

## Jeffrey J. Urban

Lawrence Berkeley National Laboratory  
1 Cyclotron Road, Mail Stop 67R4110  
Work: (510) 486-4526 Home: (412) 352-9403  
jjurban@lbl.gov

---

### Education

Ph.D. in Physical Chemistry, Harvard University, November 2004  
M.A. in Physical Chemistry, Harvard University, 2000  
B.S. with Honors in Biochemistry and Molecular Biology, The Pennsylvania State University, 1998

### Professional Background

- Facility Director, Inorganic Materials Facility, Lawrence Berkeley National Laboratory (2012-present)
- Deputy Director, Inorganic Materials Facility, Lawrence Berkeley National Laboratory (2010-2012)
- Staff Scientist, Inorganic Materials Facility, Lawrence Berkeley National Laboratory (2007-present)
- Postdoctoral Studies in Synthesis and Measurements of Nanocrystal Transistors, Thermoelectrics, and Photovoltaics with Professor Christopher B. Murray, University of Pennsylvania (2004-2007)
- Graduate Studies in Synthesis and Physical Characterization of Transition Metal Oxide Nanostructures with Professor Hongkun Park, Harvard University (1999-2004)
- Graduate Studies in Bio-organic Synthesis of Peptidomimetic Libraries with Professor Gregory L. Verdine, Harvard University (1998-1999)
- Undergraduate Research in Protein Folding Biophysics with Professor C. R. Matthews, Pennsylvania State University (1996-1998)

### Teaching Experience

#### Guest Lecturer:

Chemical Engineering, University of California, Berkeley, Spring 2018  
Materials Science and Engineering, University of California, Berkeley, Fall 2017  
Chemical Engineering, University of California, Berkeley, Spring 2016  
Materials Science and Engineering, University of California, Berkeley, Fall 2015  
Chemical Engineering, University of California, Berkeley, Spring 2015  
Chemical Engineering, University of California, Berkeley, Spring 2013  
Chemical Engineering, University of California, Berkeley, Spring 2012  
Physics and Nanoscale Science and Engineering, University of California, Berkeley, Spring 2012  
Chemistry and Materials Science and Engineering, University of California, Berkeley, Spring 2011  
Chemistry and Materials Science and Engineering, University of California, Berkeley, Spring 2010  
Materials Science and Engineering, University of California, Berkeley, Spring 2010  
Physics and Nanoscale Science and Engineering, University of California, Berkeley, Spring 2010  
Chemistry and Materials Science and Engineering, University of California, Berkeley, Spring 2009

#### Teaching Fellow:

Materials Chemistry and Physics, Harvard University, Fall 2002 (Head Teaching Fellow)  
Graduate Quantum Mechanics, Harvard University, Fall 2001 (Head Teaching Fellow)  
Advanced Physical Organic Chemistry, Harvard University, Spring 1999  
Introductory Organic Chemistry, Harvard University, Fall 1998

### Presentations (From 2009-Present)

September 2019—UC Berkeley, Nanoscience series (Invited talk)  
July 2019—Telluride Summer School, Solar solutions to environmental problems, Telluride, CO (Invited Talk)  
March 2019—ICSS, Micro and Nanoengineering, Honolulu, HI (Invited Talk)  
February 2019—Gordon Research Conference, Nanomaterials for Energy, Irvine, CA (Invited Talk)  
December 2018—Department of Mechanical Engineering, U.C. Merced, Merced, CA (Invited Colloquium)  
March 2018—American Chemical Society (ACS) Meeting, New Orleans, LA (Invited Talk)  
March 2018—American Physical Society (APS) Meeting, Los Angeles, CA (Invited Plenary)  
December 2017—IC3T International Chemistry Congress, Caparica, Portugal (Invited Talk)  
September 2017—Lablinks sustainable energy conference hosted by *Cell Press* and *Joule*, Berkeley, CA (Invited Talk)  
July 2017—ICH2P Conference on Hydrogen Energy, Plenary Speaker, Brisbane, Australia (Invited, Declined)  
June 2017—NUS/IMRE Thermoelectrics workshop, Plenary Speaker, Singapore (Invited)  
May 2017—ECS Meeting, New Orleans, LA (Invited)  
February 2017—EMN Meeting, Orlando, FL (Invited)  
January 2017—Advanced Light Source Upgrade Workshop, Berkeley, CA (Invited)  
December 2016—MRS Session of Organic and Hybrid Thermoelectrics, Boston, MA (Invited)  
November 2016—AIChE annual meeting, 2 invited talks in 2 separate sessions, San Francisco, CA (Invited)  
October 2016—Electrochemical Society Meeting, Honolulu, HI (Invited)  
September 2016—Department of Civil and Environmental Engineering, U.C. Berkeley (Invited)  
August 2016—Presentation at Molecular Foundry Annual User Meeting, Berkeley, CA (Invited)  
July 2016—Institute of Materials Research and Engineering (IMRE), Singapore (Invited)  
July 2016—Department of Chemical Engineering, EPFL Sion, Switzerland (Invited)  
July 2016—Department of Materials Engineering, ETH Zurich, Switzerland (Invited)  
June 2016—LBL Public science outreach: “Cleantech Pitchfest” – Marine Theater, San Francisco, CA (Invited)  
May 2016—Presentation to International Panel of Hydrogen and Fuel Cells for the Economy, Berkeley, CA (Invited)  
April 2016—Department of Chemical Engineering, Stanford University, Palo Alto, CA (Invited)  
April 2016—Presentation to Technical Team of H2 Fuel Cell Manufacturers, Berkeley, CA (Invited)  
April 2016—Department of Applied Physics, Eindhoven University, Netherlands (Invited)  
February 2016—EMM Meeting, Thermal transport in nanostructures, Orlando, FL (Invited)  
November 2015—ESA Retreat, MSD Opportunities in Water-energy Nexus, Berkeley, CA  
November 2015—Hydrogen Storage Consortia Meeting, NREL, Golden, CO  
October 2015—Technology showcase, Bay Area PV Consortium, Berkeley, CA (Invited)  
September 2015—Institute of Physics, Chinese Academy of Sciences, Beijing China (Invited)  
September 2015—Inorganic Colloquium, Department of Chemistry, U.C. Berkeley (Invited)  
May 2015—MSD retreat, Materials Science Opportunities in the Water-Energy Nexus (Invited)  
May 2015—Virginia Tech, New Horizons in Sustainable Energy Series, Blacksburg, VA (Invited)  
March 2015—ACS Meeting Earth abundant materials for hydrogen storage, Denver, CO (Invited)  
March 2015—LOPEC Thin-film electronics, Munich, Germany (Invited)  
December 2014—MRS Symposium on Organic/Hybrid Thermoelectrics, Boston, MA (Invited)  
November 2014—IEEE Nanotechnology Symposium, Santa Clara, CA (Invited)  
October 2014—UC Berkeley NSE Colloquium, Berkeley, CA (Invited)  
September 2014—AVS Energy Storage Meeting, Santa Clara, CA (Invited)  
August 2014—Annual User Meeting, The Molecular Foundry, Berkeley, CA (Invited)  
June 2014—National Academy of Engineering, Invited speaker, presenter, and co-organizer, Energy harvesting and power transmission, Tokyo, Japan (Invited)  
May 2014—BAPVC Program Review, Hybrid barrier materials (Speaker and Poster), Stanford, CA  
March 2014—ACS National Meeting, Li<sup>+</sup> ion transport (Invited), Dallas, TX

