

Qingfeng Lin, PhD

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SUMMARY

- Research Scientist with 7+ years of experience in Semiconductor and Optics
- Demonstrated research experience in semiconductor materials and devices
- Proven skills in fabrication, characterization, and programming tools
- Publish 30+ papers and 3 US patents, gain 1100+ citations

EDUCATION

The Hong Kong University of Science and Technology **Kowloon, Hong Kong**
Ph.D., Electrical Engineering, GPA: 3.44 Jul. 2014

- PhD scholarship to do research on solar energy and nanotechnology
- Obtained Ph.D. degree in 4 years with 15 papers published in top-rated scientific journals
- Shortlisted for PhD Research Excellence Awards from 1,900+ PhD students

University of Science and Technology of China **Hefei, China**
B.S., Electrical Engineering, GPA: 3.40 Jul. 2010

- Won outstanding graduate student award based on exceptional academic performance
- Built a team of 5 members for 2008RoboGame, won final eight in 96 teams
- Orchestrated University Student Volleyball Association as a Vice President

WORK EXPERIENCE

University of Southern California **Los Angeles, California**
Postdoctoral Scholar Sep. 2015 – present

Principle Investigator: Prof. Rehan Kapadia; Collaborator: Prof. Daniel Dapkus

- Grow low-cost large-area III-V semiconductors *via* thin-film VLS technique using CVD furnace
- Characterize III-V thin films with photoluminescence spectra, SEM, UV-Vis spectra, XRD, *etc.*
- Explore hot electron transfer mechanism through electrochemical hot electron transistors
- Design nanoscale field emission devices with ultra-low turn-on voltages (<1 V)
- Demonstrate indium phosphide synaptic devices for scalable neuromorphic computing
- Fabricate sharp tip Si arrays by ICP-RIE and KOH etching for field emitters
- Collaborate with MOCVD growers to fabricate photodetectors and solar cells

The Hong Kong University of Science and Technology **Kowloon, Hong Kong**
Postdoctoral Fellow Aug. 2014 – Aug. 2015

Principle Investigator: Prof. Zhiyong Fan; Collaborator: Prof. Key May Lau, Prof. Hoi Sing Kowk

- Fabricated flexible α -Si:H solar cells on nanostructured polyimide substrates with PECVD system, obtaining 7.06% efficiency, which outperformed the flat substrates by 94%
- Gained higher production yield, improved flexibility and robustness with the nanotextured cells
- Partnered with MOCVD researchers to fabricate III-V quantum dot lasers
- Mentored 10+ junior researchers, who later enrolled in MIT, Harvard, UC Berkeley, *etc.*

The Hong Kong University of Science and Technology **Kowloon, Hong Kong**
PhD Researcher Aug. 2010 – Jul. 2014

Principle Investigator: Prof. Zhiyong Fan; Collaborator: Prof. Key May Lau, Prof. Hoi Sing Kowk

- Fabricated 1000+ α -Si:H solar cells with PECVD system, achieving 7.58% efficiency contributed by the superior light trapping capability of inverted nanocone photonic structures
- Invented low-cost self-cleaning anti-reflection films, enhancing the daily energy output of high-efficiency CdTe solar cells by 7%
- Developed ordered nanostructures *via* electrochemical anodization and nanoimprint

- Analyzed nanophotonic structures with SEM, UV-Vis spectra, FDTD solutions, *etc.*
- Created periodic Si arrays by ASML stepper and RIE as nanoimprint molds
- Presented research achievements at international conferences all over the world
- Devised a UV-Vis system, which reduced budget by 70% and contributed to 5+ groups
- Set up a quantum efficiency measurement system and a solar simulator

University of Science and Technology of China

Undergraduate Researcher

Hefei, China

Jun. 2008 – Jul. 2010

Principle Investigator: Prof. Bin Li, Prof. Hui Li

- Built a team of 5 members for 2008RoboGame at USTC, won final eight in 96 teams
- Designed a mainboard, an SPI programmer, and a telecontrol board for the robot
- In charge of program debugging and maintenance of the robot
- Designed defect-tolerant logic mapping for cross-based nanoarchitecture with C Language
- In charge of the algorithm and a dialog based interface for an eye tracking system

TECHNICAL SKILLS

Equipment: Sputter, Evaporator, ALD, Lithography, Focused Ion Beam, Plasma Cleaner, Surface Profiler, Semiconductor Device Analyzer, Keithley SourceMeter, Ion Miller, Material Printer

Software: MATLAB, LabVIEW, FDTD Solutions, Sentaurus, AutoCAD, L-Edit, 3DS MAX

Programming Languages: MATLAB, Python, C, C++

PATENTS

- Zhiyong Fan, Kwong Hoi Tsui, **Qingfeng Lin**, “Three dimensional anti-reflection nanocone film”, US Patent: 20160293781 A1.
- **Qingfeng Lin**, Rehan Kapadia, “Scalable indium phosphide thin-film nanophotonics platform for photovoltaic and photoelectrochemical devices”, US Provisional 62/442,121.
- Fatemeh Razaeifar, **Qingfeng Lin**, Steve Cronin, Rehan Kapadia, “Independent tuning of work function and field enhancement factor in hybrid lanthanum hexaboride-graphene-silicon field emitters”, US Provisional 62556178.

