

# XING SHENG

## Associate Professor

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Department of Electronic Engineering  
Rohm Building, Tsinghua University  
Beijing, China 100084

### Education

- *Ph.D., Materials Science and Engineering, Massachusetts Institute of Technology, 2012*  
Thesis advisor: Lionel C. Kimerling
- *B. Eng., Materials Science and Engineering, Tsinghua University, 2007*

### Professional Experiences

- *Associate Professor, Dept. Electronic Engineering, Tsinghua University, 2015–present*  
also affiliated with: Beijing Innovation Center for Future Chips  
IDG/McGovern Institute for Brain Research at Tsinghua University
- *Postdoctoral Associate, University of Illinois at Urbana-Champaign, 2012–2015*  
Advisor: John A. Rogers

### Research Interests

- Non-conventional Optoelectronics for Biomedical Applications
- Optical Neural Interfaces
- Biocompatible and Biodegradable Photonics

### Awards and Honors

- Young Scientist Award, Photonics & Electromagnetics Research Symposium (PIERS), 2018
- Young Scientist Award, Microsystems & Nanoengineering Summit (MINE), 2018
- 《中国激光》主编推荐奖优秀论文, 2018
- “中国新锐科技卓越影响奖”, 2018
- Best Poster Award (2nd prize) in Nature Conference on Flexible Electronics, Nanjing, 2016
- ‘1000 Plan Program for Young Talents’, Chinese government, 2015
- Gordon Engineering Leadership Teaching Assistantship, MIT, 2011
- Energy Initiative Seed Fund Award, MIT, 2010
- Best Poster Award (runner-up) in the 35th IEEE Photovoltaic Specialists Conference, 2010
- Energy Initiative Martin Fellowship, MIT, 2010
- DuPont-MIT Alliance Fellowship, 2007
- MIT Presidential Fellowship, 2007
- Outstanding Graduates, Tsinghua University, 2007
- DuPont Scholarship, Tsinghua University, 2006
- Samsung Scholarship, Tsinghua University, 2005
- Wuzhande Scholarship, Tsinghua University, 2004
- Freshman Scholarship, Tsinghua University, 2003

## Teaching Experience

- Leading Lecturer at Tsinghua
  - 20230313 “Foundation of Solid State Physics”
  - 80230992 “Principles of Micro- and Nanofabrication for Electronic and Photonic Devices”
  - 80231001 “Laboratory of Micro- and Nanofabrication for Electronic and Photonic Devices”
  - 60230072 “Academic Writings and Presentations for Electrical Engineering”
- Worked as a guest lecturer and a teaching assistant for multiple courses at Tsinghua, MIT and UIUC
- Supervised undergraduate and graduate students at MIT, UIUC and Tsinghua

