

Xi Chen, PH.D.

Assistant Professor

Advanced Science Research Center (ASRC), City University of New York (CUNY)

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CURRENT APPOINTMENTS

09/2017—present Assistant Professor, PhD Program in Physics, The Graduate Center of the City University of New York, New York, NY

07/2017—present Assistant Professor, PhD Program in Chemistry, The Graduate Center of the City University of New York, New York, NY

08/2016—present Assistant Professor, Department of Chemical Engineering, City College of New York, New York, NY

08/2016—present Assistant Professor, Nanoscience Initiative, CUNY Advanced Science Research Center (ASRC), New York, NY

EDUCATION

Columbia University, New York, NY

Postdoctoral Research Scientist in Biological Sciences and Physics; with Honors August, 2016

Stevens Institute of Technology, Hoboken, NJ

Ph.D. Nanotechnology in Mechanical Engineering; with Honors May, 2012

Tsinghua University, Beijing, China

M.S. in Precision Instruments in Mechanical Engineering July, 2007

B.S. in Mechanical Engineering; with Honors July, 2005

HONORS & AWARDS

The World Economic Forum Expert in Future of Energy and Water 2018

The Science and Technology in Society (STS) forum Future Leaders Program (one of four US young scientists to present the US), Kyoto, Japan 2017

CUNY Summer Undergraduate Research Program (CSURP) Mentor Award 2017

CUNY ASRC Seed Grant, City University of New York 2017

PSC-CUNY Research Award Program, City University of New York 2017

CUNY Faculty Travel Award, City University of New York	2017
Blavatnik Regional Awards for Young Scientists, New York Academy of Sciences, Finalist	2016
Five Year Service Award for the Siemens Competition in Math, Science & Technology	2016
Postdoctoral Research Symposium Award (5 out of 110), Columbia University	2015
James Harry Potter Award for outstanding PhDs, Stevens Institute of Technology	2012
Transducer Research Foundation (TRF) Student Award, IEEE MEMS, Paris, France	2012
National Science Foundation (NSF) Student Award, ASME IMECE, Denver, CO	2011
ASME Micro- and Nano-Systems (MNS) Photo Contest, 3rd Place, Washington, DC	2011
Fellowship of National Science Foundation (NSF) for APSS2010 (international summer school program in civil engineering) and 2nd place in final competition, University of Tokyo, Tokyo, Japan	2010
IEEE/NIST International Mobile Microrobotics Challenge, 3rd Place, Anchorage, Alaska	2010
Outstanding graduate paper award, Tsinghua University	2005
Challenge Cup of Science and Technology Production, 2nd Place, Tsinghua University	2005
Fellowship of National Instrument and Meter Association, Beijing	2003
Top Ten Association President Award, Tsinghua University	2003

PUBLICATIONS

Peer-Reviewed Articles

Ahmet-Hamdi Cavusoglu, **Xi Chen**, Pierre Gentine, and Ozgur Sahin, Potential for natural evaporation as a reliable renewable energy resource, *Nature Communications* 8, 617 (2017). (Major media coverage: *Discover*, *Gizmodo*, *Popular Mechanics*, *MIT Technology Review*, and *Popular Science*)

Xi Chen, Davis Goodnight, Zhenghan Gao, Ahmet-Hamdi Cavusoglu, Nina Sabharwal, Michael Delay, Adam Driks, and Ozgur Sahin, Scaling up nanoscale water-driven energy conversion into evaporation-driven engines and generators, *Nature Communications* 6, 7346 (2015). (Highlighted in *Nature* and *Science NOW*. Major media coverage: *NBC News*, *PBS*, *The New York Times*, *The Washington Post*, *The Guardian*, *BBC*, *Scientific American*, and *Discovery News*.)

Xi Chen, L Mahadevan, Adam Driks and Ozgur Sahin, Bacillus spores as building blocks for stimuli-responsive materials and nanogenerators, *Nature Nanotechnology* 9, 137-141 (2014). (Highlighted in *Science*. Major media coverage: *The Wall Street Journal* and *Discovery News*.)

Xi Chen, Stephen Guo, Jinwei Li, Guitao Zhang, Ming Lu and Yong Shi, Flexible piezoelectric nanofiber composite membranes as high performance acoustic emission sensors, *Sensors and Actuators A* 199, 372-378 (2013).