PUBLICATIONS (1100+ citations, h-index=17, *equal contribution)

1. **Qingfeng Lin**, Debarghya Sarkar, Yuanjing Lin, Matthew Yeung, Louis Blankemeier, Jubin Hazra, Wei Wang, Shanyuan Niu, Jayakanth Ravichandran, Zhiyong Fan, Rehan Kapadia, “Scalable Indium Phosphide Thin-Film Nanophotonics Platform for Photovoltaic and Photoelectrochemical Devices”, *ACS Nano*, 11, 5113 (2017).
2. **Qingfeng Lin**, Linfeng Lu, Mohammad Mahdi Tavakoli, Chi Zhang, Ga Ching Lui, Zhuo Chen, Xiaoyuan Chen, Lei Tang, Daquan Zhang, Yuanjing Lin, Paichun Chang, Dongdong Li, Zhiyong Fan, “High Performance Thin Film Solar Cells on Plastic Substrates with Nanostructure-Enhanced Flexibility”, *Nano Energy*, 22, 539 (2016).
3. **Qingfeng Lin**, Siu-Fung Leung, Linfeng Lu, Xiaoyuan Chen, Zhuo Chen, Haoning Tang, Wenjun Su, Dongdong Li, Zhiyong Fan, “Inverted Nanocone-Based Thin Film Photovoltaics with Omnidirectionally Enhanced Performance”, *ACS Nano*, 8, 6484 (2014).
4. Kwong-Hoi Tsui,* **Qingfeng Lin**,* Hungtao Chou, Qianpeng Zhang, Huiying Fu, Pengfei Qi, Zhiyong Fan, “Low-cost, Flexible and Self-cleaning Three-Dimensional Nanocone Anti-Reflection Films for High-Efficiency Photovoltaics”, *Advanced Materials*, 26, 2805 (2014). (Highlighted in SPIE Newsroom on Feb. 14, 2014, "Reducing reflection losses in solar cells")
5. **Qingfeng Lin**, Hongtao Huang, Yan Jing, Huiying Fu, Paichun Chang, Dongdong Li, Yan Yao, Zhiyong Fan, “Flexible Photovoltaic Technologies”, *Journal of Materials Chemistry C*, 2, 1233 (2014).
6. **Qingfeng Lin**, Siu-Fung Leung, Kwong-Hoi Tsui, Bo Hua, Zhiyong Fan, “Programmable Nanoengineering Templates for Fabrication of Three-Dimensional Nanophotonic Structures”, *Nanoscale Research Letters*, 8, 268 (2013).