## Publications

### *Peer-Reviewed Journals:*

Google Scholar: <https://scholar.google.com/citations?hl=en&user=bS9skH4AAAAJ>

#co-first author, \*corresponding author

1. H. Ding, G. Lv, Z. Shi, D. Cheng, Y. Xie, Y. Huang, L. Yin, J. Yang, Y. Wang, **X. Sheng\***, “Optoelectronic Sensing of Biophysical and Biochemical Signals based on Photon Recycling of a micro-LED”, *Nano Research* **XX**, XX (2021).
2. C. Liu, Y. Zhao, X. Cai, Y. Xie, T. Wang, D. Cheng, L. Li, R. Li, Y. Deng, H. Ding, G. Lv, G. Zhao, L. Liu, G. Zou, M. Feng, Q. Sun, L. Yin, **X. Sheng\***, “A Wireless, Implantable Optoelectrochemical Probe for Optogenetic Stimulation and Dopamine Detection”, *Microsystems & Nanoengineering* **6**, 64 (2020) (*Front Cover*).
3. R. Nazempour, Q. Zhang, C. Liu, **X. Sheng\***, “Design of Silicon Photonic Structures for Multi-site, Multi-Spectral Optogenetics in the Deep Brain”, *IEEE Photonics Journal* **12**, 4200107 (2020).
4. R. Li, H. Qi, Y. Ma, Y. Deng, S. Liu, Y. Jie, J. Jing, J. He, X. Zhang, L. Wheatley, C. Huang, **X. Sheng**, M. Zhang, L. Yin\*, “A Flexible and Physically Transient Electrochemical Sensor for Real-Time Wireless Nitric Oxide Monitoring”, *Nature Communications* **11**, 3207 (2020).
5. L. Wang, C. Lu, S. Yang, P. Sun, Y. Wang\*, Y. Guan, S. Liu, D. Cheng, H. Meng, Q. Wang, J. He, H. Hou, H. Li, W. Lu, Y. Zhao, J. Wang, Y. Zhu, Y. Li, D. Luo, T. Li, H. Chen, S. Wang, **X. Sheng**, W. Xiong, X. Wang, J. Peng\*, L. Yin\*, “A fully biodegradable and self-electrified device for neuroregenerative medicine”, *Science Advances* **6**, eabc6686 (2020).
6. C. Jia, L. Li, Y. Liu, B. Fang, H. Ding, J. Song, Y. Liu, K. Xiang, S. Lin, Z. Li, W. Si, B. Li, **X. Sheng**, D. Wang, X. Wei\*, H. Wu\*, “Highly Compressible and Anisotropic Lamellar Ceramic Sponges with Superior Thermal Insulation and Acoustic Absorption Performances”, *Nature Communications* **11**, 3732 (2020).
7. D. Kong#, D. Cheng#, X. Wang, K. Zhang, H. Wang, K. Liu, H. Li, **X. Sheng\***, L. Yin\*, “Solution Processed Lead-free Cesium Titanium Halide Perovskites and Their Structural, Thermal and Optical Characteristics”, *Journal of Materials Chemistry C* **8**, 1591–1597 (2020) (*Inside Front Cover*).
8. Y. Jiang, W. Qi, Q. Zhang, H. Liu, J. Zhang, N. Du, R. Nazempour, Y. Su, R. Fu, K. Zhang, P. Lyu, F. Dong, L. Yin, **X. Sheng\***, Y. Wang\*, “Green Light-Based Photobiomodulation with an Implantable and Biodegradable Fiber for Bone Regeneration”, *Small Methods* **4**, 1900879 (2020) (*Back Cover*).
9. R. Zhou, M. Feng, J. Wang, Q. Sun\*, J. Liu, S. Zhang, M. Ikeda, T. Liu, Z. Huang, **X. Sheng**, H. Yang, “InGaN-based lasers with an inverted ridge waveguide heterogeneously integrated on Si(100)”, *ACS Photonics* **7**, 2636–2642 (2020).

