modulators, improving throughput and data consistency across wafer-level measurements
- **PDK Component Validation:** Used Lumerical MODE and KLayout to verify design–fabrication correlation of standard passive components; provided feedback for layout parameter tuning and performance benchmarking

SELECTED PUBLICATIONS

- **Zhang, H.**, Peterson, J. C., Guyot-Sionnest, P. "Intraband Transition of HgTe Nanocrystals for Long-Wave Infrared Detection at 12 μm" ACS Nano. 2023, vol. 17, issue 8, 7530–7538