XING SHENG

Associate Professor

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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: 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. L. Li, G. Tang, Z. Shi, H. Ding, C. Liu, D. Cheng, Q. Zhang, L. Yin, Z. Yao, L. Duan, D. Zhang, C. Wang, M. Feng, Q. Sun, Q. Wang, Y. Han, L. Wang, Y. Luo, **X. Sheng***, "Transfer-Printed, Tandem Microscale Light-Emitting Diodes for Full-Color Displays", *Proceedings of the National Academy of Sciences USA* **118**, e2023436118 (2021).
2. 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) (***Invited***).
3. Y. Xie, H. Wang, D. Cheng, H. Ding, D. Kong, L. Li, L. Yin, G. Zhao, L. Liu, G. Zou, J. Wei, C. Li, C. Liu*, **X. Sheng***, "Diamond Thin Films Integrated with Flexible Substrates and Their Physical, Chemical and Biological Characteristics", *Journal of Physics D: Applied Physics* **54**, 384004 (2021) (***Invited***).
4. R. Nazempour#, B. Zhang#, Z. Ye, L. Yin, X. Lv, **X. Sheng***, "Emerging Applications of Optical Fiber-Based Devices for Brain Research", *Advanced Fiber Materials* **XX**, XX (2021) (***Invited***).
5. D. Kong#, K. Zhang#, J. Tian, L. Yin*, **X. Sheng***, "Biocompatible and Biodegradable Light-Emitting Materials and Devices", *Advanced Materials Technologies* **XX**, XX (2021) (***Invited***).
6. Y. Yang, M. Wu, A. Vázquez-Guardado, A. Wegener, J. Grajales-Reyes, Y. Deng, T. Wang, R. Avila, J. Moreno, S. Minkowicz, V. Dumrongprechachan, J. Lee, S. Zhang, A. Legaria, Y. Ma, S. Mehta, D. Franklin, L. Hartman, W. Bai, M. Han, H. Zhao, W. Lu, Y. Yu, **X. Sheng**, A. Banks, X. Yu, Z. Donaldson, R. Gereau, C. Good, Z. Xie*, Y. Huang*, Y. Kozorovitskiy*, J. A Rogers*, "Wireless multilateral devices for optogenetic studies of individual and social behaviors", *Nature Neuroscience* **24**, 1035–1045 (2021).
7. 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***).
8. 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).
9. 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***).

10. 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***).
11. H. Wang#, P. Sun#, L. Yin*, **X. Sheng***, "3D Electronic and Photonic Structures as Active Biological Interfaces", *InfoMat* **2**, 527–552 (2020) (***Invited Review***).
12. **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***).
13. 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).
14. 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).
15. 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).
16. 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).
17. 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).
18. 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).
19. 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).
20. 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).
21. 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).
22. 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***).
23. 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).
24. 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).
25. 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).

26. 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).
27. 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).
28. 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).
29. 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_2 Nanowires", *ACS Applied Materials & Interfaces* **11**, 9326–9332 (2019).
30. 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).
31. 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***).
32. 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).
33. 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).
34. 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).
35. 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***).
36. 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).
37. 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***).
38. 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).
39. 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).

40. H. Xu#, L. Yin#, C. Liu, **X. Sheng***, N. Zhao*, "Recent Advances in Biointegrated Optoelectronic Devices", *Advanced Materials* **30**, 1800156 (2018) (***Invited***).
41. 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***
42. R. Nazempour, Q. Zhang, R. Fu, **X. Sheng***, "Biocompatible and Implantable Optical Fibers and Waveguides for Biomedicine", *Materials* **11,** 1283 (2018) (***Invited***).
43. 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***).
44. 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).
45. 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).
46. 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***).
47. 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***).
48. 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).
49. 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).
50. 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***).
51. 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).
52. **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***).
53. **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***).
54. 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).

55. J. S. Price, N. C. Giebink, **X. Sheng**, J. A. Rogers, "Putting CPV on Rooftops", *Compound Semiconductor Magazine* **21,** 44 (2015) (***Invited***).
56. **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).
57. **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***).
58. **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***).
59. 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).
60. 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).
61. 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).
62. **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***).
63. **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).
64. **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).
65. **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).
66. **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).
67. **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).
68. **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).
69. **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).
70. 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).
71. 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).
72. Y. Wang, Z. Li, **X. Sheng**, Z. Zhang*, "Synthesis and optical properties of V_2O_5 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

2021
- IEEE International Conference on Nano/Micro Engineered & Molecular Systems (IEEE-NEMS), Xiamen, China

2019
- Conference on Micro-nano Optical Technology and Application (MOTA), Nanjing, China
- Applied Optics and Photonics China (AOPC), Beijing, China
- Laser Technology and Optoelectronics (LTO) Conference, Shanghai, China

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. & Eng., 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.*