10. J. Liu, H. Qie, Q. Sun\*, M. Feng, J. Wang, X. Sun, **X. Sheng**, M. Ikeda, H. Yang, “Enhanced carrier confinement and radiative recombination in GaN-based laser by tailoring first-barrier doping”, *Optics Express* **28**, 32124–32131 (2020).
11. J. Wang, M. Feng\*, R. Zhou, Q. Sun\*, J. Liu, X. Sun, X. Zheng\*, M. Ikeda, **X. Sheng**, H. Yang, “Continuous-wave electrically injected GaN-on-Si microdisk laser diodes”, *Optics Express* **28**, 12201–12208 (2020).
12. J. Wang, M. Feng\*, R. Zhou, Q. Sun\*, J. Liu, X. Sun, X. Zheng\*, **X. Sheng**, H. Yang, “Thermal characterization of electrically injected GaN-based microdisk lasers on Si”, *Applied Physics Express* **13**, 074002 (2020).
13. Y. Tang, M. Feng\*, P. Wen, J. Liu, J. Wang, X. Sun, Q. Sun\*, S. Zhang\*, **X. Sheng**, M. Ikeda, H. Yang, “Degradation study of InGaN-based laser diodes grown on Si”, *Journal of Physics D: Applied Physics* **53**, 395103 (2020).
14. W. Ling, J. Yu, N. Ma, Y. Li, Z. Wu, R. Liang, Y. Hao, H. Pan, W. Liu, B. Fu, K. Wang, H. Wang, L. Li, **X. Sheng**, H. Peng, B. Ning, J. Yang, X. Huang\*, “Flexible Electronics and Materials for Synchronized Stimulation and Monitoring in Multi-Encephalic Regions”, *Advanced Functional Materials* **30**, 2002644 (2020).
15. H. Wang#, P. Sun#, L. Yin\*, **X. Sheng\***, “3D Electronic and Photonic Structures as Active Biological Interfaces”, *InfoMat* **2**, 527–552 (2020) (*Invited Review*).
16. X. Huang, L. Wang\*, H. Wang, B. Zhang, X. Wang, R. Y. Z. Stening, **X. Sheng**, L. Yin\*, “Materials Strategies and Device Architectures of Emerging Power Supply Devices for Implantable Bioelectronics”, *Small* **16**, 1902827 (2020) (*Invited Review*).
17. **X. Sheng\***, L. Gao, Y. M. Song, H. Tao, S. Yun, “Bio-Inspired and Bio-Integrated Photonic Materials and Devices: Feature Issue Introduction”, *Optical Materials Express* **10**, 155–156 (2020) (*Invited*).
18. D. Cheng, D. Kong, **X. Sheng**, L. Yin, H. Li\*, “Perovskite Hetero-Anionic-Sublattice Interfaces for Optoelectronics and Nonconventional Electronics”, *Nanoscale* **12**, 7263–7272 (2020).
19. H. Zhou, J. Park, Y. Lee, J. Park, J. Kim, J. Kim, H. Lee, S. Jo, X. Cai, L. Li, **X. Sheng**, H. Yun, J. Park, J. Sun, T. Lee\*, “Water Passivation of Perovskite Nanocrystals Enables Air-Stable Intrinsically Stretchable Color-Conversion Layers for Stretchable Displays”, *Advanced Materials* **32**, 2001989 (2020).
20. Z. Shi#, H. Ding#, H. Hong, D. Cheng, K. Rajabi, J. Yang, Y. Wang, L. Wang, Y. Luo, K. Liu, **X. Sheng\***, “Ultrafast and Low-Power Optoelectronic Infrared-to-Visible Upconversion Devices”, *Photonics Research* **7**, 1161–1168 (2019).
21. H. Ding, H. Hong, D. Cheng, Z. Shi, K. Liu, **X. Sheng\***, “Power- and Spectral-Dependent Photon-Recycling Effects in a Double-Junction Gallium Arsenide Photodiode”, *ACS Photonics* **6**, 59–65 (2019).
22. Y. Zhao#, C. Liu#, Z. Liu, W. Luo, L. Li, X. Cai, D. Liang, Y. Su, H. Ding, Q. Wang, L. Yin, J. Guan, M. Luo, **X. Sheng\***, “Wirelessly Operated, Implantable Optoelectronic Probes for Optogenetics in Freely Moving Animals”, *IEEE Transactions on Electron Devices* **66**, 785–792 (2019).
23. R. Nazempour, C. Liu, Y. Chen, C. Ma, **X. Sheng\***, “Performance Evaluation of an Implantable Sensor for Deep Brain Imaging: an Analytical Investigation”, *Optical Materials Express* **9**, 3729–3737 (2019).
24. S. Xing, L. Lin, J. Huo, G. Zou, **X. Sheng**, L. Liu\*, Y. N. Zhou, “Plasmon-Induced Heterointerface Thinning for Schottky Barrier Modification of Core/Shell SiC/SiO<sub>2</sub> Nanowires”, *ACS Applied Materials & Interfaces* **11**, 9326–9332 (2019).
25. L. Wang, Y. Gao, F. Dai, D. Kong, H. Wang, P. Sun, Z. Shi, **X. Sheng**, B. Xu\*, L. Yin\*, “Geometrical and Chemical Dependent Hydrolysis Mechanisms of Silicon Nanomembranes for Biodegradable Electronics”, *ACS Applied Materials & Interfaces* **11**, 18013–18023 (2019).
26. Y. Chen, H. Wang, Y. Zhang, R. Li, C. Chen, H. Zhang, S. Tang, S. Liu, X. Chen, H. Wu, R. Lv, **X.**