February 2014—MURI Program Review, Thermal/Electrical Transport in Organic/Inorganic Composites, Santa Barbara, CA  
December 2013—Nanotek Conference, Las Vegas, NV, Nanoscale energy storage (Invited)  
November 2013—AIChE conference, San Francisco, CA, Thermal transport in nanomaterials (Invited)  
October 2013—"Great in 8", Public outreach talk in Berkeley Repertory Theater (Invited)  
September 2013—NCCA VS talk on Li-ion transport (Invited), Santa Clara, CA  
July 2013—ASME Heat transfer conference, Minneapolis, MN (Invited)  
July 2013—MURI Review, Hybrid Organic-Inorganic Materials (Presenting Speaker), Washington DC  
June 2013—User Executive Committee (UEC) Seminar, Thermal energy harvesting (Invited)  
May 2013—National Academy of Engineering, Frontiers of Engineering, Beijing, China (Invited)  
April 2013—DOE Physical Behavior of Materials, Washington, DC (Invited Presenter)  
March 2013—TMS Conference, San Antonio, TX, Nanostructured Li-ion Batteries (Invited Speaker)  
January 2013—DOE Review, Nanostructured Materials for Thermoelectrics (Presenting Speaker)  
December 2012—Scientific Advisory Board Meeting, Molecular Foundry, Berkeley, CA  
June 2012—Canadian Chemical Society (CSC) Conference, Calgary, Alberta, Canada (Invited Talk)  
April 2012—Materials Research Society, San Francisco, CA (Invited Talk)  
September 2011—IROS Workshop, San Francisco, CA (Invited Talk)  
September 2011—NCCA VS Energy Storage Seminar, SEMI HQ, San Jose, CA (Invited Talk)  
September 2011—MSE Seminar Series, UC Berkeley, CA (Invited Talk)  
August 2011—University of Texas, Austin, Chemical Engineering Department (Invited Talk)  
July 2011—Gordon Research Conference, Mount Holyoke, MA (Invited Talk)  
July 2011—IEEE Nano Symposium, Santa Clara, CA (Invited Talk)  
November 2010—Hydrogen Storage and Production Conference, Netherlands (Invited Talk)  
August 2010—MSD Program Review, CCS EFRC (Overview Talk)  
July 2010—Gordon Research Conference, Tilton, NH (Invited Lecture)  
June 2010—US/Japan Clean Energy Workshop, Albuquerque, NM (Invited Participant)  
June 2010—ONR Program Review, Santa Barbara, CA (Review Talk)  
May 2010—Condensed Matter Physics Seminar, UC Davis (Invited Talk)  
April 2010—LBL MSD Molecular Foundry Transport Workshop, Berkeley, CA (Invited Talk)  
Jan 2010—DOE Review: Nanostructured Thermoelectrics, Berkeley, CA  
Nov 2009—NSF/DOE Nanoscience Workshop, Saclay, France (Invited Talk)  
Nov 2009—Optics Seminar in Electrical Engineering, UC Berkeley, Berkeley, CA (Invited Talk)  
Sept 2009—Nanoscale Informal Science Education (NISE) Lecture, San Francisco, CA (Invited Talk)  
Aug 2009—LBL MSD Program Review for Thermoelectrics, Napa Valley, CA  
May 2009—ONR Hybrid Photovoltaics Review, National Harbor, MD  
April 2009—Greenpower Conferences, Solar Power Generation, San Francisco, CA (Invited Talk)  
April 2009—Electronic Materials Symposium, Santa Clara, CA (Invited)

## Peer-Reviewed Publications

(star indicates contact author(s), gray text clarifies role in contributing-author-only work)

FYI: Pink color indicates to be updated when DOI or other information is finalized.

+ALS indicates a collaboration with ALS

119. “Observation of the softest known phonon modes in the hybrid perovskite  $\text{CH}_3\text{NH}_3\text{PbI}_3$ ”, Yunwei Ma, Hao Ma, Heng Wang, Carla Slebodnick, Ahmet Alata, Jeffrey J. Urban, and Zhiting Tian\*, *accepted, Phys. Rev. Lett.*, (2019)  
Role in work: Contributed to experimental design, measurements, and data interpretation  
DOI: tbd.

117. “‘Runaway’ carbon dioxide conversion leads to enhanced sorption in a nanohybrid porous magnesium metal hydride”, Sohee Jeong<sup>^</sup>, Phillip Milner<sup>^</sup>, Liwen F. Wan<sup>^</sup>, Yi-Sheng Liu, Julia Oktawiec, Edmond W. Zaia, Jinghua Guo, David Prendergast, Jeffrey R. Long, and Jeffrey J. Urban\*, *accepted, Advanced Materials*, (2019). +ALS  
DOI:

131. “Enhanced  $\text{CO}_2$  capture and hydrogen purification via hydroxy metal-organic framework/polyimide mixed matrix membranes”, Canghai Ma and Jeffrey J. Urban\*, *accepted, ChemSusChem.*, (2019).  
DOI: <http://dx.doi.org/10.1002/cssc.201902248>

127. “Solvent-free synthesis of organometallic halides  $\text{CH}_3\text{NH}_3\text{PbI}_3$  and  $(\text{CH}_3\text{NH}_3)_3\text{Bi}_2\text{I}_9$  and their thermoelectric transport properties”, Xiang Long, Zhenyu Pan, Zhuolei Zhang, Jeffrey J. Urban, and Heng Wang\*, *accepted, Appl. Phys. Lett.*, (2019)  
Role in work: Contributed to experimental design, measurements, and data interpretation  
DOI: <https://doi.org/10.1063/1.5113535>

111. “In-situ resonant band engineering of solution-processed semiconductors generates high-performance n-type thermoelectric nano-inks”, Ayaskanta Sahu, Boris Russ, Miao Liu, Jason D. Forster, Fan Yang, Edmond Zaia, Raffaella Buonsanti, Chris Dames, Kristin A. Persson, Nelson E. Coates, Rachel A. Segalman, and Jeffrey J. Urban\*, *not yet rejected, Nature Communications.*, (2019).  
DOI:

113. “Impact of source position and obstructions on fume hood releases”, Tracy M. Mattox\*, Carleton Falzone, Sasan Sadrizadeh, Tevye Kuykendall, and Jeffrey J. Urban\*, *accepted, Annals of Work Exposures and Health*, (2019).  
DOI: [10.1093/annweh/wxz062](https://doi.org/10.1093/annweh/wxz062)

First accepted  
-2020-

135. “Super-selective lead removal by two-dimensional MoS<sub>2</sub> nanosheets and membranes”, Zhongying Wang, Qingsong Tu, Yanghua Duan, Alison Sim, Julie Yu, Jeffrey J. Urban, David L. Sedlak, and Baoxia Mi\*, *submitted*, (2019).

DOI:

Role in work: Contributed to experimental design, measurements, and data interpretation

134. “Tackling challenges in Seebeck coefficient measurement of high resistance samples with an AC measurement technique”, Zhenyu Pan, Zheng Zhu, Jeffrey J. Urban, Fan Yang\*, and Heng Wang\*, *submitted*, (2019)

Role in work: Contributed to experimental design, measurements, and data interpretation

DOI:

133. “Cation lattice influence on hydrogenation kinetics in sodium borohydride”, Tracy M. Mattox\*, Anne L. Pham, Andrew Doran, and Jeffrey J. Urban\*, *submitted*, (2019).

DOI:

132. “Vaporization behavior of Ir<sub>4</sub>(CO)<sub>12</sub> and Re<sub>2</sub>(CO)<sub>10</sub> measured by torsion effusion gravimetric method”, Dhanesh Chandra\*, Anjali Talekar, K.H. Lau, Raja Chelleppa, Wen Ming Chien, *submitted* (2019)

Role in work: Contributed to experimental design, measurements, and data interpretation

DOI: tbd

130. “Nature-inspired hydrogen-bonded supramolecular coordinating complex as metallohosts for selective ion removal”, Ngoc T.N. Bui, Hyungmook Kang, Simon Teat, Gregory M. Su, Chih-Wen Pao, Yi-Sheng Liu, Eddy Zaia, Jinghua Guo, Jeng-lung Chen, Tracy M. Mattox, Jeffrey R. Long, Peter Fiske, Robert Kostecki, and Jeffrey J. Urban\*, *submitted*, (2019). +ALS

DOI:

129. “Enhanced charge-carrier transport in 2D perovskites by doping with single-walled carbon nanotubes and graphene”, Mauricio Solis de la Fuente\*, Sumanjeet Kaur\*, Qin Hu, Edward Barnard, Ahmet Kusoglu, Thomas P. Russell, Jeffrey J. Urban, and Ravi Prasher\*, *submitted*, (2019). +ALS

Role in work: Contributed to experimental design, measurements, and data interpretation

128. “Unveiling the mechanism of phase evolution and hydrogen storage behavior in nanocrystalline Mg(BH<sub>4</sub>)<sub>2</sub> within reduced graphene oxide”, Sohee Jeong, Tae Wook Heo, Julia Oktawiec, Rongpei Shi, ShinYoung Kang, James L. White, Edmond W. Zaia, Liwen F. Wan, Keith G. Ray, Yi-Sheng Liu, Vitalie Stavila, Jinghua Guo, Jeffrey R. Long, Brandon C. Wood, and Jeffrey J. Urban\*, *under review*, (2019). +ALS

DOI:

**126.** “Best practices for temperature control, light flux measurement, and electrode stability characterization in photoelectrochemistry”, Erin B. Creel<sup>^</sup>, Elizabeth R. Corson<sup>^</sup>, Robert Kostecki, Bryan D. McCloskey, and **Jeffrey J. Urban\***, *under revision*, (2019).