7. **Qingfeng Lin**, Bo Hua, Siu-fung Leung, Xicheng Duan, and Zhiyong Fan, "Efficient Light Absorption with Integrated Nanopillar/Nanowell Arrays for Three-Dimensional Thin-Film Photovoltaic Applications", *ACS Nano*, 7, 2725 (2013).
8. Siu-Fung Leung,* Miao Yu,* **Qingfeng Lin**,* Kyungmook Kwon, Kwong-Lung Ching, Leilei Gu, Kyoungsik Yu, Zhiyong Fan, "Efficient Photon Capturing with Ordered Three-dimensional Nanowell Arrays", *Nano Letters*, 12, 3682 (2012).
9. **Qingfeng Lin**, Louis Blankemeier, Fatemeh Rezaeifar, Debarghya Sarkar, Nirakar Poudel, Steve Cronin, Rehan Kapadia, "Electrochemical Hot Electron Transistors", *under preparation*.
10. Debarghya Sarkar, Wei Wang, Matthew Yeung, Louis Blankemeier, **Qingfeng Lin**, Rehan Kapadia, "Heteroepitaxial InP Growth on Crystalline Oxides", *under preparation*.
11. Fatemeh Rezaeifar, **Qingfeng Lin**, Chenhao Ren, Rehan Kapadia, "Integrated Photonic Waveguide Assisted Electron Emission Device", *under preparation*.
12. Debarghya Sarkar, Jun Tao, Wei Wang, **Qingfeng Lin**, Matthew Yeung, Chenhao Ren, Rehan Kapadia, "Mimicking Biological Synaptic Functionality with an Indium Phosphide Synaptic Device on Silicon for Scalable Neuromorphic Computing", *submitted*.
13. Fatemeh Rezaeifar, **Qingfeng Lin**, Xiangyu Chen, Tracy M. Mattox, Ayush Garg, Andrew Clough, Nirakar Poudel, Louis Blankemeier, Debarghya Sarkar, Steve Cronin, Rehan Kapadia, "Independent tuning of workfunction and field enhancement factor in hybrid lanthanum hexaboride-graphene-silicon field emitters", *Journal of Vacuum Science & Technology B*, 35, 062202 (2017).
14. Yuan Gao, Yuanjing Lin, Jiaqi Chen, **Qingfeng Lin**, Yue Wu, Wenjun Su, Wenli Wang, Zhiyong Fan, "Three-dimensional nanotube electrode arrays for hierarchical tubular structured high-performance pseudocapacitors", *Nanoscale*, 8, 13280 (2016).
15. Mengwei Sun, Zhen Xu, Min Yin, **Qingfeng Lin**, Linfeng Lu, Xinzhong Xue, XufeiZhu, Yanxia Cui, ZhiyongFan, Dongdong Li, "Broad-band Three Dimensional Nanocave ZnO Thin Film Photodetectors Enhanced by Au Surface Plasmon Resonance", *Nanoscale*, 8, 8924 (2016).
16. Mohammad Mahdi Tavakoli, **Qingfeng Lin**, Siu-Fung Leung, Ga Ching Lui, Hao Lu, Liang Li, Bin Xiang, Zhiyong Fan, "Efficient, Flexible and Mechanically Robust Perovskite Solar Cells on Inverted Nanocone Plastic Substrates", *Nanoscale*, 8, 4276 (2016).
17. Yuanjing Lin, **Qingfeng Lin**, Xue Liu, Yuan Gao, Jin He, Wenli Wang, Zhiyong Fan, "A Highly Controllable Electrochemical Anodization Process to Fabricate Porous Anodic Aluminum Oxide Membranes", *Nanoscale Research Letters*, 10, 495 (2015)
18. Huapeng Xiao, Jun Wang, Hongtao Huang, Linfeng Lu, **Qingfeng Lin**, Zhiyong Fan, Xiaoyuan Chen, Chaehwan Jeong, Xufei Zhu, Dongdong Li, "Performance optimization of flexible a-Si:H solar cells with nanotextured plasmonic substrate by tuning the thickness of oxide spacer layer", *Nano Energy*, 11, 78 (2015).
19. Yuan Gao, Huanyu Jin, **Qingfeng Lin**, Xiang Li, Mohammad Mahdi Tavakoli, Siu-Fung Leung, Wing Man Tang, Limin Zhou, Helen Lai Wa Chan, Zhiyong Fan, "Highly Flexible and Transferable Supercapacitors with Ordered Three-dimensional MnO₂/Au/MnO₂ Nanospikes Arrays", *Journal of Materials Chemistry A*, 3, 10199 (2015).
20. Yongcai Qiu, Siu-Fung Leung, Zhanhua Wei, **Qingfeng Lin**, Xiaoli Zheng, Yuegang Zhang, Zhiyong Fan, Shihe Yang, "Enhanced Charge Collection for Splitting of Water Enabled by an Engineered Three-Dimensional Nanospire Array", *The Journal of Physical Chemistry C*, 118, 22465 (2014).
21. Zhiyong Fan, **Qingfeng Lin**, "Reducing reflection losses in solar cells", *SPIE Newsroom*, 14 February 2014, DOI: 10.1117/2.1201402.005343.
22. Yongcai Qiu, Siu-Fung Leung, Qianpeng Zhang, Bo Hua, **Qingfeng Lin**, Zhanhua Wei, Kwong-Hoi Tsui, Shihe Yang, Zhiyong Fan, "Efficient Photoelectrochemical Water Splitting with Ultrathin film of Hematite on Three-dimensional Nanophotonic Structures", *Nano Letters*, 14, 2123 (2014).
23. Siu-Fung Leung, Leilei Gu, Qianpeng Zhang, Kwong-Hoi Tsui, Jia-Min Shieh, Chang-Hong Shen, Tzu-Hsuan Hsiao, Chin-Hung Hsu, Linfeng Lu, Dongdong Li, **Qingfeng Lin**, Zhiyong Fan, "Roll-to-roll fabrication of large scale and regular arrays of three-dimensional nanospikes for high efficiency and flexible photovoltaics", *Scientific Reports*, 4, 4243 (2014).