- Sheng**, P. Zhang, S. Wang, L. Yin\*, “Electrochemically-Triggered Degradation of Silicon Membranes for Smart On-Demand Transient Electronic Devices”, *Nanotechnology* **30**, 394002 (2019) (*Invited*).
27. W. Bai, J. Shin, R. Fu, I. Kandela, D. Lu, X. Ni, Y. Park, Z. Liu, T. Hang, D. Wu, Y. Liu, C. Haney, I. Stepien, Q. Yang, J. Zhao, K. Nandoliya, H. Zhang, **X. Sheng**, L. Yin, K. MacRenaris, A. Brikha, F. Aird, M. Pezhouh, J. Hornick, W. Zhou, J. A. Rogers\*, “Bioresorbable Photonic Devices for the Spectroscopic Characterization of Physiological Status and Neural Activity”, *Nature Biomedical Engineering* **3**, 644–654 (2019).
  28. E. Song, C. Chiang, R. Li, X. Jin, J. Zhao, M. Hill, Y. Xia, L. Li, Y. Huang, S. M. Won, K. J. Yu, **X. Sheng**, H. Fang, M. A. Alam, Y. Huang, J. Viventi, J. Chang, J. A. Rogers\*, “Flexible Electronic/Optoelectronic Microsystems with Scalable Designs for Chronic Bio-Integration”, *Proceedings of the National Academy of Sciences USA* **116**, 15398–15406 (2019).
  29. H. Ding#, L. Lu#, Z. Shi, D. Wang, L. Li, X. Li, Y. Ren, C. Liu, D. Cheng, H. Kim, N. C. Giebink, X. Wang, L. Yin, L. Zhao, M. Luo, **X. Sheng\***, “Microscale Optoelectronic Infrared-to-Visible Upconversion Devices and Their Use as Injectable Light Sources”, *Proceedings of the National Academy of Sciences USA* **115**, 6632–6637 (2018).
  30. C. Liu#, Q. Zhang#, D. Wang, G. Zhao, X. Cai, L. Li, H. Ding, K. Zhang, H. Wang, D. Kong, L. Yin, L. Liu, G. Zou, L. Zhao, **X. Sheng\***, “High Performance, Biocompatible Dielectric Thin-Film Optical Filters Integrated with Flexible Substrates and Microscale Optoelectronic Devices”, *Advanced Optical Materials* **6**, 1800146 (2018) (*Back Cover*).
  31. R. Fu#, W. Luo#, R. Nazempour#, D. Tan, H. Ding, K. Zhang, L. Yin, J. Guan\*, **X. Sheng\***, “Implantable and Biodegradable Poly(L-lactic acid) Fibers for Optical Neural Interfaces”, *Advanced Optical Materials* **6**, 1700941 (2018).
  32. L. Li#, C. Liu#, Y. Su, J. Bai, J. Wu, Y. Han, Y. Hou, S. Qi, Y. Zhao, H. Ding, Y. Yan, L. Yin, P. Wang, Y. Luo, **X. Sheng\***, “Heterogeneous Integration of Microscale GaN Light Emitting Diodes and Their Electrical, Optical and Thermal Characteristics on Flexible Substrates”, *Advanced Materials Technologies* **3**, 1700239 (2018) (*Back Cover*).
  33. L. Lu#, P. Gutruf#, L. Xia#, D. Bhatti, X. Wang, A. Vazquez-Guardado, X. Ning, X. Shen, T. Sang, R. Ma, G. Pakeltis, G. Sobczak, H. Zhang, D. Seo, M. Xue, L. Yin, D. Chanda, **X. Sheng\***, M. Bruchas\*, J. A. Rogers\*, “Wireless Optoelectronic Photometers for Monitoring Neuronal Dynamics in the Deep Brain”, *Proceedings of the National Academy of Sciences USA* **115**, E1374–E1383 (2018).
  34. L. Lu#, Z. Yang#, K. Meacham, C. Cvetkovic, E. A. Corbin, A. Vazquez-Guardado, M. Xue, L. Yin, J. Boroumand, G. Pakeltis, T. Sang, K. J. Yu, D. Chanda, R. Bashir, R. W. Gereau, **X. Sheng\***, J. A. Rogers\*, “Biodegradable Monocrystalline Silicon Photovoltaic Microcells as Power Supplies for Transient Biomedical Implants”, *Advanced Energy Materials* **8**, 1703035 (2018).
  35. H. Xu#, L. Yin#, C. Liu, **X. Sheng\***, N. Zhao\*, “Recent Advances in Biointegrated Optoelectronic Devices”, *Advanced Materials* **30**, 1800156 (2018) (*Invited*).
  36. Z. Shi, L. Li, Y. Zhao, R. Fu, **X. Sheng\***, “Implantable Optoelectronic Devices and Systems for Biomedical Application”, *中国激光 (Chinese Journal of Lasers)* **45**, 0207001 (2018) (In Chinese) (*Invited*) (*Front Cover*). 主编推荐奖优秀论文
  37. R. Nazempour, Q. Zhang, R. Fu, **X. Sheng\***, “Biocompatible and Implantable Optical Fibers and Waveguides for Biomedicine”, *Materials* **11**, 1283 (2018) (*Invited*).
  38. X. Huang, D. Wang, Z. Yuan, W. Xie, Y. Wu, R. Li, Y. Zhao, D. Luo, L. Cen, B. Chen, H. Wu, H. Xu, **X. Sheng**, M. Zhang, L. Zhao, L. Yin\*, “A Fully Biodegradable Battery for Self-Powered Transient Implants”, *Small* **12**, 1800994 (2018) (*Inside Front Cover*).
  39. X. Wang, Y. Ma, **X. Sheng**, Y. Wang\*, H. Xu\*, “Ultrathin Polypyrrole Nanosheets via Space-Confined Synthesis for Efficient Photothermal Therapy in the Second Near-Infrared Window”, *Nano Letters* **18**, 2217 (2018).
  40. R. Li, S. Xie, L. Zhang, L. Li, D. Kong, Q. Wang, R. Xin, **X. Sheng**, L. Yin, C. Yu, Z. Yu, X. Wang\*,