125. “Anharmonic convergence: turning two dials on phonons for high zT in p-type PbTe”, **Jeffrey J. Urban\***, preview, *Joule*, **3(5)**, 1180-1181 (2019).  
DOI: <https://doi.org/10.1016/j.joule.2019.04.014>

**124.** “Dynamic synthesis of a crystalline nitrogenated porous graphitic framework as cathode materials for lithium-ion batteries”, Xinle Li, Hongxia Wang, Hao Chen, Qiubo Zhang, Qi Zheng, Haiyan Mao, Yawei Liu, Songliang Cai, Bing Sun, Haimei Zheng, Jeffrey A. Reimer, **Jeffrey J. Urban**, Jim Ciston, Tianwei Tan, Emory M. Chan, Jian Zhang\*, Yi Cui\*, Yi Liu\*, *submitted*, 2019.  
Role in work: Contributed to experimental design, measurements, and data interpretation

123. “New horizons in thermoelectric materials: correlated electrons, organic transport, machine learning, and more”, **Jeffrey J. Urban\***, Akanksha K. Menon, Zhiting Tian, Anubhav Jain, and Kedar Hippalgaonkar, *invited perspective, J. Appl. Phys.*, **125**, 180902 (2019)  
DOI: <https://doi.org/10.1063/1.5092525>

**122.** “Designing ultra-stable natural-driven nanocomposite membranes for unparalleled dual-nanofiltration performance”, Yanqiu Zhang, Xiquan Cheng, Xu Jiang, **Jeffrey J. Urban**, Cher Hon Lau\*, Lu Shao\*, *submitted*, (2019).  
DOI:  
Role in work: Contributed to experimental design, measurements, and data interpretation

**121.** “Electrochemical atomic layer epitaxy deposition of SnTe ultrathin films”, Taise M. Manhobosco\*, Shaul Aloni, **Jeffrey J. Urban**, Sara M. Manhobosco, Jaqueline dos Santos Soares, Anna Paula M. Barboza, Alan Barros de Oliveira, and Ronaldo Junio C. Batista, *submitted*, 2019.  
DOI:  
Role in work: Contributed to experimental design, measurements, and data interpretation

120. “Chloride influence on the reaction mechanism of Lanthanum Hexaboride”, Tracy M. Mattox\*, Andrew Doran, and **Jeffrey J. Urban\***, *J. Crystal Growth*, **518(15)**, 30-33 (2019).  
+ALS  
DOI: <https://doi.org/10.1016/j.jcrysgro.2019.04.020>

**118.** “Engineering an integrated evaporation and condensation system for solar-driven desalination: mimicking the full water cycle in Nature”, Zhongyun Liu, Casey Finnerty, David Sedlak, Kara Nelson, Jeffrey J. Urban, and Baoxia Mi\*, *under revision*, (2019).

DOI:

Role in work: Contributed to experimental design, measurements, and data interpretation

115. “Directing selectivity of electrochemical carbon dioxide reduction using plasmonics”, Erin B. Creel, Elizabeth R. Corson, Robert Kostecki, Jeffrey J. Urban, and Bryan D. McCloskey\*, *ACS Energy Lett.*, **4(5)**, 1098-1105 (2019).

DOI: <https://doi.org/10.1021/acseenergylett.9b00515>

Role in work: Contributed to experimental design, measurements, and data interpretation.

114. “Molecular insight into the lower critical solution temperature transition of alkyl phosphonium benzene sulfonate – water mixtures”, Hyungmook Kang<sup>^</sup>, David E. Suich<sup>^</sup>, James F. Davies, Aaron D. Wilson, Jeffrey J. Urban\*, and Robert Kostecki\*, *Comms. Chem.*, **2(1)**, 51 (2019) +ALS

- DOI: <https://doi.org/10.1038/s42004-019-0151-2>

112. “Edge-functionalized graphene nanoribbon encapsulation to enhance stability and control kinetics of hydrogen storage materials”, Liwen F. Wan<sup>^</sup>, Eun Seon Cho<sup>^</sup>, Tomas Marangoni<sup>^</sup>, Yi-Sheng Liu, Cameron Rogers, Edmond W. Zaia, Ryan R. Cloke, Patrick T. Shea, Yi-De Chuang, Jinghua Guo, Brandon C. Wood, Felix R. Fischer, Jeffrey J. Urban\*, and David Prendergast\*, *Chem. Mater.*, **31(8)**, 2960-2970 (2019). +ALS

DOI: 10.1021/acs.chemmater.9b00494

110. “Enhanced forward osmosis desalination with a hybrid ionic liquid/hydrogel thermos-responsive draw agent system”, Chih-Hao Hsu, Canghai Ma, Ngoc Bui, Zhuonan Song, Robert Kostecki, and Jeffrey J. Urban\*, *ACS Omega*, **4(2)**, 4296-4303 (2019)

DOI: 10.1021/acsomega.8b02827

**109.** “Progress and perspective: soft thermoelectric materials for wearable and internet-of-things applications”, Edmond W. Zaia, Madeleine P. Gordon, Pengyu Yuan, and Jeffrey J. Urban\*, *invited progress report, Advanced Electronic Materials, accepted online*, (2019).

DOI: <https://doi.org/10.1002/aelm.201800823>

\*This article has been chosen to be featured on the back cover of an upcoming issue

108. “Molecular level insight into enhanced n-type transport in solution-printed hybrid thermoelectrics”, Edmond W. Zaia, Madeleine P. Gordon, Valerie Niemann, Jaeyoo Choi, Ruchira Chatterjee, Chih-Hao Shu, Junko Yano, Boris Russ, Ayaskanta Sahu, and **Jeffrey J. Urban\***, *Advanced Energy Materials*, **9(13)**, 1803469 (2019).

DOI: <https://doi.org/10.1002/aenm.201803469>

**\*This article has been chosen to be featured on the back cover of an upcoming issue.**

107. “Low-cost, scalable process for improved power factor in Cu<sub>2</sub>Se thin films at room temperature”, Michael R. Scimeca, Fan Yang, Edmond W. Zaia, Louise Chen, Peter Zhao, Madeleine P. Gordon, Jason D. Forster, Yi-Sheng Liu, Jinghua Guo, **Jeffrey J. Urban**, and Ayaskanta Sahu\*, *Advanced Energy Materials*, **2(2)**, 1517-1525 (2019). +ALS

DOI: 10.1021/acsaem.8b02118

Role in work: Contributed to experimental design, measurements, and data interpretation.

106. “In-situ/operando multimodal soft x-ray characterization in energy science”, Yi-Sheng Liu, Sohee Jeong, Xuefei Feng, Eun Seon Cho, James White, Vitalie Stavila, Mark D. Allendorf, **Jeffrey J. Urban\*** and **Jinghua Guo\***, *ChemPhysChem*, **20(10)**, 1261-1271 (2019). +ALS

DOI: <https://doi.org/10.1002/cphc.201801185>

105. “Tuning lanthanum hexaboride to absorb solar heat: a review”, Tracy M. Mattox\* and **Jeffrey J. Urban\***, *Materials*, **11(12)** (2018).

