

ANG CHEN

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Python 

Matlab 

Mathematica 

AnsysOptics 

COMSOL 

Optics 

Photonics 

Sensors 

GPUs 

CUDA 

♥ INTERESTS

I consider myself somewhere between an engineer, programmer, and optical physicist. One of my greatest interests is utilizing my knowledge of optics and photonics to solve problems across various industries. In this process, I study various components, develop corresponding optical algorithms, model their optical performance, and conduct relevant optical tests. I am highly motivated to enhance the efficiency of simulations and experiments in engineering, thereby rapidly driving research and development across various industries.

🎓 EDUCATION

🏠 Fudan University, Shanghai

2012.09 - 2018.01

Ph.D. in condensed matter physics

Research Advisor: Prof. Jian Zi

Thesis: “Novel Optical Phenomena in Micro and Nano Photonic Structures”

🏠 Tongji University, Shanghai

2008.09 - 2012.06

B.S. in applied physics

Research Advisor: Prof. Jian Zi

Thesis: “Optimal Design for the Amorphous Photonic Structures”

👤 EMPLOYMENT

Senior Technical Expert

MZ Optoelectronics, Shanghai

2024.04 - present

- Led a 5-person engineering team to develop a new generation of optical metrology equipment for the semiconductor industry.
- Coordinated cross-functional teams to build a system-level simulation platform using Ansys Optics for modeling and evaluating the optical performance of metrology equipment.
- Applied the Abbe imaging principle and the established simulation platform to decompose key components of the optical imaging system, define performance specifications, and conduct error analysis.
- Conducted research on advanced optical metrology technologies for leading-edge semiconductor nodes worldwide, and developed technology roadmaps and production feasibility assessments for the company.

Optical Waveguide Design Expert

PicoLab, ByteDance, Shanghai

2022.08 - 2024.03

- Developed advanced simulation capabilities for diffractive optical waveguides (a key component) in augmented reality with a Python framework: a cloud container environment for simulating various optical responses of wavelength, angle, and polarization in diffractive light waveguides.
- Established a closed-loop validation platform for diffractive light waveguides, encompassing design simulation, sample preparation, and experimental measurements.

Lead Optical Metrology Engineer, R&D

Ideaoptics, Shanghai

2019.07 - 2022.07

- Established a deep learning search tool integrated into spectral measurement hardware, which can be used to measure the geometrical parameters such as period and depth of all kinds of gratings nondestructively.
- Developed a backpropagation algorithm for multi-layer film optical measurements, capable of measuring the thickness of each layer in up to several hundred layers of thin films, and thus particularly useful for optical monitoring in manufacturing 3D NAND storage chips.
- Applied for patents supporting the corresponding R&D technologies.
- Was selected for the 2020 Shanghai Rising Star Project.
- Led a project in the Scientific Instrumentation field of the 2022 Shanghai Science and Technology Innovation Action Plan.

Research Associate, Photonics Lab
University of Wisconsin-Madison

2018.05 - 2019.06

- Developed a custom toolset incorporating convolutional neural networks for image deblurring.
- Processed an on-chip multi-mode spectrometer using compressive sensing.

🔧 SKILLS

- Numerical development of computational electromagnetism (RCWA, FDTD and FEM).
- Deployment of deep learning frameworks with PyTorch and TensorFlow.
- Low-level to high-level programming: linking and loading libraries and modules on different operating systems (Linux/MacOS/Windows).
- Data analysis: utilizing Python to extract valuable information from raw data.
- Scientific simulation software: Mathematica, MATLAB, COMSOL, Ansys Optics, etc.
- Utilizing open-source software and algorithm packages for desktop publishing, drawing, and multimedia creation: L^AT_EX, Blender, Python Manim library, etc.

🎵 HOBBIES

- Culture: I have a deep passion for history, geography, religion, and the humanities, having read copious amounts of related literature and watched numerous corresponding documentaries.
- Astronomy: I am a proficient user of SpaceEngine (an exceptional space simulator) and frequently explore outer space on my computer.
- Sports: I dedicate a significant amount of my leisure time to playing soccer, table tennis, and billiards.

