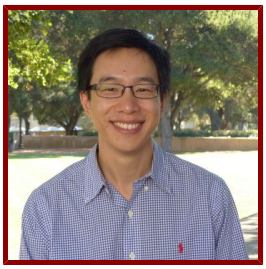
Stanford



Jonathan Fan

Associate Professor of Electrical Engineering and Senior Fellow at the Precourt Institute for Energy

Bio

BIO

Jonathan Fan is an Associate Professor in the Department of Electrical Engineering at Stanford University, where he is broadly research topics in electromagnetics and photonics engineering as applied to a diverse range of topics including artificial intelligence, additive manufacturing, computational displays, and sustainable chemical production. He received his bachelor's degree with highest honors from Princeton University and his doctorate from Harvard University. He is the recipient of the Air Force Young Investigator Award, Sloan Foundation Fellowship in Physics, Packard Foundation Fellowship, and the Presidential Early Career Award for Scientists and Engineers.

ACADEMIC APPOINTMENTS

- Associate Professor, Electrical Engineering
- Senior Fellow, Precourt Institute for Energy
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Director, Fast Turnaround Facility in the Stanford Nanofabrication Facility, (2014- present)

HONORS AND AWARDS

- SPIE Rising Researcher, SPIE (2020)
- Okawa Foundation Research Award, Okawa Foundation (2019)
- 3M Untenured Faculty Award, 3M (2018)
- Packard Foundation Fellowship, Packard Foundation (2016)
- Sloan Foundation Award in Physics, Sloan Foundation (2016)
- AFOSR Young Investigator Award, Department of Defense (2015)
- Invitee to the National Academy of Engineering Frontiers Symposium, National Academy of Engineering (2014)
- Presidential Early Career Award for Scientists and Engineers, Department of Defense (2014)
- Beckman Postdoctoral Fellowship, University of Illinois, Urbana-Champaign (2011)
- Jeffrey O. Kephard '80 Engineering Physics Award, Princeton University (2004)
- National Science Foundation Graduate Fellowship, National Science Foundation (2004)
- Peter Marks Prize for Solid State Physics, Princeton University (2004)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Technical Committee Member of the Electronic Materials Symposium, Electronic Materials Symposium (2017 - present)
- Technical Committee Member of the OSA Novel Materials and Applications Conference, OSA (2019 - present)
- Technical Committee Member of the SPIE Metamaterials conference, SPIE (2019 - present)
- Technical Group Member of the OSA Optical Materials Group, OSA (2018 - present)
- Member of MRS, MRS (2020 - present)
- Member of IEEE, IEEE (2020 - present)
- Member of OSA, OSA (2014 - present)
- Member of SPIE, SPIE (2014 - present)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- PhD, Harvard University , Applied Physics (2010)
- MS, Harvard University , Applied Physics (2006)
- BSE, Princeton University , Electrical Engineering (2004)

PATENTS

- John A. Rogers, Sheng Xu, Jonathan A. Fan, Younggang Huang, Yihui Zhang. "United States Patent 10497633 Stretchable electronic systems with containment chambers", The Board Of Trustees Of The University Of Illinois, Northwestern University, Dec 3, 2019
- James D. Plummer, Kai Zhang, Xue Bai Pitner, Jonathan A. Fan. "United States Patent 10435814 Single metal crystals", The Board of Trustees of the Leland Stanford Junior University, Oct 8, 2019
- John A. Rogers, Jonathan Fan, Woon-Hong Yeo, Yewang Su, Yonggang Huang, Yihui Zhang. "United States Patent 10192830 Self-similar and fractal design for stretchable electronics", The Board of Trustees of the University of Illinois, Northwestern University, Jan 29, 2019
- Federico Capasso, Nanfang Yu, Jonathan Fan. "United States Patent US8328396 Methods and apparatus for improving collimation of radiation beams", President And Fellows Of Harvard College, Dec 11, 2012

LINKS

- My Lab Site: https://fanlab.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Optical engineering plays a major role in imaging, communications, energy harvesting, and quantum technologies. We are exploring the next frontier of optical engineering on three fronts. The first is new materials development in the growth of crystalline plasmonic materials and assembly of nanomaterials. The second is novel methods for nanofabrication. The third is new inverse design concepts based on optimization and machine learning.