DOI: doi:[10.3390/ma11122473](https://doi.org/10.3390/ma11122473)

104. “Removal and recovery of heavy metal ions by two-dimensional MoS<sub>2</sub> nanosheets: performance and mechanisms”, Zhongying Wang, Alison Sim, **Jeffrey J. Urban**, , and Baoxia Mi\*, *Environmental Science & Technology*, **52(17)**, 9741-9748 (2018).

DOI: 10.1021/acs.est.8b01705

Role in work: Contributed to experimental design, measurements, and data interpretation

103. “Supercritical geothermal cogeneration: bringing leading-edge technologies online in a combined, flexible energy plant powered by highly-efficient, supercritical geothermal resources”, Jim Schnell\*, W.A. Elders, R. Kosteki, **J.J. Urban**, K. Nichols, W. Osborn, M. Tucker, and E. Wachsman, *paper presented at Geothermal Resources Council meeting* (2018).

102. “Nanostructured metal hydrides for hydrogen storage”, Andreas Schneemann, James L. White, ShinYoung Kang, Sohee Jeong, Liwen F. Wan, Eun Seon Cho, Tae Wook Heo, David



Prendergast, Jeffrey J. Urban, Brandon C. Wood, Mark D. Allendorf, and Vitalie Stavila\*, *Chemical Reviews*, 118(22), 10775-10839 (2018).

DOI: 10.1021/acs.chemrev.8b00313

Role in work: Contributed to metal hydride composites and hybrids

101. “An assessment of strategies for the development of solid-state sorbents for vehicular hydrogen storage”, Mark D. Allendorf,\* Zeric Hulvey,\*<sup>b</sup> Thomas Gennett, Thomas Autrey, Jeffrey Camp, Hiroyasu Furukawa, Maciek Haranczyk, Martin Head-Gordon, Di-Jia Liu, Jeffrey R. Long, Donald Siegel, Vitalie Stavila, Jeffrey J. Urban, Brandon Wood, *Energy and Environmental Science*, **11(10)**, 2784-2812, (2018).

DOI: 10.1039/c8ee01085d

Role in work: Contributed to graphene-based sorbents

\*Chosen as a HOT Paper by E&ES Editors in February 2019

100. “Bottom-up meets top-down: tailored raspberry-like Fe<sub>3</sub>O<sub>4</sub>-Pt nanocrystal superlattices”, Fen Qiu<sup>^</sup>, Rene H. J. Vervuurt<sup>^</sup>, Marcel A. Verheijen, Edmond W. Zaia, Erin B. Creel, Youngsang Kim, Jeffrey J. Urban\*, and Ageeth A. Bol\*, *Nanoscale*, 10, 5859-5863, (2018).

DOI: 10.1039/c8nr00655e

99. “Polymer morphology dominates over energy-dependent scattering in inorganic-organic hybrid thermoelectrics”, Pawan Kumar<sup>^</sup>, Edmond W. Zaia<sup>^</sup>, Erol Yildirim, DV Maheswar Repaka, Shuo-Wang Yang, Jeffrey J. Urban\*, and Kedar Happalgaonkar\*, *Nature Communications*, **9(1)**, 5347 (2018).

DOI: <https://doi.org/10.1038/s41467-018-07435-z>

98. “Experimental phonon dispersion lifetimes of organic-inorganic hybrid perovskite CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> from inelastic X-ray scattering”, Hao Ma, Yunwei Ma, Carla Slebodnick, Ahmet Alatas, Jeffrey J. Urban, and Zhiting Tian\*, *J. Phys. Chem. Lett.*, **10(1)**, 1-6 (2018)

Role in work: Contributed to experimental design, measurements, and data interpretation

DOI: 10.1021/acs.jpcclett.8b03419

97. “A temperature-controlled photoelectrochemical cell for quantitative product analysis”, Elizabeth R. Corson, Erin B. Creel, Youngsang Kim, Jeffrey J. Urban, Robert Kosteci, and Bryan D. McCloskey, *Rev. Sci. Inst.*, **89(5)**, 055112(2018).

DOI: 10.1063/1.5024802

Role in work: Contributed to experimental design, measurements, and data interpretation

96. “Facile transformation of imine covalent organic frameworks into crystalline porous aromatic frameworks”, Xinle Li, Changlin Zhang, Songliang Cai, Hong Fang, and Jeffrey J. Urban, Jim Ciston, Emory M. Chan, and Yi Liu\*, *Nature Communications*, **9(1)**, (2018).

DOI: 10.1038/s41467-018-05462-4

Role in work: Contributed to experimental design, measurements, and data interpretation

95. “Chloride influence on the formation of lanthanum hexaboride: an in-situ diffraction study”, Tracy M. Mattox\*, Chloe Groome, Andrew Doran, Christine M. Beavers, and **Jeffrey J. Urban\***, *Journal of Crystal Growth*, **486**, 60-65 (2018)

DOI: 10.1016/j.jcrysro.2018.01.013

- 2019-94. “Realizing the thermal memristor via a solid-state phase change material”, Fan Yang, Madeleine P. Gordon, and **Jeffrey J. Urban\***, **125(2)**, *Journal of Applied Physics*, (2019).

DOI: <https://doi.org/10.1063/1.5063737>

93. “Polymers of intrinsic microporosity (PIMs) gas separation membranes: a mini review”, Canghai Ma and **Jeffrey J. Urban\***, *Proceedings of the Nature Research Society*, **2(1)**, 02002 (2018).

DOI: 10.11605/j.pnrs.201802002

92. “Weaving a new world: wearable thermoelectric textiles”, Jaeyoo Choi, Edmond W. Zaia, Madeleine Gordon, and **Jeffrey J. Urban\***, invited opinion, *Current Trends in Fashion Technology and Textile Engineering*, **2(2)**, 555583, (2018).

DOI: [10.19080/CTFTTE.2018.02.555583](https://doi.org/10.19080/CTFTTE.2018.02.555583)

91. “Moving the plasmon of LaB6 from IR to near-IR via Eu doping, Tracy M. Mattox\*, D. Keith Coffman, Inwhan Roh, Christopher Sims, and **Jeffrey J. Urban\***, *Materials*, **11(2)**, 226 (2018)

DOI: 10.3390/ma11020226

90. “Modulation of carrier type in nanocrystal-in-matrix composites by interfacial doping”, Richa Sharma, April M. Sawvel, Bastian Barton, Angang Dong, Raffaella Buonsanti, Anna Llordes, Eric Schaible, Stephanus Axnanda, Zhi Liu, **Jeffrey J. Urban**, Dennis Nordlund, Christian Kisielowski, and Delia J. Milliron, *Chem. Mater.*, **30(8)** 2544 (2018)

DOI: 10.1021/acs.chemmater.7b04689

Role in work: Contributed to experimental design, measurements, and data interpretation

89. “Surface plasmon-assisted photoelectrochemical reduction of CO<sub>2</sub> and NO<sub>3</sub><sup>-</sup> on nanostructured silver electrodes”, Youngsang Kim, Erin B. Creel, David Sranko, Elizabeth R. Corson, Alexis T. Bell, Bryan McCloskey, **Jeffrey J. Urban**, and Robert Kostecki\*, *Advanced Energy Materials*, **8(22)**, 1800363 (2018).

DOI: <https://doi.org/10.1002/aenm.201800363>

Role in work: Contributed to experimental design, measurements, and data interpretation.

