

# NICHOLAS X. FANG

*PROFESSOR*  
MECHANICAL ENGINEERING  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
[nicfang@mit.edu](mailto:nicfang@mit.edu)

Professor Nicholas X. Fang is Professor of Mechanical Engineering at the Massachusetts Institute of Technology. Professor Fang earned his B.S. and M.S. degrees in Physics from Nanjing University, China; and Ph.D. degree in Mechanical Engineering from the University of California at Los Angeles. He joined the M.I.T. faculty in 2011. Prior to that, he worked as assistant professor of Mechanical Engineering at the University of Illinois at Urbana-Champaign. Professor Fang teaches and conducts research in the area of micro/nanotechnology. Professor Fang's research programs have focused on the engineered optical and acoustic metamaterials. While the main efforts focus on new insights of material and device design from fundamental approaches, his group also actively pursue the applications in the areas of energy conversion, communication, and biomedical imaging. For example, together with his collaborators from HKUST and MIT, his group will build and test smart adaptive control/monitoring system for energy efficient buildings.

Professor Fang has published over 150 archival journal papers with his group and has mentored 11 Master's students and 30 Doctoral students as well as more than a dozen Postdoctoral Associates, now pursuing successful careers in industry and research laboratories, and academia such as Rutgers University and University of California at San Diego.

Professor Fang has been the recipient of several awards and honors recognizing his research and teaching efforts, including the UIUC Award of Excellence in Advising; the selected Professional of the Year 2010 in Higher Education by Cambridge Who's Who; the ICO Prize from the International Commission of Optics; the NSF CAREER Award; the Society of Manufacturing Engineering Outstanding Young Investigator Award; Technology Review Magazine's 35 Young Innovators Award; the ASME Chao and Trigger Young Manufacturing Engineer Award and the ASME Pi Tau Sigma Gold Medal Award.

---

# NICHOLAS FANG

*Professor of MIT/MechE Department,  
Office: 3-449D, 77 Massachusetts Ave, Cambridge, MA 02139  
Cell: 617-866-8282 • nicfang@mit.edu • <http://web.mit.edu/nanophotonics>*

## **Education:**

Ph.D.	University of California, Los Angeles	2004
M. S.	Nanjing University, China	1998
B. S.	Nanjing University, China	1996

## **Selected Honors and Awards:**

ASME Pi-Tau-Sigma Gold Medal	2006
Award of Excellence in Advising, UIUC	2007
TR35 Young Innovators	2008
SME Young Manufacturing Engineer Award	2009
NSF CAREER Award	2009
Xerox Faculty Award, UIUC	2010
Invited Participant of Frontier of Engineering by National Academy of Engineering	2010
Cambridge Who's Who Professional of the Year in Higher Education Category	2010
ICO Prize/Ernest Abbe Medal by the International Commission of Optics	2011
ASME Chao and Trigger Young Manufacturing Engineer Award	2013
Fellow, International Society for Nanomanufacturing (ISNM)	2013

## **Teaching Experience:**

Thermal-Fluidic Sciences, Materials, Manufacturing, Optics and Photonics, Sensor Technologies

## **Selected External Professional Service**

Editor in Chief, Journal of Micro- and Nano-Manufacturing	2018-Present
Co Editor-in-Chief, Frontiers in Optics and Photonics,	2014-present
Co-organizer, ASME Symposium on Acoustic/Phononic Metamaterials	2009- 2013
Co-organizer, MRS Symposium on Metamaterials	2006, 2011, 2012
Technical Committee, CLEO/QELS	2011, 2012
Technical Committee, ICALEO Nanomanufacturing	2009-now
Expert Witness, Westlaw Round Table Group	2009- present
Board member, Heroyk Company	2015- present
User Committee, Center of Nanoscale Materials, Argonne National Laboratory	2009-2012

## **Publications of Nicholas X. Fang**

Professor Fang, together with his research group and collaborators, has published over 150 peer-reviewed archival journal publications; over 90 conference proceedings papers, 4 book chapters, and he is an inventor on one issued and several pending U.S. Patents. Professor Fang has mentored 11 M.S. and 30 Ph.D. theses as well as several postdoctoral associates.