Teaching

COURSES

2025-26

- Engineering Electromagnetics: EE 142 (Spr)

2024-25

- Electromagnetic Waves: EE 242 (Aut)
- Integrated Circuit Fabrication Laboratory: EE 312 (Win)

- Introduction to Electromagnetics and Its Applications: EE 42, ENGR 42 (Spr)

2023-24

- Electromagnetic Waves: EE 242 (Aut)
- Engineering Electromagnetics: EE 142 (Spr)
- Optics and Electronics Seminar: APPPHYS 483 (Spr)

2022-23

- Advanced Micro and Nano Fabrication Laboratory: ENGR 241 (Spr)
- Electromagnetic Waves: EE 242 (Aut)
- Engineering Electromagnetics: EE 142 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Saner Baskaya, Arynn Gallegos, Hongxiang Jia, Calvin Lin, Anna Miller, Janet Zhong

Postdoctoral Faculty Sponsor

Chenkai Mao, Chenghao Wan

Doctoral Dissertation Advisor (AC)

Sara Azzouz, Connor Cremers, Tianxiang Dai, Ariana Hofelmann, Robert Lupoiu, Dolly Mantle, Feven Naba, Zhennan Ru, Yixuan Shao

Master's Program Advisor

Eric Chiu, Milo Eirew, Luke Qi, Lara Wagner

Doctoral (Program)

Nancy Ammar, Sara Azzouz, Allison Brand, Tianxiang Dai, Catherine Deng, Jasmin Falconer, Ariana Hofelmann, Kelsey Lee, Jackie Yang, Tim Zhao

Publications

PUBLICATIONS

- **Hyperbolic Polaritonic Rulers Based on van der Waals α-MoO3 Waveguides and Resonators.** *ACS nano*
  Yu, S. J., Yao, H., Hu, G., Jiang, Y., Zheng, X., Fan, S., Heinz, T. F., Fan, J. A.
  2023
- **Polychromatic metasurfaces for complete control of phase and polarization in the mid-infrared.** *Light, science & applications*
  Zhou, Y., Fan, J. A.
  2023; 12 (1): 249
- **Arbitrary Achromatic Polarization Control with Reconfigurable Metasurface Systems** *LASER & PHOTONICS REVIEWS*
  Wang, E. W., Yu, S., Phan, T., Dhuey, S., Fan, J. A.
  2023
- **Snapshot Mueller spectropolarimeter imager.** *Microsystems & nanoengineering*
  Dai, T., Phan, T., Wang, E. W., Kwon, S., Son, J., Lee, M., Fan, J. A.
  2023; 9: 125
- **Conformal Volumetric Grayscale Metamaterials.** *Advanced materials (Deerfield Beach, Fla.)*
  Huang, Q., Gan, L. T., Fan, J. A.
  2022: e2204688
- **"Deep approaches to learning" in a project-based nanofabrication graduate course** *JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY*

Tang, M., Kommera, S., Raghuram, U., Rincon, M., Xu, X., Fan, J., Howe, R. T.
2022

- **Reparameterization Approach to Gradient-Based Inverse Design of Three-Dimensional Nanophotonic Devices** *ACS PHOTONICS*
  Gershnabel, E., Chen, M., Mao, C., Wang, E. W., Lalanne, P., Fan, J. A.
  2022
- **Algorithm-Driven Paradigms for Freeform Optical Engineering** *ACS PHOTONICS*
  Fan, J. A., Chen, M., Jiang, J.
  2022; 9 (9): 2860-2871
- **High Speed Simulation and Freeform Optimization of Nanophotonic Devices with Physics-Augmented Deep Learning** *ACS PHOTONICS*
  Chen, M., Lupoiu, R., Mao, C., Huang, D., Jiang, J., Lalanne, P., Fan, J. A.
  2022
- **Electrically Driven Hyperbolic Nanophotonic Resonators as High Speed, Spectrally Selective Thermal Radiators.** *Nano letters*
  Roberts, J. A., Ho, P., Yu, S., Fan, J. A.
  2022
- **In Situ TEM tensile testing of bicrystals with tailored misorientation angles** *ACTA MATERIALIA*
  Kiani, M. T., Gan, L. T., Traylor, R., Yang, R., Barr, C. M., Hattar, K., Fan, J. A., Gu, X.
  2022; 224
- **Ultrahigh-Quality Infrared Polaritonic Resonators Based on Bottom-Up-Synthesized van der Waals Nanoribbons.** *ACS nano*
  Yu, S., Jiang, Y., Roberts, J. A., Huber, M. A., Yao, H., Shi, X., Bechtel, H. A., Gilbert Corder, S. N., Heinz, T. F., Zheng, X., Fan, J. A.
  1800
- **Multifunctional Conformal Grayscale Electromagnetic Metamaterials**
  Huang, Q., Gan, L. T., Fan, J. A.
  edited by Chang-Hasnain, C. J., Fan, J. A., Zhou, W.
  SPIE-INT SOC OPTICAL ENGINEERING.2022
- **Dynamic circular birefringence response with fractured geometric phase metasurface systems.** *Proceedings of the National Academy of Sciences of the United States of America*
  Wang, E. W., Phan, T., Yu, S. J., Dhuey, S., Fan, J. A.
  2022; 119 (12): e2122085119
- **Ultrahigh-quality van der Waals hyperbolic polariton resonators**
  Yu, S., Jiang, Y., Roberts, J. A., Huber, M. A., Yao, H., Shi, X., Bechtel, H. A., Corder, S. N. G., Heinz, T. F., Zheng, X., Fan, J. A.
  edited by Chang-Hasnain, C. J., Fan, J. A., Zhou, W.
  SPIE-INT SOC OPTICAL ENGINEERING.2022
- **WaveY-Net: Physics-Augmented Deep Learning for High-Speed Electromagnetic Simulation and Optimization**
  Chen, M., Lupoiu, R., Mao, C., Huang, D., Jiang, J., Lalanne, P., Fan, J. A.
  edited by Chang-Hasnain, C. J., Fan, J. A., Zhou, W.
  SPIE-INT SOC OPTICAL ENGINEERING.2022
- **Optical meta-waveguides for integrated photonics and beyond.** *Light, science & applications*
  Meng, Y., Chen, Y., Lu, L., Ding, Y., Cusano, A., Fan, J. A., Hu, Q., Wang, K., Xie, Z., Liu, Z., Yang, Y., Liu, Q., Gong, et al
  2021; 10 (1): 235
- **Detection of Trace Impurity Gradients in Noble Metals by the Photothermoelectric Effect** *JOURNAL OF PHYSICAL CHEMISTRY C*
  Evans, C., Gan, L. T., Yang, R., Abbasi, M., Wang, X., Traylor, R., Fan, J. A., Natelson, D.
  2021; 125 (31): 17509-17517
- **Raman spectroscopic study of artificially twisted and non-twisted trilayer graphene** *APPLIED PHYSICS LETTERS*
  Kim, S., Lee, D., Wang, B., Yu, S., Watanabe, K., Taniguchi, T., Fan, J. A., Xue, J., Lee, K.
  2021; 118 (13)
- **Codoping Mg-Mn Based Oxygen Carrier with Lithium and Tungsten for Enhanced C-2 Yield in a Chemical Looping Oxidative Coupling of Methane System** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*