88. “Solid-state thermal rectification and negative differential thermal resistance using junctions of phase transition materials”, Hyungmook Kang, Fan Yang, and **Jeffrey J. Urban\***, *Phys. Rev. Applied*, **10(2)**, 024034 (2018).  
DOI: <https://doi.org/10.1103/PhysRevApplied.10.024034>

87. “Design rules for self-assembly of 2D nanocrystal/metal-organic framework structures”, Fen Qiu, John Edison, Zdenek Preisler, Yan-Fang Zhang, Guo Li, Aizhao Pan, Chih-Hao Hsu, Tracy M. Mattox, Peter Ercius, Chengyu Song, Karen Bustillo, Michael A. Brady, Edmond W. Zaia, Sohee Jeong, Jeffrey B. Neaton, Shixuan Du, Steven Whitelam, and **Jeffrey J. Urban\***, *Angewandte Chemie*, **130(40)**, 13356-13360 (2018).  
DOI: [10.1002/anie.201807776](https://doi.org/10.1002/anie.201807776) and [10.1002/ange.201807776](https://doi.org/10.1002/ange.201807776)

86. “Templated self-assembly of one-dimensional CsPbX<sub>3</sub> perovskite nanocrystal superlattices”, Aizhao Pan, Matthew Jurow, Yanrui Zhao, Fen Qiu, Ya Liu, Juan Yang, **Jeffrey J. Urban**, Ling He\*, and Yi Liu\*, *Nanoscale*, **9(45)**, 17688 (2017).  
DOI: [10.1039/c7nr06579e](https://doi.org/10.1039/c7nr06579e)  
Role in work: Contributed to experimental design, measurements, and data interpretation

85. “Current best practices for handling inorganic nanoparticle waste in a laboratory setting”, Tracy M. Mattox\*, Carleton Falzone, and **Jeffrey J. Urban\***, *J. Sci. Med., special issue on Chemical Waste*, **5(2)**, 1045 (2017).  
DOI:

84. “Hierarchically controlled inside-out doping of Mg Nanocomposites for moderate temperature hydrogen storage”, Eun Seon Cho, Anne M. Ruminski, Yi-Sheng Liu, Patrick T. Shea, ShinYoung Kang, Edmond W. Zaia, Yi-De Chuang, Xiaowang Zhou, Tae Wook Heo, Jinghua Guo, Brandon C. Wood, and **Jeffrey J. Urban\***, *Advanced Functional Materials*, **27(47)**, 1704316 (2017). +ALS  
DOI: [10.1002/adfm.201704316](https://doi.org/10.1002/adfm.201704316)

83. “Nanorod suprastructures from a ternary graphene oxide-polymer-CsPbX<sub>3</sub> perovskite nanocrystal composite that displays high environmental stability”, Aizhao Pan, Matthew Jurow, Fen Qiu, Juan Yang, Baoyi Ren, **Jeffrey J. Urban**, Ling He\* and Yi Liu\*, *Nano Letters*, **17(11)**, 6759-6765 (2017).  
DOI: [10.1021/acs.nanolett.7b02959](https://doi.org/10.1021/acs.nanolett.7b02959)  
Role in work: Contributed to experimental design, measurements, and data interpretation.

**Fun note: This paper appears back to back with publication #80 in Nano Letters**

82. “Understanding the stability and filtration capability of MoS<sub>2</sub> membranes”, Zhongying Wang, Qingsong Tu, Sunxiang Zheng, **Jeffrey J. Urban**, Shaofan Li, and Baoxia Mi\*, *Nano Letters*, **17(12)**, 7289-7298, (2017).

DOI: 10.1021/acs.nanolett.7b02804

Role in work: Contributed to experimental design, measurements, and data interpretation

81. “Emerging scientific and engineering opportunities within the water-energy nexus”, **Jeffrey J. Urban\***, *Joule*, invited perspective, **1(4)**, 665-688, (2017).

DOI: 10.1016/j.joule.2017.10.002

80. “Dual-channel, molecular-sieving core/shell ZIF@MOF architectures as engineered fillers in hybrid membranes for highly selective CO<sub>2</sub> separation”, Zhuonan Song<sup>^</sup>, Fen Qiu<sup>^</sup>, Edmond W. Zaia, Zhongying Wang, Martin Kunz, Jinghua Guo, Michael Brady, Baoxia Mi, and **Jeffrey J. Urban\***, *Nano Letters*, **17(11)**, 6752-6758 (2017). +ALS

DOI: 10.1021/acs.nanolett.7b02910

**Fun note: This paper appears back to back with publication #83 in Nano Letters**

79. “Atomically-thin interfacial suboxide key to hydrogen storage performance enhancements of magnesium nanoparticles encapsulated in reduced graphene oxide”, Liwen F. Wan, Yi-Sheng Liu, Eun Seon Cho, Jason D. Forster, Sohee Jeong, **Jeffrey J. Urban**, Jinghua Guo, and David Prendergast\*, *Nano Letters*, **17(9)**, 5540-5545 (2017). +ALS

DOI: 10.1021/acs.nanolett/7b02280

Role in work: Contributed to X-ray spectroscopy and data interpretation.

78. “Anion-mediated negative thermal expansion in lanthanum hexaboride”, Tracy M. Mattox\*, Chloe Groome, Andrew Doran, Christine M. Beavers, and **Jeffrey J. Urban\***, *Solid State Communications*, **265**, 47-51 (2017). +ALS

DOI: 10.1016/j.ssc.2017.07.012

77. “Ultralow thermal conductivity in all-inorganic halide perovskites”, Woochul Lee<sup>^</sup>, Huashan Li<sup>^</sup>, Andrew B. Wong, Dandan Zhan, Minliang Lai, Yi Yu, Qiao Kong, Elbert Lin, **Jeffrey J. Urban**, Jeffrey C. Grossman, and Peidong Yang\*, *PNAS*, **114(33)**, 8693-8697 (2017).

DOI: 10.1073/pnas.1711744114

Role in work: Contributed to experimental design, measurements, and data interpretation.

- 76. “Long range order in nanocrystal assemblies determines thin-film charge transport”, Michela Sainato, Ayaskanta Sahu, Brian Shevitski, Jason D. Forster, Shaul Aloni, Giuseppe Barillaro\*, and **Jeffrey J. Urban\***, *ACS Omega*, **2**, 3681-3690 (2017).

DOI: 10.1021/acsomega.7b00433

75. “Poly(vinylidene fluoride) (PVDF) binder degradation in Li-O<sub>2</sub> batteries: a consideration for the characterization of lithium superoxide”, Joseph K. Papp, Jason D. Forster, Colin M. Burke, Hyo Won Kim, Alan C. Luntz, Robert M. Shelby, **Jeffrey J. Urban**, and Bryan D. McCloskey\*, *J. Phys. Chem. Lett.*, **8(6)**, 1169-1174 (2017).

DOI: 10.1021/acs.jpcclett.7b00040

Role in work: Contributed to Raman spectroscopy and data interpretation.