Jinwei Li, **Xi Chen**, Weihe Xu, Chang-Yong Nam, and Yong Shi, TiO₂ nanofiber solid state dye sensitized solar cell with thin TiO₂ hole blocking layer prepared by atomic layer deposition, *Thin Solid Films* 536, 275-276 (2013)

Weihe Xu, Jinwei Li, Guitao Zhang, **Xi Chen**, Richard Galos, Hamid Hadim, Ming Lu, Yong Shi, A low-cost MEMS tester for measuring single nanostructure's thermal conductivity, *Sensors and Actuators A* 191, 89-98 (2013)

Xi Chen, Shiyu Xu, Nan Yao, and Yong Shi, Young's modulus determination of unpolled electrospun PZT nanofibers, *Science of Advanced Materials* 4, 847-850 (2012). (Invited)

Xi Chen, Anton Li, Nan Yao, and Yong Shi, Adjustable stiffness of individual piezoelectric nanofibers by electron beam polarization, *Applied Physics Letters* 99, 193102 (2011).

Xi Chen, Jinwei Li, Guitao Zhang, and Yong Shi, PZT nano active fiber composites for acoustic emission detection, *Advanced Materials* 23, 3965-3969 (2011). (Frontispiece)

Jinwei Li, **Xi Chen**, Nan Ai, Jumin Hao, Qi Chen, Stefan Strauf and Yong Shi, Silver nanoparticle doped TiO₂ nanofiber dye sensitized solar cells, *Chemical Physics Letters* 514, 141-145 (2011).

Xi Chen, Shiyu Xu, Nan Yao, and Yong Shi, 1.6 Volt Nanogenerator for mechanical energy harvesting using PZT nanofibers, *Nano Letters* 10, 2133-2137 (2010).

Xi Chen, Shiyu Xu, Nan Yao, Weihe Xu, and Yong Shi, Potential measurement from a single lead zirconate titanate nanofiber using a nanomanipulator, *Applied Physics Letters* 94, 253113 (2009).

Xi Chen, and Fengtian Han, Design and experiment with miniaturized high-voltage DC-DC switching power supply, *Electrical Measurement & Instrumentation* 43, 481 (2006). (In Chinese)

Book Chapters

Xi Chen, Nan Yao, and Yong Shi, "Mechanical Properties Characterization of PZT Nanofibers," *Nanocantilever Beams: Modeling, Fabrication, and Applications*, eds. Ioana Voiculescu, Mona Zaghoul, Pan Stanford (2016).

Xi Chen, and Yong Shi, “PZT Nano Active Fiber Composites Based Acoustic Emission Sensor,” *Selected Topics in Micro/Nano-robotics for Biomedical Applications*, eds. Yi Guo, Springer (2012).

Xi Chen, Nan Yao, and Yong Shi, “Energy Harvesting Based on PZT Nanofibers,” *Energy Efficiency and Renewable energy through Nanotechnology*, eds. Ling Zhang, Springer Series in Nanoscience and Technology (2011).

Conference Proceedings & Presentations

Michael DeLay, **Xi Chen**, Jonathan Dworkin, Adam Driks, Ozgur Sahin. Microcantilever investigation of nanoconfinement effects on water exchange. Biophysical Society 61th Annual Meeting, New Orleans, February 11-15, 2017. (Poster Presentation)

Michael DeLay, **Xi Chen**, Ahmet-Hamdi Cavusoglu, Adam Driks, and Ozgur Sahin. Nanoconfinement effects on spore water exchange, European Spore Conference, Royal Holloway, University of London, April 2016.

Xi Chen, Zhenghan Gao, Ahmet-Hamdi Cavusoglu, Michael DeLay, Onur Cakmak, Adam Driks, and Ozgur Sahin. Using bioinspired water-responsive materials to build evaporation-driven engines. *2016 MRS Spring Meeting & Exhibit*, March 28 - April 1, Phoenix, AZ, 2016. (Poster Presentation)

Ahmet-Hamdi Cavusoglu, **Xi Chen**, Ozgur Sahin, Potential of water-responsive materials to harvest energy from evaporation, *Proceeding of TechConnect World Innovation Conference*, June 14-17, Washington, DC, 2015.

Ahmet-Hamdi Cavusoglu, **Xi Chen**, Kathleen Tatem, Ozgur Sahin, Rapid prototyping bacterial spore hygro-actuators for soft robotics and adaptive materials, *Proceeding of TechConnect World Innovation Conference*, June 14-17, Washington, DC, 2015.