- L. Gao\*, “Soft and transient magnesium plasmonics for environmental and biomedical sensing”, *Nano Research* **11**, 4390 (2018).
41. Y. Yao, K. Lee, **X. Sheng**, N. A. Batara, N. Hong, J. He, L. Xu, M. M. Hussain, H. A. Atwater, N. S. Lewis, R. G. Nuzzo\*, J. A. Rogers\*, “Porous Nanomaterials for Ultra broadband Omnidirectional Anti-Reflection Surfaces with Applications in High Concentration Photovoltaics”, *Advanced Energy Materials* **7**, 1601992 (2017) (**Frontispiece Cover**).
  42. H. Araki, J. Kim, S. Zhang, A. Banks, K. E. Crawford, **X. Sheng**, P. Gutruf, Y. Shi, R. M. Pielak, J. A. Rogers\*, “Materials and Device Designs for an Epidermal UV Colorimetric Dosimeter with Near Field Communication Capabilities”, *Advanced Functional Materials* **27**, 1604465 (2017) (**Back Cover**).
  43. K. Lee, Y. Yao, J. He, B. Fisher, **X. Sheng**, M. Lumb, L. Xu, M. A. Anderson, D. Scheiman, S. Han, Y. Kang, A. Gumus, R. Bahabry, J. W. Lee, U. Paik, N. D. Bronstein, A. P. Alivisatos, M. Meitl, S. Burroughs, M. M. Hussain, J. C. Lee\*, R. Nuzzo\*, J. A. Rogers\*, “Concentrator Photovoltaic Module Architectures With Capabilities for Capture and Conversion of Full Global Solar Radiation”, *Proceedings of the National Academy of Sciences USA*, **113**, E8210–E8218 (2016).
  44. J. Kim, G. A. Salvatore\*, H. Araki, A. M. Chiarelli, Z. Xie, A. Banks, **X. Sheng**, Y. Liu, J. W. Lee, K. Jang, S. Y. Heo, K. Cho, H. Luo, B. Zimmerman, J. Kim, L. Yan, X. Feng, S. Xu, M. Fabiani, G. Gratton, Y. Huang, U. Paik\*, J. A. Rogers\*, “Battery-free, Stretchable Optoelectronic Systems for Wireless Optical Characterization of the Skin”, *Science Advances* **2**, e1600418 (2016).
  45. Y. Yao, L. Xu, **X. Sheng**, N. D. Bronstein, J. A. Rogers, A. P. Alivisatos, R. G. Nuzzo\*, “Full solar spectrum conversion via multi-junction architectures and optical concentration”, in *Roadmap on optical energy conversion*, *Journal of Optics* **18**, 073004 (2016) (**Invited**).
  46. X. Guo\*, D. Wang, B. Liu, S. Li, **X. Sheng**, “Enhanced light absorption in thin film silicon solar cells with Fourier-series based periodic nanostructures”, *Optics Express* **24**, A408–A413 (2016).
  47. **X. Sheng**#, C. Robert#, S. Wang, G. Pakeltis, B. Corbett\*, J. A. Rogers\*, “Transfer Printing of Fully Formed Thin-Film Microscale GaAs Lasers on Silicon with a Thermally Conductive Interface Material”, *Laser and Photonics Reviews* **9**, L17–L22 (2015) (**Back Cover**).
  48. **X. Sheng**, M. H. Yun, C. Zhang, A. M. Al-Okaily, M. Masouraki, L. Shen, S. Wang, W. L. Wilson, J. Y. Kim, P. Ferreira, X. Li, E. Yablonovitch, J. A. Rogers\*, “Device Architectures for Enhanced Photon Recycling in Thin-Film Multijunction Solar Cells”, *Advanced Energy Materials* **5**, 1400910 (2015) (**Back Cover**).
  49. J. S. Price#, **X. Sheng**#, B. Meulblok, J. A. Rogers\*, N. C. Giebink\*, “Wide-angle Planar Microtracking for Quasi-static Microcell Concentrating Photovoltaics”, *Nature Communications* **6**, 6223 (2015).
  50. J. S. Price, N. C. Giebink, **X. Sheng**, J. A. Rogers, “Putting CPV on Rooftops”, *Compound Semiconductor Magazine* **21**, 44 (2015) (**Invited**).
  51. **X. Sheng**#, C. A. Bower#, S. Bonafede, J. W. Wilson, B. Fisher, M. Meitl, H. Yuen, S. Wang, L. Shen, A. R. Banks, C. J. Corcoran, R. G. Nuzzo, S. Burroughs\*, J. A. Rogers\*, “Printing-based Assembly of Quadruple Junction, Four-terminal Microscale Solar Cells and Their Use in High-efficiency Modules”, *Nature Materials* **13**, 593–598 (2014).
  52. **X. Sheng**#, C. Yu#, V. Malyarchuk, Y. Lee, S. Kim, T. Kim, L. Shen, C. Horng, J. Lutz, N. C. Giebink, J. Park, J. A. Rogers\*, “Silicon based visible-blind ultraviolet detection and imaging using down-shifting luminophores”, *Advanced Optical Materials* **2**, 313 (2014) (**Frontispiece Cover**).
  53. **X. Sheng**\*, L. Z. Broderick, L. C. Kimerling, “Photonic crystal structures for light trapping in thin-film Si solar cells: modeling, process and optimizations”, *Optics Communications* **314**, 41 (2014) (**Invited**).
  54. H. Ning, N. A. Krueger, **X. Sheng**, H. Keum, C. Zhang, K. D. Choquette, X. Li, S. Kim, J. A. Rogers, P. V. Braun\*, “Transfer printing of tunable porous silicon microcavities with embedded emitters”, *ACS Photonics* **1**, 1144–1150 (2014).