📄 PATENTS

CN Patents

1. Tongyu Li, Lei Shi, **Ang Chen**, Guopeng Lu, Haiwei Yin, Jian Zi. “Metrology method and system for critical dimensions based on dispersion relation in momentum space,” CN Patent, App. No.: CN202010474340.3, Pub. No.: CN111595812B.
2. Tongyu Li, **Ang Chen**, Lei Shi, Guopeng Lu, Mingjia Zheng, Lingjie Fan, Haiwei Yin. “Method, system, computing device and storage medium for optical measurement”, CN Patent, App. No.: CN202011312192.1, Pub. No.: CN112484968B.
3. Lingjie Fan, **Ang Chen**, Tongyu Li, Lei Shi, Haiwei Yin. “Method, system, computing device and storage medium for measuring optical constants of thin films,” CN Patent, App. No.: CN202110225675.6, Pub. No.: CN112964651B.
4. Maoxiong Zhao, Lei Shi, Yiwen Zhang, **Ang Chen**, Songting Hu, Haiwei Yin, Jian Zi. “Measuring system and method for microlens,” CN Patent, App. No.: CN202010305955.3, Pub. No.: CN111397861B.

US Patents

1. Tongyu Li, Lei Shi, **Ang Chen**, Guopeng Lu, Haiwei Yin, Jian Zi. “Metrology method and system for critical dimensions based on dispersion relation in momentum space”, US Patent, App. No.: 17/927,974, Pub. No.: US 2023/0213870 A1.
2. Tongyu Li, **Ang Chen**, Lei Shi, Guopeng Lu, Mingjia Zheng, Lingjie Fan, Haiwei Yin. “Method, system, computing device and storage medium for optical measurement”, US Patent, App. No.: 18/037,569, Pub. No.: US 2023/0408544 A1.

📄 PAPERS
(2535 CITATIONS)

1. Jie Liu, Ziyun Peng, Qianju Song, **Ang Chen**, LiPing Yang, Chunxiong Zheng and Dezhan Han. “Complex band structure and bound states in the continuum: A unified theoretical framework,” *Reports on Progress in Physics* **89**, 037901 (2026).
2. Peng Hu, Chongwu Xie, Qianju Song, **Ang Chen**, Hong Xiang, Dezhan Han and Jian Zi. “Bound states in the continuum based on the total internal reflection of Bloch waves,” *National Science Review* **10**, nwac043 (2023).
3. Lingjie Fan[†], **Ang Chen**[†], Tongyu Li[†], Jiao Chu, Yang Tang, Jiajun Wang, Maoxiong Zhao, Tangyao Shen, Minjia Zheng, Fang Guan, Haiwei Yin, Lei Shi and Jian Zi. “Thin-film neural networks for optical inverse problem,” *Light: Advanced Manufacturing* **2**, 27 (2021) [[†]equal contribution].
4. Tongyu Li[†], **Ang Chen**[†], Lingjie Fan, Minjia Zheng, Jiajun Wang, Guopeng Lu, Maoxiong Zhao, Xinbin Cheng, Wei Li, Xiaohan Liu, Haiwei Yin, Lei Shi and Jian Zi. “Photonic-dispersion neural networks for inverse scattering problems,” *Light: Science & Applications* **10**, 154 (2021) [[†]equal contribution].
5. Maoxiong Zhao, Mu Ku Chen, Ze-Peng Zhuang, Yiwen Zhang, **Ang Chen**, Qinmiao Chen, Wenzhe Liu, Jiajun Wang, Ze-Ming Chen, Bo Wang, Xiaohan Liu, Haiwei Yin, Shumin Xiao, Lei Shi, Jian-Wen Dong, Jian Zi and Din Ping Tsai. “Phase characterisation of metalenses,” *Light: Science & Applications* **10**, 52 (2021).
6. Yiwen Zhang, Maoxiong Zhao, Jiajun Wang, Wenzhe Liu, Bo Wang, Songting Hu, Guopeng Lu, **Ang Chen**, Jing Cui, Weiyi Zhang, Chia Wei Hsu, Xiaohan Liu, Lei Shi, Haiwei Yin and Jian Zi. “Momentum-space imaging spectroscopy for the study of nanophotonic materials,” *Science Bulletin* **66**, 824 (2021).
7. Weishuang Yin, **Ang Chen**, Xiuye Liang, Lei Shi, Fang Guan, Xiaohan Liu, and Jian Zi. “Frequency scanning single-ridge serpentine dual-slot-waveguide array antenna,” *IEEE Access* **8**, 77245 (2020).
8. Weishuang Yin, Xiuye Liang, **Ang Chen**, Zhe Zhang, Lei Shi, Fang Guan, Xiaohan Liu, and Jian Zi. “Cross-polarization suppression for patch array antennas via generalized Kerker effects,” *Optics Express* **28**, 40 (2020).
9. Xiuye Liang, Weishuang Yin, **Ang Chen**, Zhe Zhang, Jianping Zeng, Lei Shi, Fang Guan, Xiaohan Liu, and Jian Zi. “Ultrawideband, wide scanning stripline-fed tightly coupled array antenna based on parallel-dipole elements,” *Sensors* **20**(18), 5065 (2020).
10. Bo Wang, Wenzhe Liu, Maoxiong Zhao, Jiajun Wang, Yiwen Zhang, **Ang Chen**, Fang Guan, Xiaohan Liu, Lei Shi and Jian Zi. “Generating optical vortex beams by momentum-space polarization vortices centred at bound states in the continuum,” *Nature Photonics* **14**, 623 (2020).
11. Jiajun Wang, **Ang Chen**^{*}, Maoxiong Zhao, Wenzhe Liu, Yiwen Zhang, Xiaohan Liu, Lei Shi^{*} and Jian Zi^{*}. “Observation of optical states below light cone with compound lattices,” *OSA Continuum* **2**, 1844 (2019) [^{*}corresponding authors].
12. Erfan Khoram, **Ang Chen**, Dianjing Liu, Qiqi Wang, Ming Yuan and Zongfu Yu. “Nanophotonic media for artificial neural inference,” *Photonics Research* **7**, 823 (2019).
13. Zhu Wang, Soongyu Yi, **Ang Chen**, Ming Zhou, Ting Shan Luk, Anthony James, John Nogan, Willard Ross, Graham Joe, Alireza Shahsafi, Ken Xingze Wang, Mikhail A. Kats and Zongfu Yu. “Single-shot on-chip spectral sensors based on photonic crystal slabs,” *Nature Communications* **10**, 1020 (2019).
14. Yuyu Xia, Yunyun Dai, Bo Wang, **Ang Chen**, Yanbin Zhang, Yiwen Zhang, Fang