Baser, D. S., Cheng, Z., Fan, J. A., Fan, L.
2021; 9 (7): 2651–60

- **Multiobjective and categorical global optimization of photonic structures based on ResNet generative neural networks** *NANOPHOTONICS*
  Jiang, J., Fan, J. A.
  2021; 10 (1): 361–69
- **Deep neural networks for the evaluation and design of photonic devices** *NATURE REVIEWS MATERIALS*
  Jiang, J., Chen, M., Fan, J. A.
  2020
- **Mechanistic Insight into Hydrogen-Assisted Carbon Dioxide Reduction with Ilmenite** *ENERGY & FUELS*
  Cheng, Z., Baser, D. S., Shah, V., Fan, J. A., Fan, L.
  2020; 34 (12): 15370–78
- **Design Space Reparameterization Enforces Hard Geometric Constraints in Inverse-Designed Nanophotonic Devices** *ACS PHOTONICS*
  Chen, M., Jiang, J., Fan, J. A.
  2020; 7 (11): 3141–51
- **SBA-16-Mediated Nanoparticles Enabling Accelerated Kinetics in Cyclic Methane Conversion to Syngas at Low Temperatures** *ACS APPLIED ENERGY MATERIALS*
  Liu, Y., Qin, L., Pan, J., Chen, Y., Goetze, J. W., Xu, D., Fan, J. A., Fan, L.
  2020; 3 (10): 9833–40
- **Multiple Tunable Hyperbolic Resonances in Broadband Infrared Carbon-Nanotube Metamaterials** *PHYSICAL REVIEW APPLIED*
  Roberts, J., Ho, P., Yu, S., Wu, X., Luo, Y., Wilson, W. L., Falk, A. L., Fan, J. A.
  2020; 14 (4)
- **Thermoelectric response from grain boundaries and lattice distortions in crystalline gold devices.** *Proceedings of the National Academy of Sciences of the United States of America*
  Evans, C. I., Yang, R., Gan, L. T., Abbasi, M., Wang, X., Traylor, R., Fan, J. A., Natelson, D.
  2020
- **Robust Freeform Metasurface Design Based on Progressively Growing Generative Networks** *ACS PHOTONICS*
  Wen, F., Jiang, J., Fan, J. A.
  2020; 7 (8): 2098–2104
- **Numerical Optimization Methods for Metasurfaces** *LASER & PHOTONICS REVIEWS*
  Elsawy, M. M. R., Lanteri, S., Duvigneau, R., Fan, J. A., Genevet, P.
  2020
- **Cobalt doping modi fication for enhanced methane conversion at low temperature in chemical looping reforming systems** *CATALYSIS TODAY*
  Guo, M., Cheng, Z., Liu, Y., Qin, L., Goetze, J., Fan, J. A., Fan, L.
  2020; 350: 156–64
- **MetaNet: a new paradigm for data sharing in photonics research** *OPTICS EXPRESS*
  Jiang, J., Lupoiu, R., Wang, E. W., Sell, D., Hugonin, J., Lalanne, P., Fan, J. A.
  2020; 28 (9): 13670–81
- **3D Electromagnetic Reconfiguration Enabled by Soft Continuum Robots** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Gan, L. T., Blumenschein, L. H., Huang, Z., Okamura, A. M., Hawkes, E. W., Fan, J. A.
  2020; 5 (2): 1704–11
- **Freeform metasurface design based on topology optimization** *MRS BULLETIN*
  Fan, J. A.
  2020; 45 (3): 196–201
- **Mid-IR and UV-Vis-NIR Mueller matrix ellipsometry characterization of tunable hyperbolic metamaterials based on self-assembled carbon nanotubes** *Journal of Vacuum Science & Technology B*
  Schoche, S., Ho, P., Roberts, J. A., Yu, S. J., Fan, J. A., Falk, A. L.