Xi Chen, Davis W. Goodnight, Zhenghan Gao, Ahmet-Hamdi Cavusoglu, Nina Sabharwal, Michael DeLay, Adma Driks, Ozgur Sahin, Using spores of Bacillus to create evaporation-driven engines, *Biophysical Society 59th Annual Meeting*, February 7-11, Baltimore, 2015. (Poster Presentation)

Michael DeLay, **Xi Chen**, Jonathan Dworkin, Adam Driks, Ozgur Sahin, The bacterial spore as an energy-rich adaptive material, *Biophysical Society 59th Annual Meeting*, February 7-11, Baltimore, 2015.

Xi Chen, Ahmet-Hamdi Cavusoglu, Davis M Goodnight, Zhenghan Gao, Adam Driks, Ozgur Sahin, Water-Responsive Hybrid Spore/Plastic Materials for Giant Stroke Actuation and Energy

Conversion from Evaporation, *2014 MRS Fall Meeting & Exhibit*, November 30 - December 5, Boston, 2014. (Poster Presentation)

Ahmet-Hamdi Cavusoglu, **Xi Chen**, and Ozgur Sahin, Power Generation and Water Savings Using Water-Responsive Materials, *2014 MRS Fall Meeting & Exhibit*, November 30 - December 5, Boston, 2014.

Ozgun Sahin, and **Xi Chen**, Bacillus spores as building blocks for stimuli-responsive materials and nanogenerators, *APS March Meeting 2014*, Volume 59, Number 1, March 3–7, Denver, Colorado, 2014.

Xi Chen, L. Mahadevan, Adam Driks, and Ozgur Sahin, Bacillus Spores as High Energy Density Stimuli-Responsive Materials, *2013 MRS Fall Meeting & Exhibit*, December 1-6, Boston, 2013. (Oral Presentation)

Xi Chen, and Ozgur Sahin, AFM based probing of nanoscale energy conversion processes in biological materials, *16th International Conference on Non-Contact Atomic Force Microscopy*, August 5-9, Maryland, 2013. (Oral Presentation)

Xi Chen, and Yong Shi, Characterization of piezoelectric nanofiber composite acoustic sensor for structure health monitoring, *Proceeding of ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDET/CIE)*, August 12-15, Chicago, Illinois, 2012.

Yong Shi, and **Xi Chen**, High Voltage Output Nanogenerator Based on PZT Nanofibers, *Proceeding of the 39th Annual Meeting & Exposition of the Controlled Release Society*, July 15-18, Québec City, Canada, 2012.

Xi Chen, Stephen Guo, and Yong Shi, Acoustic emission transducer based on PZT nanofibers, *Proceeding of the 25rd International Conference on Micro Electro Mechanical Systems (MEMS)*, January 29- February 2, Paris, France, 2012. (Poster Presentation)

Xi Chen, and Yong Shi, PZT nano active fiber composites based acoustic emission sensor, *ASME International Mechanical Engineering Congress & Exposition (IMECE)*, November 11-17, Denver, CO, USA, 2011. (Awarded Poster Presentation)

Xi Chen, Richard Galo, and Yong Shi, A Self-powered PZT Nanofiber composites sensor for structure health monitorin, *Proceeding of the 6th International Workshop on Advanced Smart Materials and Smart Structures Technology (ANCRiSST)*, July 25-26, Dalian, China, 2011.

Richard Galo, **Xi Chen**, and Yong Shi, Ultralow power energy storage circuit for piezoelectric nanogenerators, *Proceeding of ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDET/CIE)*, August 28-31, Washington, DC, USA, 2011.

Xi Chen, and Yong Shi, Electrical determination of elastic modulus of individual PZT nanofibers by in situ SEM, *Proceeding of ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDET/CIE)*, August 28-31, Washington, DC, USA, 2011. (Oral Presentation)

Wuming Jing, **Xi Chen**, Sean Lyttle, Zhenbo Fu, Yong Shi, David Cappelleri, A magnetic thin film microrobot with two operating modes, *Proceeding of IEEE ICRA*, May 9-13, Shanghai, China, 2011.