55. Y. Shen, Y. Jia, **X. Sheng**, L. Shen, J. A. Rogers, N. C. Giebink\*, “Nonimaging optical gain in luminescent concentration through photonic control of emission etendue”, *ACS Photonics* **1**, 746–753 (2014).
56. Y. Zou, **X. Sheng**, K. Xia, H. Fu, J. Hu\*, “Parasitic loss suppression in photonic and plasmonic photovoltaic light trapping structures”, *Optics Express* **22**, A1197–A1202 (2014).
57. **X. Sheng**#, L. Shen#, T. Kim, L. Li, X. Wang, R. Dowdy, P. Froeter, K. Shigeta, X. Li, R.G. Nuzzo, N. C. Giebink\*, J. A. Rogers\*, “Doubling the power output of bifacial thin-film GaAs solar cells by embedding them in luminescent waveguides”, *Advanced Energy Materials* **3**, 991–996 (2013) (**Front Cover**).
58. **X. Sheng**#, C. J. Corcoran#, J. He, L. Shen, S. Kim, J. Park, R. G. Nuzzo\*, J. A. Rogers\*, “Enhanced ultraviolet responses in thin-film InGaP solar cells by down-shifting”, *Physical Chemistry Chemical Physics* **15**, 20434–20437 (2013).
59. **X. Sheng**\*, J. Hu, J. Michel, L. C. Kimerling, “Light trapping limits in plasmonic solar cells: an analytical investigation”, *Optics Express* **20**, A496–A501 (2012).
60. **X. Sheng**\*, S. G. Johnson, L. Z. Broderick, J. Michel, L. C. Kimerling, “Integrated photonic structures for light trapping in thin-film Si solar cells”, *Applied Physics Letters* **100**, 111110 (2012).
61. **X. Sheng**, J. Liu, I. Kozinsky, A. M. Agawal, J. Michel\*, L. C. Kimerling, “Design and non-lithographic fabrication of light trapping structures for thin film silicon solar cells”, *Advanced Materials* **23**, 843–847 (2011).
62. **X. Sheng**\*, S. G. Johnson, J. Michel, L. C. Kimerling, “Optimization-based design of surface textures for thin-film Si solar cells”, *Optics Express* **19**, A841–A850 (2011).
63. **X. Sheng**\*, L. Z. Broderick, J. Hu, L. Yang, A. Eshed, E. A. Fitzgerald, J. Michel, L. C. Kimerling, “Design and fabrication of high-index-contrast self-assembled texture for light extraction enhancement in LEDs”, *Optics Express* **19**, A701–A709 (2011).
64. **X. Sheng**\*, J. Liu, N. Coronel, A. M. Agawal, J. Michel, L. C. Kimerling, “Integration of self-assembled porous alumina and distributed bragg reflector for light trapping in Si photovoltaic devices”, *IEEE Photonics Technology Letters* **22**, 1394–1396 (2010).
65. X. Zhou, Z. Li, Y. Wang, **X. Sheng**, Z. Zhang\*, “Photoluminescence of amorphous niobium oxide films synthesized by solid-state reaction”, *Thin Solid Films* **516**, 4213–4216 (2008).
66. G. Sheng, Z. Li\*, **X. Sheng**, Y. Hu, Z. Zhang, “Microcosmic behavior research of palladium membrane irradiated by helium ions”, *原子能科学与技术 (Atomic Energy Science Technology)* **41**, 418 (2007) (in Chinese).
67. Y. Wang, Z. Li, **X. Sheng**, Z. Zhang\*, “Synthesis and optical properties of V<sub>2</sub>O<sub>5</sub> nanorods”, *Journal of Chemical Physics* **126**, 164701 (2007).