74. “Facile synthesis and electrochemistry of Si-Sn-C nanocomposites for high-energy Li-ion batteries”, Jing Xu, Min Ling, Lydia Terborg, Hui Zhao, Fen Qiu, Jeffrey J. Urban, Robert Kostecki, Gao Liu\*, and Wei Tong\*, *J. Electrochem. Soc.*, **164(7)**, A1378-A1383 (2017).  
DOI: 10.1149/2.0241707jes  
Role in work: Contributed to material characterization and data interpretation.
73. “Swelling of graphene oxide membranes in aqueous solution: characterization of interlayer spacing and insight into water transport mechanisms”, Sunxiang Zheng, Qingsong Tu, Jeffrey J. Urban, Shaofan Li, and Baoxia Mi\*, *ACS Nano*, **11(6)**, 6440-6450 (2017).  
DOI: 10.1021/acsnano.7b02999  
Role in work: Contributed to experimental design, measurements, and data interpretation.
72. “Effects of size and structural defects on the vibrational properties of Lanthanum Hexaboride nanocrystals”, Chloe Groome, Inwhan Roh, Tracy M. Mattox\*, Jeffrey J. Urban\*, *ACS Omega*, **2(5)**, 2248-2254 (2017).  
DOI:10.1021/acsomega.7b00263
71. “Solution-processed Cu<sub>2</sub>Se nanocrystal films with bulk-like thermoelectric performance”, Jason D. Forster, Jared J. Lynch, Nelson E. Coates, Jun Liu, Hyejin Jang, Edmond Zaia, Madeleine P. Gordon, Maxime Sczybowski, Ayaskanta Sahu, David Cahill, and Jeffrey J. Urban\*, *Scientific Reports*, **7(1)**, 2765, (2017).  
DOI: 10.1038/s41598-017-02944-1
70. “Organic Electronics: One model to rule them all”, Jeffrey J. Urban\*, *Nature Materials*, **16(2)**, 157-159, (2017).  
DOI:10.1038/nmat4790
69. “Investigation of phonon coherence and backscattering using Silicon nanomeshes”, Jaeho Lee<sup>^</sup>, Woochul Lee<sup>^</sup>, Geoff Wehmeyer<sup>^</sup>, Scott Dhuey, Deirdre L. Olynick, Stefano Cabrini, Chris Dames, Jeffrey J. Urban\*, and Peidong Yang\*, *Nature Communications*, **8**, 14054 (2017).  
DOI:10.1038/ncomms14054
68. “Anomalously low electronic thermal conductivity in metallic vanadium dioxide”, Sangwook Lee, Kedar Hippalgaonkar, Fan Yang, Jiawang Hong, Changhyun Ko, Joonki Suh, Kai Liu, Kevin Wang, Jeffrey J. Urban, Xiang Zhang, Chris Dames, Sean A. Hartnoll, Olivier Delaire\*, and Junqiao Wu\*, *Science*, **355(6323)**, 371-374, (2017).  
DOI: 10.1126/science.aag0410  
Role in work: Contributed to thermal conductivity modeling and theoretical interpretation.
67. “Bottom-up design of de novo thermoelectric hybrid materials using chalcogenide resurfacing”, Ayaskanta Sahu, Boris Russ, Norman C. Su, Jason D. Forster, Preston Zhou, Eun Seon Cho, Peter Ercius, Nelson E. Coates, and Jeffrey J. Urban\*, *J. Mat. Chem. A.*, **5**, 3346-3357, (2017).  
DOI: 10.1039/C6TA09781B

66. "Tailoring polymer configuration for nanocrystal growth: the role of chain length and solvent", Eun Seon Cho, Fen Qiu, and **Jeffrey J. Urban\***, *Small*, **13(3)**, (2017).  
DOI: 10.1002/smll.201602572

**This article is featured on the frontispiece (inside cover) of *Small*, 13(3), (2017)**

65. "Soft PEDOT:PSS aerogel architectures for thermoelectric applications", Madeleine P. Gordon<sup>^</sup>, Edmond W. Zaia<sup>^</sup>, Preston Zhou<sup>^</sup>, Boris Russ, Nelson E. Coates, Ayaskanta Sahu, and **Jeffrey J. Urban\***, special issue of the *Journal of Applied Polymer Science* on "Structure, Properties, and Applications of Thermoelectric Polymers", **134**, 44070, (2017).  
DOI: 10.1002/app.44070
64. "Insight into the ligand-mediated synthesis of colloidal cesium lead bromide perovskite nanocrystals: the role of organic acid, base, and Cs precursors", Aizhao Pan, Bo He, Xiaoyun Fan, Zeke Liu, **Jeffrey J. Urban**, Paul A. Alivisatos, Ling He\* and Yi Liu\*, *ACS Nano*, **10 (8)**, 7943-7954 (2016).  
DOI: 10.1021/acsnano.6b03863  
Role in work: Contributed to experimental design, measurements, and data interpretation.
63. "Transparent and robust metal-organic framework/polymer films as water vapor barriers", Youn Jue Bae, Eun Seon Cho, Fen Qiu, Daniel T. Sun, Teresa E. Williams, Berend Smit, **Jeffrey J. Urban\***, and Wendy L. Queen\*, *ACS Applied Materials and Interfaces*, **8(16)**, 10098-10103 (2016). +ALS  
DOI: 10.1021/acsami.6b01299
62. "Graphene oxide/metal nanocrystal laminates: the atomic limit for safe, selective hydrogen storage", Eun Seon Cho, Anne M. Ruminski, Shaul Aloni, Yi-Sheng Liu, Jinghua Guo, and **Jeffrey J. Urban\***, *Nature Communications*, **7**, 10804 (2016). +ALS Chosen as ALS highlight. +ALS  
DOI: 10.1038/ncomms10804
61. "Organic thermoelectrics for energy harvesting and temperature control", Boris Russ<sup>^</sup>, Anne Glauddell<sup>^</sup>, **Jeffrey J. Urban\***, Michael L. Chabinyc\*, and Rachel A. Segalman\*, *Nature Reviews Materials*, **1**, 16050, (2016).  
DOI: 10.1038/natrevmats.2016.50
60. "Geometric analysis of enhanced thermal conductivity in epoxy composites: a comparison of graphite and carbon nanofibers fillers", Anne M. Ruminski, Fan Yang, Eun Seon Cho, Joseph Silber, Edgar Olivera, Thomas Johnson, Eric C. Anderssen, Carl H. Haber, and **Jeffrey J. Urban\***, *Physica Status Solidi A*, **1**, 1600368 (2016).  
DOI: 10.1002/pssa.201600368
59. "Tethered tertiary amines as solid-state n-type dopants for solution-processable organic semiconductors", Boris Russ, Maxwell J. Robb, Bhooshan C. Popere, Erin E. Perry, Cheng-Kang Mai, Stephanie Fronk, Shrayesh N. Patel, Thomas E. Mates, Guillermo C. Bazan, **Jeffrey J. Urban**, Michael L. Chabinyc\*, Craig J. Hawker\*, and Rachel A. Segalman\*, *Chemical Science*, **7**, 1914-1919 (2016).  
Role in work: Contributed to experimental design, measurements, and data interpretation.

58. "Carrier scattering at alloy nanointerfaces enhances power factor in PEDOT:PSS hybrid thermoelectrics", Edmond W. Zaia, Ayaskanta Sahu, Preston Zhou, Madeleine P. Gordon, Jason D. Forster, Yi-Sheng Liu, Jinghua Guo, and **Jeffrey J. Urban\***, *Nano Letters*, **16(5)**, 3352-3359 (2016). +ALS
57. "Far-field optical nanothermometry with sub-diffraction limit spatial resolution using individual sub-50nm NaYF<sub>4</sub>:ErYb nanoparticles", Jacob Kilbane, Emory R. Chan, **Jeffrey J. Urban**, and Chris Dames\*, *Nanoscale*, **8(22)**, 11611-11616 (2016).  
Role in work: Contributed to experimental design.
56. "Influence of nanoparticle size on Raman and FTIR spectra of Lanthanum Hexaboride", Tracy M. Mattox\*, Shruthi Chockkalingam, and **Jeffrey J. Urban\***, *Journal of Phys. Chem. C*, **120(9)**, 5188-5195 (2016).
55. "Enhanced permeation arising from dual transport pathways in hybrid polymer-MOF membranes", Norman C. Su, Daniel T. Sun, Christine Beavers, David K. Britt, Wendy L. Queen, and **Jeffrey J. Urban\***, *Energy and Environmental Science*, **9**, 922-931 (2016).  
**This article was featured on the cover of *Energy and Environmental Science*, Issue 9 (2016).**  
+ALS
54. "Thermal transport in Silicon Nanowires at high temperature up to 700K", Jaeho Lee<sup>^</sup>, Woochul Lee<sup>^</sup>, Jongwoo Lim<sup>^</sup>, Yi Yu, Qiao Kong, **Jeffrey J. Urban\***, and Peidong Yang\*, *Nano Letters*, **16(7)**, 4133-4140 (2016).
53. "Prospects for thermoelectricity in quantum dot hybrid arrays", **Jeffrey J. Urban\***, *Invited commentary, Nature Nanotechnology*, **10(12)**, 997-1001, (2015).  
doi:10.1038/nnano.2015.289
52. "Anisotropic in-plane thermal conductivity of black phosphorus nanoribbons at temperatures higher than 100K", Sangwook Lee, Fan Yang, Joonki Suh, Sijie Yang, Yeonbae Lee, Guo Li, Hwan Sung Choe, Aslihan Suslu, Yabin Chen, Changhyun Ko, Joonsuk Park, Kai Liu, Jingbo Li, Kedar Hippalgaonkar, **Jeffrey J. Urban**, Sefaattin Tongay, and Junqiao Wu\*, *Nature Communications*, **6**, 1-7, (2015).  
Role in work: Contributed to thermal conductivity modeling.
51. "Enhancing separation and mechanical performance of hybrid membranes through nanoparticle surface modification", Norman C. Su, Hilda G. Buss, Bryan D. McCloskey, and **Jeffrey J. Urban\***, *ACS Macro Lett.*, **4**, 1239-1243 (2015).
50. "Carrier Lifetime Enhancement in a Tellurium Nanowire/PEDOT:PSS Nanocomposite by Sulfur Passivation", Heyman, J.N\*., Sahu, A., Coates, N.E., Ehmman, B. and **Urban, J.J.**, *MRS Proc.*, **1742**, (2015).  
Role in work: Contributed to materials, experimental design, measurements, and data interpretation
49. "Chemically directing d-block heterometallics to nanocrystal surfaces as molecular beacons of surface structure", Evelyn L. Rosen, Keith Gilmore, April M. Sawvel, Aaron T. Hammack,