Xi Chen, and Yong Shi, A PZT nanoscale active fiber composites acoustic emission sensor for structure health monitoring, *Proceeding of SPIE Smart Structures/NDE*, March 6-10, San Diego, CA, USA, 2011. (Poster Presentation)

Xi Chen, and Yong Shi, Nanoscale active fiber composites acoustic emission sensor, *Proceeding of NSF Engineering Research and Innovation Conference*, January 4-7, Atlanta, Georgia, 2011.

Xi Chen, Shiyu Xu and Yong Shi, Electro-mechanical coupling of piezoelectric nanocomposites, *Proceeding of ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDET/CIE)*, August 15-18, Montreal, Quebec, Canada, 2010.

Wuming Jing, **Xi Chen**, Sean Lyttle, Zhenbo Fu, Yong Shi and David J. Cappelleri, Design of a micro-scale magnetostrictive asymmetric thin film bimorph (μ MAB) microrobot, *Proceeding of ASME International Mechanical Engineering Congress & Exposition (IMECE)*, November 12-18, Vancouver, British Columbia, Canada, 2010.

Xi Chen, Yong Shi, Sundeep Mangla and Ming Zhang, Modelling and simulation of a bio-mimetic MEMS actuator with self-sensing for thrombus retrieving, *Proceeding of ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDET/CIE)*, August 3-6, Brooklyn, New York, USA, 2008. (Poster Presentation)

Xi Chen, Fengtian Han and Yunfeng Liu, Modeling of an electrostatic micromotor based on a levitated rotor, *Proceeding of International Conference on Integration and Commercialization of Micro and Nano-Systems*, January 10-13, Sanya, Hainan, China, 2007. (Poster Presentation)

Patents

Xi Chen, Zhi-Lun Liu, Mir Ahnaf Hussain, and Zane Shatz, Hygroscopic rotary engines, *Provisional patent filing in process.*

Xi Chen and Zhi-Lun Liu, Horizontal rotary engine, *Provisional patent: 62/631,006.*

Xi Chen, Rein Ulijn, Yi-Ren Wang, Daniela Kroiss, Zhi-Lun Liu, and Haozhen Wang, Artificial muscle comprising peptidoglycan, *Provisional patent: 62/599,989*.

Xi Chen, Davis W. Goodnight, Ozgur Sahin, Evaporation-driven engines, *WIPO Patent WO2015172067 A1*.

Fengtian Han, **Xi Chen**, Qiuping Wu, and Jingxin Dong, Electrostatically levitated micromotor based on MEMS technology. *China Patent CN200610011606.0*.

INVITED TALKS

(Upcoming) Department of Chemical Engineering, NYU Tandon	Apr 2018
(Upcoming) Department of Physics, Queens College	Apr 2018
Sustainability and Nanotechnology, MRS Fall Meeting, Boston	Nov 2017
Physics Colloquium, Department of Physics, CCNY	Nov 2017
Department of Chemistry, College of Staten Island	Oct 2017
Blavatnik Science Symposium, New York Academy of Sciences	Jul 2017
LSM/IAMDN Seminar, Rutgers, The State University of New Jersey	Apr 2017
Biodesign Challenge, Parson School of Design	Mar 2017
Bio-Inspired Nanomaterials Symposium, CUNY ASRC	Feb 2017
Research Information Series lecture, CCNY	Feb 2017
The New York Nanoscience Discussion Group, New York University	Oct 2016

TEACHING & ADVISING

Teaching

CHE 31000, Introduction to Material Sciences, CCNY	Spring 2018
CHEM 79051, Nanoscience Laboratory Course at the ASRC	Spring 2018
CHE I5700-R, Advanced Materials, CCNY	Fall 2017
CHEM 79051, Nanoscience Laboratory Course at the ASRC	Spring 2017
CHE I9700, Q Report, Chemical Engineering, CCNY	Spring 2017

Curriculum Vitae	Xi Chen, Ph.D.
Biodesign Challenge, Parsons School of Design (one lecture and a term project)	Spring 2017
ChE 9600 - 1st year PhD student talks, Chemical Engineering, CCNY	Fall 2016
Teaching Assistant, Dynamics, Stevens Institute of Technology	2011
Teaching Assistant, Introduction to MEMS, Stevens Institute of Technology	2010
Teaching Assistant, Thermodynamics, Stevens Institute of Technology	2008-2009
Teaching Assistant, Automated Production Systems, Stevens Institute of Technology	2008-2009

Lab Supervision & Advising

CUNY ASRC/Chemical Engineering at CCNY (2016-present):

PhD students: Roxy Piotrowska (GC Chemistry), Haozhen Wang (GC Physics), Zhi-Lun Liu (CCNY ChE), Yu Han (CCNY ChE).