#### *Book Chapters:*

1. H. Ding, **X. Sheng**, “Thin-Film III-V Single Junction and Multijunction Solar Cells and Their Integration onto Heterogeneous Substrates”, in *Inorganic Flexible Optoelectronics: Materials and Applications* ed. by Z. Ma and D. Liu, Wiley-VCH (2019).
2. **X. Sheng**, S. Wang, L. Yin, “Flexible, Stretchable and Biodegradable Thin-Film Silicon Photovoltaics”, in *Advances in Silicon Solar Cells* ed. by S. J. Ikhmayies, Springer-Verlag (2018).
3. L. Yin, **X. Sheng**, “Nonconventional Biosensors Based on Nanomembrane Materials”, in *Nanobiomaterials: Classification, Fabrication and Biomedical Applications* ed. by X. Wang, M. Ramalingam, X. Kong and L. Zhao, Wiley-VCH (2018).
4. **X. Sheng**, *Thin-film Silicon Solar Cells: Photonic Design, Process and Fundamentals*, LAMBERT Academic Publishing (2012).

### *Patents:*

1. **X. Sheng**, C. Liu, Y. Zhao, L. Li, X. Cai, Y. Xie, Q. Wang, “Wireless, Multifunctional Optogenetic Systems”, submitted
2. **X. Sheng**, H. Ding, Z. Shi, “Optoelectronic Upconversion Devices”, CN108011017B / WO2019100380.
3. J. A. Rogers, **X. Sheng**, C. A. Bower, M. Meitl, S. Burroughs, “Printing-based multi-junction, multi-terminal photovoltaic devices”, US20150207012 / WO2015109242.
4. A. Agarwal, B. Albert, L. Z. Broderick, J. Cheng, J. Hu, L. C. Kimerling, J. Liu, J. Michel, **X. Sheng**, “Methods and apparatus for concentration photovoltaics”, US20140090686 / WO2013056139.
5. **X. Sheng**, J. Liu, J. Michel, A. M. Agarwal, L. C. Kimerling, “Pseudo-periodic structure for use in thin film solar cells”, US20100307579 / WO2010141145.