### **Selected Journal Publications: (from 150 journal articles, cited over 16000 times as of 2018)**

1. X. Zheng, H. Lee, T.H. Weisgraber, M. Shusteff, J. DeOtte, E. B. Duoss, J. D. Kuntz, M. M. Biener, Q. Ge, J. A. Jackson, S. O. Kucheyev, N. X. Fang, and C.M. Spadaccini, "Ultralight, Ultrastiff Mechanical Metamaterials", *Science*, 344, 1373(2014)
2. Fang N., Xi D., Xu J., Ambati M., Sun C. and Zhang X., 2006, "Ultrasonic Metamaterials with Negative Modulus", *Nature Materials*, Vol 5 (6), pp452-456.
3. Qiming Wang, Julie A. Jackson, Qi Ge, Jonathan B. Hopkins, Christopher M. Spadaccini, Nicholas X. Fang, "Lightweight Mechanical Metamaterials with Tunable Negative Thermal Expansion", *Phys. Rev. Lett.* 117, 175901 (2016)
4. Qi Ge, Amir Hosein Sakhaei, Howon Lee, Conner K Dunn, Nicholas X Fang, Martin L Dunn, "Multimaterial 4D Printing with Tailorable Shape Memory Polymers", *Scientific Reports* 6, 31110 (2016)
5. H. Lee, and N. X. Fang, "Micro 3D Printing Using a Digital Projector and its Application in the Study of Soft Materials", *Journal of visualized experiments*, Vol 69, art no: 4457, doi: 10.3791/4457 (2012)
6. X. Zheng, J. Deotte, M.P. Alonso, G.R. Farquar, T.R. Weisgraber, S. Gemberling, H. Lee, N. X. Fang, and C. M Spadaccini, "Design and optimization of a light-emitting diode projection micro-stereolithography three-dimensional manufacturing system", *Review of Scientific Instruments*, Vol 83:12, art no. 125001(2012)
7. Howon Lee, Jiaping Zhang, Hanqing Jiang, and Nicholas X. Fang, "Prescribed Pattern Transformation in Swelling Gel Tubes by Elastic Instability", *Phys. Rev. Lett.*, 108, 214304(2012).
8. Xia C.G., H. Lee, and N. X. Fang, "Solvent Driven Polymeric Micro Beam Device," *Journal of Micromechanics and Microengineering*, Vol 20:8, art. no. 085030(2010)
9. C.G. Xia and N. X. Fang, "Fully three-dimensional micro fabrication with grayscale polymeric self-sacrificial structure", *Journal of Micromechanics and Microengineering*, Vol 19:11, art. no. 115029(2009)
10. Fang N., Sun C., and Zhang X, "Diffusion-Limited Photopolymerization in Scanning Micro-Stereolithography", *Applied Physics A*, Vol 79(8), pp1839-1842 (2004)

## Patents and Patent Applications:

1. N. Fang, P. M. Ferreira, K. H. Hsu, P. Schultz, and A. Kumar, "Direct Nanoscale Patterning of Metals Using Polymer Electrolytes," US Patent No. 7,998,330, 2011.
2. X. Li, N. Fang, P. Ferreira, W. Chern, I. Chun, K. Hsu, "Method of Forming an Array Of High Aspect Ratio Semiconductor Nanostructures", US Patent No. 8980656, 2015.
3. C.M Spadaccini, G. Farquar, T. Weisgraber, S. Gemberling, N. Fang, J. Xu, M. Alonso, H. Lee, "High Resolution Projection Micro Stereolithography System And Method", US Patent Application number 2015/0309473, filed 2011.
4. Maxim Shusteff, Christopher M Spadaccini, Nicholas Fang, Robert Matthew Panas, Johannes Henriksson, Brett Kelly, Allison E Browar, "Multi-beam resin curing system and method for whole-volume additive manufacturing", US Patent Application US20180015672A1, filed 2016.
5. N. Fang, C. G. Xia and A. M. Cox, "Three-Dimensional Microfabricated Bioreactors with Embedded Capillary Network", US Patent Application, 20110033887, 2011.
6. N. Fang and J. Xu, "Low-cost, Light-weight, Passive Hearing Protector", US Patent Application, 62/192124, 2015
7. N. Fang and N. Viard, "Subwavelength Acoustic Metamaterial with Tunable Acoustic Absorption", US Patent Application, 62/248377, 2015
8. Wei Q, Su K, Fang N and Zhang X, "Micro-Electro-Mechanical Band-Pass Filters for Radio Frequency Signal Processing", US patent application, PCT/US05/35304.
9. B. Azeredo, N. X Fang, P. M. Ferreira, X. Han, , K. H. Hsu, K. E Jacobs, A. Kumar, "Direct nanoscale patterning of surfaces by electrochemical imprinting", PCT/US2011/025886.
10. C. Zhao, Y. Liu, Y. Zhao, N. Fang, and T. J. Huang, "A Reconfigurable Plasmofluidic Lens", US Patent application, 61/864,373.
11. Zhang, X., N. Fang, and C. Sun, "High-Speed Plasmonic Nano-Optical Microscope," UC provisional patent pending, 2005-174.
12. H. Lee and N. Fang, "Method of Large Area Three Dimensional Microfabrication Using Combined Digital Micromask and Droplet on Demand", MIT provisional patent pending, Case 16334.

**Technical Consulting since 2009**, for multiple patent cases related to pharma manufacturing, imaging, fluid and thermal sciences