2020; 38

- **1 kW, Multi-MHz Wireless Charging for Electric Transportation**
  Phan, T., Zulauf, G., Fan, J. A., Rivas-Davila, J. M., IEEE
  IEEE.2020: 795-801
- **Broadband Mid-Infrared Resonances in Aligned Carbon Nanotube Films**
  Roberts, J., Ho, P., Yu, S., Schoeche, S., Luo, Y., Wilson, W. L., Falk, A. L., Fan, J. A., IEEE
  IEEE.2020
- **Reparameterization to Enforce Constraints in the Inverse Design of Metasurfaces**
  Chen, M., Jiang, J., Fan, J. A., IEEE
  IEEE.2020
- **Highly confined plasmons in individual single-walled carbon nanotube nanoantennas**
  Yu, S., Roberts, J., Lin, Q., Bohaichuk, S., Luo, Y., Choi, Y., Ho, P., Lee, K., Falk, A. L., Wilson, W. L., Pop, E., Wong, H., Fan, et al
  IEEE.2020
- **Free-Form Diffractive Metagrating Design Based on Generative Adversarial Networks.** *ACS nano*
  Jiang, J., Sell, D., Hoyer, S., Hickey, J., Yang, J., Fan, J. A.
  2019
- **Global Optimization of Dielectric Metasurfaces Using a Physics-Driven Neural Network.** *Nano letters*
  Jiang, J., Fan, J. A.
  2019
- **Tunable Hyperbolic Metamaterials Based on Self-Assembled Carbon Nanotubes** *NANO LETTERS*
  Roberts, J., Yu, S., Ho, P., Schoeche, S., Falk, A. L., Fan, J. A.
  2019; 19 (5): 3131–37
- **Coupling between subwavelength nano-slit lattice modes and metal-insulator-graphene cavity modes: a semi-analytical model** *OSA CONTINUUM*
  Edee, K., Benrhouma, M., Antezza, M., Fan, J., Guizal, B.
  2019; 2 (4): 1296–1309
- **Review of numerical optimization techniques for meta-device design [Invited]** *OPTICAL MATERIALS EXPRESS*
  Campbell, S. D., Sell, D., Jenkins, R. P., Whiting, E. B., Fan, J. A., Werner, D. H.
  2019; 9 (4): 1842–63
- **Ternary content-addressable memory with MoS2 transistors for massively parallel data search** *NATURE ELECTRONICS*
  Yang, R., Li, H., Smithe, K. K. H., Kim, T. R., Okabe, K., Pop, E., Fan, J. A., Wong, H.
  2019; 2 (3): 108–14
- **Large-area MRI-compatible epidermal electronic interfaces for prosthetic control and cognitive monitoring** *NATURE BIOMEDICAL ENGINEERING*
  Tian, L., Zimmerman, B., Akhtar, A., Yu, K., Moore, M., Wu, J., Larsen, R. J., Lee, J., Li, J., Liu, Y., Metzger, B., Qu, S., Guo, et al
  2019; 3 (3): 194-+
- **Robust design of topology-optimized metasurfaces** *OPTICAL MATERIALS EXPRESS*
  Wang, E. W., Sell, D., Phan, T., Fan, J. A.
  2019; 9 (2): 469–82
- **Near 100% CO selectivity in nanoscaled iron-based oxygen carriers for chemical looping methane partial oxidation.** *Nature communications*
  Liu, Y. n., Qin, L. n., Cheng, Z. n., Goetze, J. W., Kong, F. n., Fan, J. A., Fan, L. S.
  2019; 10 (1): 5503
- **Tunable Hyperbolic Plasmons in Self-Assembled Carbon Nanotube Metamaterials**
  Roberts, J., Yu, S., Falk, A. L., Ho, P., Schoeche, S., Fan, J. A., IEEE
  IEEE.2019
- **Generating high performance, topologically-complex metasurfaces with neural networks**