Sean E. Doris, Shaul Aloni, Virginia Altoe, Dennis Nordlund, Bruce E. Cohen, Jeffrey J. Urban, D. Frank Ogletree, Delia J. Milliron, David Prendergast, and \*Brett A. Helms, *Chemical Science*, **6**, 6295- 6304 (2015). +ALS

Role in work: Contributed to experimental design and concept.

48. “Nanocrystal superlattice embedded within an inorganic semiconducting matrix by in situ ligand exchange: fabrication and morphology”, Sharma, R., Sawvel, A., Barton, B., Dong, A., Llordes, A., Buonsanti, R., Axnanda, S., Liu, Z., Urban, J.J., Nordlund, D., Kieslowski, C. and \*Milliron, D.M. *Chemistry of Materials*, **27(8)**, 2755-2758 (2015).

Role in work: Contributed to experimental design, measurements, and data interpretation.

47. “Engineering synergy: energy and mass transport in hybrid nanomaterials”, Eun Seon Cho, Nelson E. Coates, Jason D. Forster, Anne M. Ruminski, Boris Russ, Ayaskanta Sahu, Norman Su, Fan Yang, and \*Jeffrey J. Urban, *Advanced Materials*, **27(38)**, 5744-5752, (2015).

46. “Chemical controls of plasmons in metal chalcogenide and metal oxide nanostructures”, Tracy M. Mattox, Xingchen Ye, Karthish Manthiram, P. James Schuck, A. Paul Alivisatos, and \*Jeffrey J. Urban, *Advanced Materials*, **27(38)**, 5830-5837, (2015).

45. “Varying the ionic functionalities of conjugated polyelectrolytes leads to both p- and n-type carbon nanotube composites for flexible thermoelectrics”, Cheng-Kang Mai, Boris Russ, Stephanie L. Fronk, Nan Hu, Mary B. Chan-Park, Jeffrey J. Urban, Rachel A. Segalman, Michael L. Chabinye, and \*Guillermo C. Bazan, **8**, 2341-2346, *Energy and Environmental Science* (2015).

**This article was featured on the cover of *Energy and Environmental Science*, Issue 8 (2015).**

Role in work: Contributed to experimental design, measurements, and data interpretation.

44. “Modified Schottky emission to explain thickness dependence and slow depolarization in BaTiO<sub>3</sub> nanowires”, Y. Qi, J.M.P. Martirez, Wissam A. Saidi, Jeffrey J. Urban, J.E. Spanier, and \*A.M. Rappe, *Phys. Rev. B*, **91(24)**, 24531 (2015). Published online at arXiv as: **arXiv:1502.04105**

Role in work: Contributed to materials growth and fabrication.

43. “Size-dependent permeability deviations from Maxwell’s model in hybrid cross-linked poly(ethylene glycol)/silica nanoparticle membranes”, Norman C. Su, Zachary P. Smith, Benny D. Freeman, and \*Jeffrey J. Urban, *Chemistry of Materials*, **27(7)**, 2421-2429 (2015).

42. “Enhanced water vapor blocking in transparent hybrid polymer-nanocrystal films”, Eun Seon Cho, Christopher M. Evans, Emily C. Davidson, Megan L. Hoarfrost, Miguel A. Modestino, Rachel A. Segalman, and \*Jeffrey J. Urban, *ACS Macro Lett.*, **4**, 70-74 (2015).

41. “Gold nanocrystal arrays as a macroscopic platform for molecular junction thermoelectrics”, William B. Chang, Boris Russ, Victor Ho, Jeffrey J. Urban, and \*Rachel Segalman, *Phys. Chem. Chem. Phys.*, **17(9)**, 6207-6211(2015).

Role in work: Contributed to materials, experimental design, measurements, and data interpretation.

40. “Mechanistic insight into the formation of cationic naked nanocrystals generated under equilibrium control”, Sean E. Doris, Jared J. Lynch, Changyi Li, Andrew W. Wills, Jeffrey J. Urban, and \*Brett A. Helms, *J. Am. Chem. Soc.*, **136(44)**, 15702-15710 (2014).



39. "Ligand symmetry correlates to thermopower enhancement in small molecule/nanocrystal hybrid materials", Jared J. Lynch, Michele Kotiuga, Vicky V.T. Doan-Nguyen, Wendy L. Queen, Jason D. Forster, Ruth A. Schlitz, Christopher B. Murray, Jeffrey B. Neaton, Michael L. Chabinye, and \***Jeffrey J. Urban**, *ACS Nano* **8(10)**, 10528-10536 (2014).
38. "Li<sup>+</sup> concentration mapping and transport via *in-situ* confocal Raman microscopy", Jason D. Forster, Stephen J. Harris, and \***Jeffrey J. Urban**, *J. Phys. Chem. Lett.* **5(11)**, 2007-2011 (2014).
37. "Terahertz and infrared transmission of an organic/inorganic hybrid thermoelectric material", Heyman, J.N., \*Alebechew, B., Kaminski, Z., \*Nguyen, M., Coates, N.E., and **Urban, J.J.**, *Appl. Phys. Lett.*, **104**, 141912 (2014).  
Role in work: Contributed to materials, experimental design, measurements, and data interpretation.
36. "Power factor enhancement in solution-processed organic n-type thermoelectric modules through side chain design", Russ, B.R., Brunetti, F., Robb, M., Miller, L., Patel, S., Ho, V., Hawker, C., **Urban, J.J.**, \*Chabinye, M., and \*Segalman, R.A., *Adv. Mater.*, **26(21)**, 3473-3477 (2014).  
Role in work: Contributed to experimental design, measurements, and data interpretation.
35. "Engineering bright sub-10-nm upconverting nanocrystals for single-molecule imaging", Gargas, D.J., Chan, E.M., Ostrowski, A.D., Aloni, S., Altoe, M.V.P., Barnard, E.S., Sanii, B., **Urban, J.J.**, Milliron, D.M., \*Cohen, B.E., and \*Schuck, P.J., *Nature Nanotechnology*, **9**, 300-305 (2014).  
Role in work: Contributed to theory, phonon dynamics, and analysis
34. "Using polymer-nanocrystal interactions to drive simultaneous enhancement of hydrogen storage and air-stability in Mg/Polymer nanocomposites", Anne M. Ruminski, Rizia Bardhan, Alyssa Brand, and \***Jeffrey J. Urban**, *Energy & Environmental Science*, **6(11)**, 3267-3271 (2013).
33. "Uncovering the intrinsic size-dependence of hydriding phase transitions in nanocrystals", Rizia Bardhan, Lester O. Hedges, Cary L. Pint, Ali Javey, \*Stephen Whitlam and \***Jeffrey J. Urban**, *Nature Materials*, **12**, 905-912 (2013).
32. "Ultralow thermal conductivity in inorganic CdSe nanocomposites with controlled grain size", \*Joseph P. Feser, Emory Chan, Arun Majumdar, Rachel A. Segalman and \***Jeffrey J. Urban**, *Nano Lett.*, **13(5)**, 2122-2127 (2013).
31. "Thermoelectric power factor optimization in PEDOT:PSS Tellurium nanowire hybrid composite", Shannon K. Yee, Nelson E. Coates, , Arun Majumdar, \***Jeffrey J. Urban**, and \*Rachel A. Segalman, *Phys. Chem. Chem. Phys.* **15**, 4024-4032 (2013).
30. "Effect of interfacial properties on polymer-nanocrystal thermoelectric transport", Nelson E. Coates, Shannon K. Yee, Brian McCullough, Kevin C. See, Arun Majumdar, \*Rachel A. Segalman, and, \***Jeffrey J. Urban**, *Adv. Mater.* **23(11)**, 1629-1633 (2013).
29. "Rationally designed, three-dimensional carbon nanotube back-contacts for efficient solar devices", Cary L. Pint, Kuniharu Takei, Rehan Kapadia, Maxwell Zheng, Alexandra C. Ford,