PhD thesis committees: Jeffrey Xu (CCNY ChE), Roxy Piotrowska (GC Chemistry).

MS students: David Fredriksson (Royal Institute of Technology), Yi-Ren Wang (University of Michigan), Cheng Ding (Stevens Institute of Technology), Shendu Ma (Columbia University), Chandan Kumar Rangineni (CCNY ChE).

Undergraduate students: Mir Ahnaf Hussain, Zane Shatz, Rubiya Tasnim, Naomi Cameron, Arzu Shahrin, Joseph Shaker, Aaron Berman (Cornell University).

High school students: Andrea Chan (Bronx High School of Science), Alex Yu.

Columbia University (2012-2016): PhD- Ahmet-Hamdi Cavusoglu, Michael DeLay, Yu-Cheng Lin, Alva Strand); MS- Kathleen Tatem; UGs- Davis Goodnight, Nina Sabharwal.

Stevens Institute of Technology (2011): supervised 1 high school student summer project that won regional awards in Siemens Competition (Stephen Guo).

Princeton University (2010): trained graduate and undergraduate students on SEM and nanomanipulator (Katie Roelofs, Anton Li, and Fabian Unterumsberger).

PROFESSIONAL SERVICE

The World Economic Forum Expert, Future of Energy and Water	2018-present
Faculty Career Panel, Columbia University	2017-present
Scientific Advisor, Parson School of Design	2017-present

Curriculum Vitae	Xi Chen, Ph.D.
Judge for Siemens Competition, Material Science discipline	2012-present
(The Competition is the nation's premier science research competition for high school students. I was awarded with the Five Year Service Award from the Siemens Foundation duo to my effort on promoting excellent young people in the U.S, igniting and sustaining today's STEM workforce and tomorrow's scientists and engineers.)	

Mentor of the New Jersey's Science program	2011
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Reviewing Services:	2010-present
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Nature Materials, Nature Nanotechnology, Nature Communications, Nano Letters, ACS Nano, Applied Physics Letters, Scientific Reports, Energy, IEEE Sensors, Journal of Applied Physics, Nanoscience and Nanotechnology Letters, Smart Materials and Structures, IEEE/ASME Transactions on Mechatronics, Journal of Physics D: Applied Physics, Micro & Nano Letters, Micromachines, Microscopy and Microanalysis.

PROFESSIONAL MEMBERSHIPS

Member, The World Economic Forum Expert Network	2018-present
Member, The Science and Technology in Society	2017-present
Member, New York Academy of Sciences	2016-present
Member, Materials Research Society	2014-present

ENGAGEMENT AND OUTREACH

City of Science, Can Nanoscience Revolutionize Medicine, New York	Oct 2017
CUNY Summer Undergraduate Research Program (C-SURP), participant	Jun-Sep 2017
NanoNY NSF-REU program, joint with Columbia University, participant	2017-2020
Emergent Macromolecular Systems, New York	Jun 2017
CUNY Nano Day, New York	Jun 2017
Educational Tour Program, ~150-500 students visited the ASRC per year	2016-present

WORKS HIGHLIGHTED IN THE MAJOR MEDIA

Could Evaporating Water Be the Next Big Thing in Renewable Energy? *GIZMODO*, Sep. 2017

Bacterial Spores Power Small Engine. *Discover Magazine*. Feb. 2016

Introducing the First Vehicle Powered by Evaporation. *Scientific American*. Sep. 2015

Evaporation Gives Spores Energy-Generating Muscle. *The New York Times*. Jun. 2015

Evaporation drives engine. *Nature*. 17 Jun. 2015

Harnessing energy from evaporating water. *BBC*. Jun. 2015

'Evaporation Engine' Propels Tiny Car With Power of Water Vapor. *NBC News*. Jun. 2015

This engine uses nothing but water and bacteria to power small devices. *The Washington Post*. Jun. 2015

Energy harnessed from humidity can power small devices. *Science Now*. Jun. 2015

Spore Work Pays Off. *Science*. Feb. 2014

The Energizer Bacterium. *The Wall Street Journal*. Feb. 2014