Fan, J. A., IEEE
IEEE.2019

- **Simulator-based training of generative neural networks for the inverse design of metasurfaces** *Nanophotonics*
  Jiang, J., Fan, J. A.
  2019
- **High-Throughput Growth of Microscale Gold Bicrystals for Single-Grain-Boundary Studies.** *Advanced materials (Deerfield Beach, Fla.)*
  Gan, L. T., Yang, R. n., Traylor, R. n., Cai, W. n., Nix, W. D., Fan, J. A.
  2019: e1902189
- **High-efficiency, large-area, topology-optimized metasurfaces.** *Light, science & applications*
  Phan, T. n., Sell, D. n., Wang, E. W., Doshay, S. n., Edee, K. n., Yang, J. n., Fan, J. A.
  2019; 8: 48
- **Metal oxide redox chemistry for chemical looping processes** *NATURE REVIEWS CHEMISTRY*
  Zeng, L., Cheng, Z., Fan, J. A., Fan, L., Gong, J.
  2018; 2 (11): 349–64
- **Understanding Interlayer Coupling in TMD-hBN Heterostructure by Raman Spectroscopy** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
  Ding, L., Ukhtary, M., Chubarov, M., Choudhury, T. H., Zhang, F., Yang, R., Zhang, A., Fan, J. A., Terrones, M., Redwing, J. M., Yang, T., Li, M., Saito, et al
  2018; 65 (10): 4059–67
- **Ultra-High-Efficiency Anomalous Refraction with Dielectric Metasurfaces** *ACS PHOTONICS*
  Sell, D., Yang, J., Wang, E. W., Phan, T., Doshay, S., Fan, J. A.
  2018; 5 (6): 2402–7
- **A Tip-Extending Soft Robot Enables Reconfigurable and Deployable Antennas** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Blumenschein, L. H., Gan, L. T., Fan, J. A., Okamura, A. M., Hawkes, E. W.
  2018; 3 (2): 949–56
- **Single-crystal metal growth on amorphous insulating substrates** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Zhang, K., Pitner, X., Yang, R., Nix, W. D., Plummer, J. D., Fan, J. A.
  2018; 115 (4): 685–89
- **High-performance axicon lenses based on high-contrast, multilayer gratings** *APL PHOTONICS*
  Doshay, S., Sell, D., Yang, J., Yang, R., Fan, J. A.
  2018; 3 (1)
- **Evaluating the Microwave Performance of Epidermal Electronics with Equivalent Transmission Line Modeling**
  Chang, T., Fan, J. A., Lee, T. H., IEEE
  IEEE.2018: 40–42
- **Freeform Metagratings Based on Complex Light Scattering Dynamics for Extreme, High Efficiency Beam Steering** *ANNALEN DER PHYSIK*
  Yang, J., Sell, D., Fan, J. A.
  2018; 530 (1)
- **A General Strategy for Stretchable Microwave Antenna Systems using Serpentine Mesh Layouts** *ADVANCED FUNCTIONAL MATERIALS*
  Chang, T., Tanabe, Y., Wojcik, C. C., Barksdale, A. C., Doshay, S., Dong, Z., Liu, H., Zhang, M., Chen, Y., Su, Y., Lee, T. H., Ho, J. S., Fan, et al
  2017; 27 (46)
- **Periodic Dielectric Metasurfaces with High-Efficiency, Multiwavelength Functionalities** *ADVANCED OPTICAL MATERIALS*
  Sell, D., Yang, J., Doshay, S., Fan, J. A.
  2017; 5 (23)
- **Strain-Limiting Substrates Based on Nonbuckling, Prestrain-Free Mechanics for Robust Stretchable Electronics** *JOURNAL OF APPLIED MECHANICS-TRANSACTIONS OF THE ASME*
  Zhang, M., Liu, H., Cao, P., Chen, B., Hu, J., Chen, Y., Pan, B., Fan, J. A., Li, R., Zhang, L., Su, Y.
  2017; 84 (12)