### **Invited Talks**

#### 2018

- Progress in Electromagnetics Research Symposium (PIERS), Toyama, Japan
- International Symposium on the Physics of Semiconductors and Applications, Jeju, Korea
- IEEE 3M-Nano, Hangzhou, China
- Microsystems & Nanoengineering Summit (MINE), Beijing, China
- Laser Technology and Optoelectronics (LTO) Conference, Shanghai, China
- China Semiconductor Technology International Conference, Shanghai, China

#### 2017

- Conference on Micro/Nano Optical Technology and Application, Suzhou, China
- International Conference on Advanced Fibers and Polymer Materials, Shanghai, China
- School of Electronic Information and Electrical Engineering, Shanghai Jiaotong University, China
- Suzhou Inst. Nanotech. & Nano-bionics, Chinese Academy of Sciences
- China Biomedical Engineering Conference, Beijing, China
- International Conference on Energy, Materials and Photonics, Shenzhen, China
- Wiley Small Science Symposium: Flexible and Wearable Devices, Hong Kong, China
- Laser Technology and Optoelectronics (LTO) Conference, Shanghai, China

#### 2016

- Light, Energy and the Environment Congress, OSA meeting, Leipzig, Germany
- International Conference on Optoelectronics and Microelectronics Technology, Shanghai, China
- Leibniz Institute for Solid State and Materials Research, Dresden, Germany
- School of Electronic Science and Engineering, Nanjing University
- Institute of Microelectronics and Optoelectronics, Zhejiang University

#### 2015

- School of Optoelectronic Information, Univ. Electronic Sci. & Tech. China
- 227th the Electrochemical Society (ECS) meeting, Chicago, IL, USA
- Dept. Electrical Engr., The Pennsylvania State University

- Nano-Electronics & Photonics Seminar, University of Illinois Urbana-Champaign
- Suzhou Inst. Nanotech. & Nano-bionics, Chinese Academy of Sciences
- University of Michigan – Shanghai Jiao Tong University Joint Institute

2014

- School of Engr. & Appl. Sci., Harvard University
- US DOE Energy Frontier Research Center – Light-Material Interactions Annual Meeting, San Francisco, CA, USA
- Dept. Electrical & Computer Engr., University of Wisconsin-Madison
- Dept. Electrical Engr., Tsinghua University

2013

- School of Materials Sci. & Engr., Huazhong Univ. Sci. & Tech.
- Wuhan National Lab of Optoelectronics
- School of Microelectronics and Solid-State Electronics, Univ. Electronic Sci. & Tech. China
- School of Materials Sci. & Engr., Tsinghua University

## **Services**

*Internal at Tsinghua:*

- *Panelist in postdoc searching committee*
- *Panelist in graduate admission committee*
- *Panelist in undergraduate admission committee*
- *Panelist in graduate thesis committee*
- *Freshmen Mentor*
- *Supervising undergraduate students supported by the Student Research Training (SRT) program*

*External:*

- *Journal Editor*
  - *Optical Materials Express*, Associate Editor, 2017–present.
  - *Optical Materials Express*, Feature issue “Bio-inspired and Bio-integrated Photonic Materials and Devices”, Lead Editor, 2019.
- *Board Member*
  - *Chinese Association of Automation*
  - *Chinese NeuroScience Society*
  - *Chinese Society of Biomedical Engineering*
- *Conference Organizer for multiple domestic and international conferences*
  - 2020 CIMTEC 9th Forum on New Materials, Montecatini Terme, Italy. International Advisory Board Member.
  - 2019 IEEE-EMBS 16th International Conference on Wearable and Implantable Body Sensor Networks (BSN), Chicago, IL, USA. Technical Program Committee.
  - 2019 MRS spring meeting, Phoenix, AZ, USA. Symposium Organizer.
  - 2017 OSA IPR meeting, New Orleans, LA, USA. Subcommittee.



- 2016 MRS fall meeting, Boston, MA, USA. Symposium Organizer.
- 2016 MRS spring meeting, Phoenix, AZ, USA. Symposium Organizer.
  
- *Reviewer for multiple international journals*
  
- *Proposal Reviewer for NSFC, and multiple international funding agencies*
  
- *Co-president, MIT Chinese Association of Science and Technology, 2010.*
  
- *Scientific consultant for several high-tech start-up companies.*