24. Jie Yang, Hongtao Huang, **Qingfeng Lin**, Linfeng Lu, Xiaoyuan Chen, Liyou Yang, Xufei Zhu, Zhiyong Fan, Ye Song, Dongdong Li, "Morphology Defects Guided Pore Initiation during the Formation of Porous Anodic Alumina", *ACS Applied Materials & Interfaces*, 6, 2285 (2014).
25. Siu-Fung Leung, Kwong-Hoi Tsui, **Qingfeng Lin**, Hongtao Huang, Linfeng Lu, Jia-Min Shieh, Chang-Hong Shen, Chin-Hung Hsu, Qianpeng Zhang, Dongdong Li and Zhiyong Fan, "Large scale, Flexible and Three-dimensional Quasi-ordered Aluminum Nanospikes for Thin Film Photovoltaics with Omnidirectional Light Trapping and Optimized Electrical Design", *Energy & Environmental Science*, 7, 3611 (2014).
26. Jinkai Li, Yongcai Qiu, Zhanhua Wei, **Qingfeng Lin**, Qianpeng Zhang, Keyou Yan, Haining Chen, Shuang Xiao, Zhiyong Fan and Shihe Yang, "A Three-dimensional Hexagonal Fluorine-doped Tin Oxide Nanocone Array: A Superior Light Harvesting Electrode for High Performance Photoelectrochemical Water Splitting", *Energy & Environmental Science*, 7, 3651 (2014).
27. Yongcai Qiu, Yihua Zhao, Xiaowei Yang, Wanfei Li, Zhanhua Wei, Junwu Xiao, Siu-Fung Leung, **Qingfeng Lin**, Hongkai Wu, Yuegang Zhang, Zhiyong Fan, Shihe Yang, "Three-dimensional metal/oxide nanocone arrays for high-performance electrochemical pseudocapacitors", *Nanoscale*, 6, 3626 (2014).
28. Bo Hua, **Qingfeng Lin**, Qianpeng Zhang, Zhiyong Fan, "Efficient Photon Management with Nanostructures for Photovoltaics", *Nanoscale*, 5, 6627 (2013).
29. Rui Yu, **Qingfeng Lin**, Siu-Fung Leung, Zhiyong Fan, "Nanomaterials and Nanostructures for Efficient Light Absorption and Photovoltaics", *Nano Energy*, 1, 57 (2012).
30. Rui Yu, Kwong-Lung Ching, **Qingfeng Lin**, Siu-Fung Leung, Diaz Arcrossito, Zhiyong Fan, "Strong Light Absorption of Self-organized 3-D Nanospike Arrays for Photovoltaic Applications", *ACS Nano*, 5, 9291 (2011).

CONFERENCES

1. **Qingfeng Lin**, Kwong-Hoi Tsui, Hongtao Chou, Qianpeng Zhang, Huiying Fu, Pengfei Qi, Zhiyong Fan, "Low-cost and Flexible Nanocone Anti-Reflection Films with Self-Cleaning Function for High-Efficiency Photovoltaics", *E-MRS 2014 Spring Meeting*, 2014, Lille, France.
2. **Qingfeng Lin**, Siu-Fung Leung, Bo Hua, Zhiyong Fan, "Programmable Three-Dimensional Nanophotonic Structures for Thin-film Photovoltaic Applications", *224th ECS Meeting*, 2013, San Francisco, CA, USA.
3. **Qingfeng Lin**, Bo Hua, Siu-Fung Leung, Zhiyong Fan, "Efficient Light Absorption with Vertically Integrated Nanostructures for Three-Dimensional Thin-Film Photovoltaic Applications", *Nanoelectronics and Nanophotonics Workshop*, 2013, Hong Kong, China.
4. **Qingfeng Lin**, Bo Hua, Siu-Fung Leung, Xicheng Duan, Zhiyong Fan, "Efficient Light Absorption with Integrated Nanopillar/Nanowell Arrays for Three-Dimensional Thin-Film Photovoltaic Applications", *International Workshop "Photonics of Functional Nanomaterials"*, 2013, Hong Kong, China.
5. **Qingfeng Lin**, Rui Yu, Kwong-Lung Ching, Siu-Fung Leung, Diaz Arcrossito, Zhiyong Fan, "Self-Organized 3-D Nanostructures for Photon Harvesting", *The 4th Association of East-Asia Research Universities Energy and Environmental Workshop*, 2012, Taipei, Taiwan, China.
6. **Qingfeng Lin**, Siu-Fung Leung, Yunze Long, Zhiyong Fan, "Self-organized Nanoporous Structure with Long Range Perfect Ordering", *19th Annual International Conference on Composites or Nano Engineering*, 2011, Shanghai, China.
7. **Qingfeng Lin**, Siu-Fung Leung, Yunze Long, Zhiyong Fan, "Fabrication of Ultra-Large Pitch Perfect Ordered Anodic Alumina Membrane", *East Asian Postgraduate Workshop on Nanoscience and Technology*, 2011, Hong Kong, China.
8. Xizi Chen, Mohammad Mahdi Tavakoli, **Qingfeng Lin**, Siu-Fung Leung, "Efficient and Flexible Perovskite Solar Cell Based on Inverted-Nanocone Structure with Enhanced Mechanical Properties", *PRiME 2016/230th ECS Meeting*, 2016, Honolulu, HI, USA.
9. Yuan Gao, **Qingfeng Lin**, Mohammad Mahdi Tavakoli, Siu-Fung Leung, Zhiyong Fan, "Highly Flexible and Transferable Supercapacitors with Ordered Three-dimensional MnO₂/Au/MnO₂ Nanospikes Arrays", *228th ECS Meeting*, 2015, Phoenix, AZ, USA.