- **Improved cyclic redox reactivity of lanthanum modified iron-based oxygen carriers in carbon monoxide chemical looping combustion** *JOURNAL OF MATERIALS CHEMISTRY A*
  Qin, L., Guo, M., Cheng, Z., Xu, M., Liu, Y., Xu, D., Fan, J. A., Fan, L.
  2017; 5 (38): 20153–60
- **Analysis of material selection on dielectric metasurface performance** *OPTICS EXPRESS*
  Yang, J., Fan, J. A.
  2017; 25 (20): 23899–909
- **Topology-optimized metasurfaces: impact of initial geometric layout** *OPTICS LETTERS*
  Yang, J., Fan, J. A.
  2017; 42 (16): 3161–64
- **Large-Angle, Multifunctional Metagratings Based on Freeform Multimode Geometries.** *Nano letters*
  Sell, D., Yang, J., Doshay, S., Yang, R., Fan, J. A.
  2017
- **In-Plane Deformation Mechanics for Highly Stretchable Electronics.** *Advanced materials*
  Su, Y., Ping, X., Yu, K. J., Lee, J. W., Fan, J. A., Wang, B., Li, M., Li, R., Harburg, D. V., Huang, Y., Yu, C., Mao, S., Shim, et al
  2017; 29 (8)
- **Impact of 1% Lanthanum Dopant on Carbonaceous Fuel Redox Reactions with an Iron-Based Oxygen Carrier in Chemical Looping Processes** *ACS ENERGY LETTERS*
  Qin, L., Cheng, Z., Guo, M., Xu, M., Fan, J. A., Fan, L.
  2017; 2 (1): 70-74
- **2D Molybdenum Disulfide (MoS2) Transistors Driving RRAMs with 1T1R Configuration**
  Yang, R., Li, H., Smithe, K. K. H., Kim, T. R., Okabe, K., Pop, E., Fan, J. A., Wong, H., IEEE
  IEEE.2017
- **Characterization of Stretchable Serpentine Microwave Devices for Wearable Electronics**
  Chang, T., Wojcik, C., Su, Y., Rogers, J. A., Lee, T. H., Fan, J. A., IEEE
  IEEE.2017: 207–10
- **Visible Light Metasurfaces Based on Single-Crystal Silicon** *ACS PHOTONICS*
  Sell, D., Yang, J., Doshay, S., Zhang, K., Fan, J. A.
  2016; 3 (10): 1919-1925
- **Electrochemically Programmable Plasmonic Antennas.** *ACS nano*
  Dong, S., Zhang, K., Yu, Z., Fan, J. A.
  2016; 10 (7): 6716-6724
- **Epidermal radio frequency electronics for wireless power transfer.** *Microsystems & nanoengineering*
  Huang, X. n., Liu, Y. n., Kong, G. W., Seo, J. H., Ma, Y. n., Jang, K. I., Fan, J. A., Mao, S. n., Chen, Q. n., Li, D. n., Liu, H. n., Wang, C. n., Patnaik, et al
  2016; 2: 16052
- **Optics and Nonlinear Buckling Mechanics in Large-Area, Highly Stretchable Arrays of Plasmonic Nano structures** *ACS NANO*
  Gao, L., Zhang, Y., Zhang, H., Doshay, S., Xie, X., Luo, H., Shah, D., Shi, Y., Xu, S., Fang, H., Fan, J. A., Nordlander, P., Huang, et al
  2015; 9 (6): 5968-5975
- **Materials and Fractal Designs for 3D Multifunctional Integumentary Membranes with Capabilities in Cardiac Electrotherapy** *ADVANCED MATERIALS*
  Xu, L., Gutbrod, S. R., Ma, Y., Petrossians, A., Liu, Y., Webb, R. C., Fan, J. A., Yang, Z., Xu, R., Whalen, J. J., Weiland, J. D., Huang, Y., Efimov, et al
  2015; 27 (10): 1731-?
- **Elasticity of Fractal Inspired Interconnects** *SMALL*
  Su, Y., Wang, S., Huang, Y., Luan, H., Dong, W., Fan, J. A., Yang, Q., Rogers, J. A., Huang, Y.
  2015; 11 (3): 367-373