- Guan, Xiaohan Liu, Lei Shi and Jian Zi. “Polarization dependent plasmonic modes in elliptical graphene disk arrays,” *Optics Express* **27**, 1080 (2019).
15. **Ang Chen**[†], Wenzhe Liu[†], Yiwen Zhang[†], Bo Wang, Fang Guan, Xiaohan Liu, Lei Shi, Ling Lu and Jian Zi. “Observing vortex polarization singularities at optical band degeneracies,” *Physical Review B* **99**, 180101(R) (2019) [[†]equal contribution; R, Rapid Communications].
 16. Jie Wang, **Ang Chen**, Yiwen Zhang, Jianping Zeng, Yafeng Zhang, Xiaohan Liu, Lei Shi and Jian Zi. “Manipulating bandwidth of light absorption at critical coupling: An example of graphene integrated with dielectric photonic structure,” *Physical Review B* **100**, 075407 (2019).
 17. Yiwen Zhang[†], **Ang Chen**[†], Wenzhe Liu[†], Chia Wei Hsu, Bo Wang, Fang Guan, Xiaohan Liu, Lei Shi, Ling Lu and Jian Zi. “Observation of polarization vortices in momentum space,” *Physical Review Letters* **120**, 186103 (2018) [[†]equal contribution].
 18. Yujie Bai, Wenzhe Liu, **Ang Chen**, Xiaohan Liu, Lei Shi and Jian Zi. “Fast photo-induced color changes of Ag particles deposited on single-crystalline TiO₂ surface,” *Applied Physics Letters* **112**, 211101 (2018).
 19. Yunyun Dai, Yuyu Xia, Tao Jiang, **Ang Chen**, Yiwen Zhang, Yujie Bai, Guiqiang Du, Fang Guan, Shiwei Wu, Xiaohan Liu, Lei Shi and Jian Zi. “Dynamical tuning of graphene plasmonic resonances by ultraviolet illuminations,” *Advanced Optical Materials* **6**, 1701081 (2018).
 20. Jie Wang, Dezhuan Han, **Ang Chen**, Yunyun Dai, Ming Zhou, Xinhua Hu, Zongfu Yu, Xiaohan Liu, Lei Shi and Jian Zi. “Using active gain to maximize light absorption,” *Physical Review B* **96**, 195419 (2017).
 21. Yunyun Dai, **Ang Chen**, Yuyu Xia, Dezhuan Han, Xiaohan Liu, Lei Shi and Jian Zi. “Symmetry breaking induced excitations of dark plasmonic modes in multilayer graphene ribbons,” *Optics Express* **24**, 020021 (2016).
 22. Yafeng Zhang, Biqing Dong, **Ang Chen**, Xiaohan Liu, Lei Shi and Jian Zi. “Using cuttlefish ink as an additive to produce non-iridescent structural colors of high color visibility,” *Advanced Materials* **27**, 4719 (2015).
 23. Qianqian Fu, **Ang Chen**, Lei Shi and Jianping Ge. “A polycrystalline SiO₂ colloidal crystal film with ultra-narrow reflections,” *Chemical Communications* **51**, 7382 (2015).