10. Yuanjing Lin, **Qingfeng Lin**, Xue Liu, Yuan Gao, Zhiyong Fan, "A Controllable and Widely Applicable Electrochemical Anodization Process to Fabricate Porous Anodic Aluminum Oxide Membrane", *228th ECS Meeting*, 2015, Phoenix, AZ, USA.
11. Zhiyong Fan, **Qingfeng Lin**, Kwong-Hoi Tsui, Qianpeng Zhang, Huiying Fu, "Flexible Nanocone Anti-Reflection Films for High-Efficiency Photovoltaics", *226th ECS Meeting*, 2014, Cancun, Mexico.
12. Zhiyong Fan, Siu-Fung Leung, **Qingfeng Lin**, Qianpeng Zhang, "Roll-to-roll Fabrication of Flexible Thin Film Solar Cells on Low Cost Three-Dimensional Nano-textured Substrates", *224th ECS Meeting*, 2013, San Francisco, CA, USA.
13. Zhiyong Fan, **Qingfeng Lin**, Siu-Fung Leung, "Rational Geometrical Design of Three-dimensional Nanostructures for Efficient Light Harvesting", *Advanced Optoelectronics for Energy and Environment*, 2013, Wuhan, China.
14. Siu-Fung Leung, Miao Yu, **Qingfeng Lin**, Kyungmook Kwon, Kwong-Lung Ching, Kyoungsik Yu, Zhiyong Fan, "Self-organized 3-D Nanostructures for Photon Management and Cost-efficient Photovoltaics", *PRiME 2012/222th ECS Meeting*, 2012, Honolulu, HI, USA.
15. Siu-Fung Leung, **Qingfeng Lin**, Miao Yu, Kyungmook Kwon, Yunze Long, Kyoungsik Yu, Zhiyong Fan, "Optical Absorption of Three-dimensional Nanoporous Structures", *19th Annual International Conference on Composites or Nano Engineering*, 2011, Shanghai, China.

AWARDS AND HONORS

- Shortlisted for the PhD Research Excellence Awards 2014-2015, top five students in more than 1,900 postgraduates in the School of Engineering in HKUST, 2015, Hong Kong, China.
- Best Poster Award, "Efficient Light Absorption with Integrated Nanostructures for 3-D Thin-Film Photovoltaic Applications", *International Workshop "Photonics of Functional Nanomaterials"*, May 6-9, 2013, Hong Kong, China.
- Outstanding Paper Award, "Engineered 3-D Nanostructures for Photon Management and Photovoltaics", *1st International Conference on Advanced Electromaterials*, Nov. 7-10, 2011, Jeju, Korea.
- Outstanding Student Scholarship (Grade 2), 2008-2009
- Outstanding Student Scholarship (Grade 3), 2007-2008
- Final Eight of 2008RoboGame held in USTC, 2008
- Outstanding High School Graduate Scholarship of Putian City, 2006

TEACHING

- Teaching Assistant for undergraduate courses
 - Introduction to Electro-Robot Design
 - CMOS VLSI Design
 - Semiconductor Material and Devices
- Supervised Final Year Projects and Undergraduate Research Opportunities Program students

JOURNAL REVIEWERSHIP

- ACS Nano
- Scientific Reports
- Nanoscale
- Applied Physics A
- Nanoscale Research Letters
- Science Bulletin