- **A hierarchical computational model for stretchable interconnects with fractal-inspired designs** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
  Zhang, Y., Fu, H., Xu, S., Fan, J. A., Hwang, K., Jiang, J., Rogers, J. A., Huang, Y.
  2014; 72: 115–30
- **Multifunctional Skin-Like Electronics for Quantitative, Clinical Monitoring of Cutaneous Wound Healing** *ADVANCED HEALTHCARE MATERIALS*
  Hattori, Y., Falgout, L., Lee, W., Jung, S., Poon, E., Lee, J., Na, I., Geisler, A., Sadhwani, D., Zhang, Y., Su, Y., Wang, X., Liu, et al
  2014; 3 (10): 1597–1607
- **Materials and Designs for Wireless Epidermal Sensors of Hydration and Strain** *ADVANCED FUNCTIONAL MATERIALS*
  Huang, X., Liu, Y., Cheng, H., Shin, W., Fan, J. A., Liu, Z., Lu, C., Kong, G., Chen, K., Patnaik, D., Lee, S., Hage-Ali, S., Huang, et al
  2014; 24 (25): 3846–54
- **Experimental and Theoretical Studies of Serpentine Microstructures Bonded To Prestrained Elastomers for Stretchable Electronics** *ADVANCED FUNCTIONAL MATERIALS*
  Zhang, Y., Wang, S., Li, X., Fan, J. A., Xu, S., Song, Y. M., Choi, K., Yeo, W., Lee, W., Nazaar, S. N., Lu, B., Yin, L., Hwang, et al
  2014; 24 (14): 2028-2037
- **Fractal design concepts for stretchable electronics** *NATURE COMMUNICATIONS*
  Fan, J. A., Yeo, W., Su, Y., Hattori, Y., Lee, W., Jung, S., Zhang, Y., Liu, Z., Cheng, H., Falgout, L., Bajema, M., Coleman, T., Gregoire, et al
  2014; 5
- **Spectrally selective chiral silicon metasurfaces based on infrared Fano resonances.** *Nature communications*
  Wu, C., Arju, N., Kelp, G., Fan, J. A., Dominguez, J., Gonzales, E., Tutuc, E., Brener, I., Shvets, G.
  2014; 5: 3892-?
- **Ultrasmooth, Highly Spherical Monocrystalline Gold Particles for Precision Plasmonics** *ACS NANO*
  Lee, Y., Schade, N. B., Sun, L., Fan, J. A., Bae, D. R., Mariscal, M. M., Lee, G., Capasso, F., Sacanna, S., Manoharan, V. N., Yi, G.
  2013; 7 (12): 11064-11070
- **Mechanics of ultra-stretchable self-similar serpentine interconnects** *ACTA MATERIALIA*
  Zhang, Y., Fu, H., Su, Y., Xu, S., Cheng, H., Fan, J. A., Hwang, K., Rogers, J. A., Huang, Y.
  2013; 61 (20): 7816–27
- **Tetrahedral Colloidal Clusters from Random Parking of Bidisperse Spheres** *PHYSICAL REVIEW LETTERS*
  Schade, N. B., Holmes-Cerfon, M. C., Chen, E. R., Aronzon, D., Collins, J. W., Fan, J. A., Capasso, F., Manoharan, V. N.
  2013; 110 (14)
- **Stretchable batteries with self-similar serpentine interconnects and integrated wireless recharging systems** *NATURE COMMUNICATIONS*
  Xu, S., Zhang, Y., Cho, J., Lee, J., Huang, X., Jia, L., Fan, J. A., Su, Y., Su, J., Zhang, H., Cheng, H., Lu, B., Yu, et al
  2013; 4
- **Plasmonic Mode Engineering with Templated Self-Assembled Nanoclusters** *NANO LETTERS*
  Fan, J. A., Bao, K., Sun, L., Bao, J., Manoharan, V. N., Nordlander, P., Capasso, F.
  2012; 12 (10): 5318-5324
- **Near-Normal Incidence Dark-Field Microscopy: Applications to Nanoplasmonic Spectroscopy** *NANO LETTERS*
  Fan, J. A., Bao, K., Lassiter, J. B., Bao, J., Halas, N. J., Nordlander, P., Capasso, F.
  2012; 12 (6): 2817-2821
- **DNA-Enabled Self-Assembly of Plasmonic Nanoclusters** *NANO LETTERS*
  Fan, J. A., He, Y., Bao, K., Wu, C., Bao, J., Schade, N. B., Manoharan, V. N., Shvets, G., Nordlander, P., Liu, D. R., Capasso, F.
  2011; 11 (11): 4859-4864
- **Dipolar modeling and experimental demonstration of multi-beam plasmonic collimators** *NEW JOURNAL OF PHYSICS*
  Tetienne, J., Blanchard, R., Yu, N., Genevet, P., Kats, M. A., Fan, J. A., Edamura, T., Furuta, S., Yamanishi, M., Capasso, F.
  2011; 13
- **Terahertz plasmonics** *ELECTRONICS LETTERS*

Yu, N., Wang, Q. J., Kats, M. A., Fan, J. A., Capasso, F., Khanna, S. P., Li, L., Davies, A. G., Linfield, E. H.
2010; 46 (26): S52–S57

- **Fano-like Interference in Self-Assembled Plasmonic Quadrumer Clusters** *NANO LETTERS*
  Fan, J. A., Bao, K., Wu, C., Bao, J., Bardhan, R., Halas, N. J., Manoharan, V. N., Shvets, G., Nordlander, P., Capasso, F.
  2010; 10 (11): 4680-4685
- **GaAs/Al0.15Ga0.85As terahertz quantum cascade lasers with double-phonon resonant depopulation operating up to 172 K** *APPLIED PHYSICS LETTERS*
  Adams, R. W., Vijayraghavan, K., Wang, Q., Fan, J., Capasso, F., Khanna, S. P., Davies, A., Linfield, E. H., Belkin, M. A.
  2010; 97 (13)
- **Designer spoof surface plasmon structures collimate terahertz laser beams** *NATURE MATERIALS*
  Yu, N., Wang, Q. J., Kats, M. A., Fan, J. A., Khanna, S. P., Li, L., Davies, A. G., Linfield, E. H., Capasso, F.
  2010; 9 (9): 730-735
- **Fano Resonances in Plasmonic Nanoclusters: Geometrical and Chemical Tunability** *NANO LETTERS*
  Lassiter, J., Sobhani, H., Fan, J. A., Kundu, J., Capasso, F., Nordlander, P., Halas, N. J.
  2010; 10 (8): 3184–89
- **Self-Assembled Plasmonic Nanoparticle Clusters** *SCIENCE*
  Fan, J. A., Wu, C., Bao, K., Bao, J., Bardhan, R., Halas, N. J., Manoharan, V. N., Nordlander, P., Shvets, G., Capasso, F.
  2010; 328 (5982): 1135-1138
- **Influence of excitation and collection geometry on the dark field spectra of individual plasmonic nanostructures** *OPTICS EXPRESS*
  Knight, M. W., Fan, J., Capasso, F., Halas, N. J.
  2010; 18 (3): 2579–87
- **Layered superconductors as negative-refractive-index metamaterials** *PHYSICAL REVIEW B*
  Rakhmanov, A. L., Yampol'skii, V. A., Fan, J. A., Capasso, F., Nori, F.
  2010; 81 (7)
- **Plasmonics for Laser Beam Shaping** *IEEE TRANSACTIONS ON NANOTECHNOLOGY*
  Yu, N., Blanchard, R., Fan, J., Wang, Q., Pfluegl, C., Diehl, L., Edamura, T., Furuta, S., Yamanishi, M., Kan, H., Capasso, F.
  2010; 9 (1): 11–29
- **Quantum cascade lasers with integrated plasmonic antenna-array collimators** *OPTICS EXPRESS*
  Yu, N., Blanchard, R., Fan, J., Wang, Q., Pfluegl, C., Diehl, L., Edamura, T., Yamanishi, M., Kan, H., Capasso, F.
  2008; 16 (24): 19447–61
- **Small divergence edge-emitting semiconductor lasers with two-dimensional plasmonic collimators** *APPLIED PHYSICS LETTERS*
  Yu, N., Blanchard, R., Fan, J., Capasso, F., Edamura, T., Yamanishi, M., Kan, H.
  2008; 93 (18)
- **Small-divergence semiconductor lasers by plasmonic collimation** *NATURE PHOTONICS*
  Yu, N., Fan, J., Wang, Q. J., Pfluegl, C., Diehl, L., Edamura, T., Yamanishi, M., Kan, H., Capasso, F.
  2008; 2 (9): 564-570
- **Terahertz quantum cascade lasers with copper metal-metal waveguides operating up to 178 K** *OPTICS EXPRESS*
  Belkin, M. A., Fan, J. A., Hormoz, S., Capasso, F., Khanna, S. P., Lachab, M., Davies, A., Linfield, E. H.
  2008; 16 (5): 3242–48
- **Wide-ridge metal-metal terahertz quantum cascade lasers with high-order lateral mode suppression** *APPLIED PHYSICS LETTERS*
  Fan, J. A., Belkin, M. A., Capasso, F., Khanna, S. P., Lachab, M., Davies, A., Linfield, E. H.
  2008; 92 (3)
- **Double-metal waveguide lambda similar or equal to 19 mu m quantum cascade lasers grown by metal organic vapour phase epitaxy** *ELECTRONICS LETTERS*
  Fan, J. A., Belkin, M. A., Troccoli, M., Corzine, S., Bour, D., Hoefler, G., Capasso, F.
  2007; 43 (23): 1284–85

- **Plasmonic nanoclusters: a path towards negative-index metafluids** *OPTICS EXPRESS*
  Urzhumov, Y. A., Shvets, G., Fan, J., Capasso, F., Brandl, D., Nordlander, P.
  2007; 15 (21): 14129–45
- **Single-mode laser action in quantum cascade lasers with spiral-shaped chaotic resonators** *APPLIED PHYSICS LETTERS*
  Audet, R., Belkin, M. A., Fan, J. A., Lee, B. G., Lin, K., Capasso, F.
  2007; 91 (13)
- **Surface emitting terahertz quantum cascade laser with a double-metal waveguide** *OPTICS EXPRESS*
  Fan, J. A., Belkin, M. A., Capasso, F., Khanna, S., Lachab, M., Davies, A., Linfield, E. H.
  2006; 14 (24): 11672–80