Junjun Zhang, Arash Jamshidi, Rizia Bardhan, Jeffrey J. Urban, Ming Wu, Joel W. Ager, Brett A. Cruden, and \*Ali Javey, *Advanced Energy Materials*, **1**, 1040-1045 (2011).

Role in work: Contributed the Raman microscopy measurements in this work.

28. “Tip-enhanced Raman spectroscopy with bowtie-antenna-based scan probes”, Alexander Weber-Bargioni, Adam Schwartzberg, Ariel Ismach, Jeffrey J. Urban, Paul Ashby, D. Frank Ogletree, \*Stefano Cabrini, and \*P. James Schuck, *Nano Lett.*, **11**, 1201-1207 (2011).

Role in work: Contributed to development of tip-based optical probes featured here.

27. “Air-stable metal hydride nanocomposites: a platform for engineering lightweight, high-energy density, cyclable storage materials”, Anne M. Ruminski, Rizia Bardhan, Alyssa Brand, and \*Jeffrey J. Urban, invited article, *Energy & Environmental Science*, **4**, 4882-4895 (2011).

26. “Controlling nanorod self-assembly in polymer thin films”, Miguel A. Modestino, Elaine R. Chan, Alexander Hexemer, Jeffrey J. Urban, and \*Rachel A. Segalman, *Macromolecules*, **44(18)**, 7364-7371 (2011).

Role in work: Contributed to experimental design and materials synthesis.

25. “Optically- and thermally-responsive programmable materials based on carbon nanotube-hydrogel polymer composites”, Xiaobo Zhang, Cary L. Pint, Min Hyung Lee, Bryan Edward Schubert, Arash Jamshidi, Kuniharu Takei, Hyunhyub Ko, Andrew Gillies, Rizia Bardhan, Jeffrey J. Urban, Ming Wu, Ronald Fearing, and \*Ali Javey, *Nano Lett.*, **11(8)**, 3229-3244 (2011).

Role in work: Contributed to optical microscopy and light scattering experiments.

### Work highlighted in Nature, July 28, 2011

24. “Pd nanoparticle decorated p-InP nanopillars for efficient water reduction”, Jaehyun Moon, Cary L. Pint, Kuniharu Takei, Min Hyung Lee, Rizia Bardhan, Jeffrey J. Urban, Arash Jamshidi, Ming Wu, and \*Ali Javey, *submitted* (2011).

Role in work: Contributed the Pd nanocrystals used in this work.

23. “Size- and surface-dependent CO<sub>2</sub> capture in chemically synthesized magnesium oxide nanocrystals”, Anne M. Ruminski, Ki-Joon Jeon, and, \*Jeffrey J. Urban, invited article in *J. Mater. Chem.*, special themed issue on “Chemical transformations of nanoparticles”, **21**, 11486-11491 (2011).

22. “Optical cavity characterization in nanowires via self-generated broad-band emission”, Adam M. Schwartzberg, Shaul Aloni, Tevye Kuykendall, P. James Schuck, and \*Jeffrey J. Urban, *Optics Express*, **19(9)**, 8903-8911 (2011).

21. “Hyperspectral nanoscale imaging on dielectric substrates with coaxial optical antenna scan probes”, Alexander Weber-Bargioni, Adam M. Schwartzburg, Matteo Cornaglia, Ariel Ismach, Jeffrey J. Urban, YuanJie Pang, Reuven Gordon, Jeffrey Bokor, Miquel Salmeron, D. Frank Ogletree, \*Stefano Cabrini, and \*P. James Schuck, *Nano Lett.*, **11(3)**, 1201-1207 (2011).

Role in work: Contributed to development of tip-based optical probes featured here.

20. “Interface segregating fluoroalkyl-modified polymers enable high fidelity block copolymer nanoimprint lithography with PS-b-PDMS”, Vincent Voet, Teresa E. Pick, Sang-Min Park, Manuel Moritz, Aaron T. Hammack, Jeffrey J. Urban, D. Frank Ogletree, \*Deirdre L. Olynick, and \*Brett A. Helms, *J. Amer. Chem. Soc.*, **133(9)**, 2812-2815 (2011).

Role in work: Contributed to surface chemical analysis via XPS spectroscopy.

19. “Air-stable magnesium nanocomposites provide rapid and high-capacity hydrogen storage without using heavy-metal catalysts”, Ki-Joon Jeon<sup>^</sup>, Hoi Ri Moon<sup>^</sup>, Anne M. Ruminski, Bin Jiang, Christian Kisielowski, Rizia Bardhan, and \***Jeffrey J. Urban**, *Nature Materials*, **10(4)**, 286-290 (2011).

**Work highlighted in *Nature Materials*, News & Views (pg. 265-266).**

**Work highlighted in *Nature Nanotechnology*, April, 2011**

**Work highlighted in CNN interview (“The Big Innovation”), March 22, 2011**

18. “Size-dependent polar ordering in colloidal GeTe nanocrystals”, Mark J. Polking, **Jeffrey J. Urban**, Delia J. Milliron, Haimei Zheng, Emory Chan, Marissa A. Caldwell, Simone Raoux, Christian F. Kisielowski, Joel W. Ager III, \*Ramamoorthy Ramesh, and \*A.P. Alivisatos, *Nano Lett.*, **11(3)**, 1147-1152 (2011).

Role in work: Contributed to analysis of size-dependent phase transition and synthesis.

17. “Water-processable polymer-nanocrystal hybrids for thermoelectrics”, Kevin C. See, Joseph P. Feser, Cynthia E. Chen, Arun Majumdar, \***Jeffrey J. Urban**, and \*Rachel A. Segalman, *Nano Lett.*, **10(11)**, 4664-4667 (2010).

**Work highlighted in *MRS Bulletin*, December 2010.**

16. “Spectroscopic evidence for exceptional thermal contribution to electron-beam induced fragmentation”, Marissa A. Caldwell, Ben Haynor, Shaul Aloni, D. Frank Ogletree, H.-S. Philip Wong, \***Jeffrey J. Urban**, and \*Delia J. Milliron, *J. Phys. Chem. C*, **114**, 22064-22068 (2010).

15. “Universal and solution-processable precursor to bismuth chalcogenide thermoelectrics”, Robert Y. Wang, Joseph P. Feser, Xun Gu, Kin Man Yu, Rachel A. Segalman, Arun Majumdar, \*Delia J. Milliron, and \***Jeffrey J. Urban**, *Chem. Mater.*, **22(6)**, 1943-1945 (2010).

14. “Carrier distribution and dynamics of nanocrystal solids doped with artificial atoms”, Dong-Kyun Ko, **Jeffrey J. Urban**, and \*Christopher B. Murray, *Nano. Lett.*, **10(5)**, 1842-1847 (2010).  
Role in work: Contributed to thermoelectric measurements and data analysis.

13. “Block copolymers for organic electronics”, \*Rachel A. Segalman, Bryan McCulloch, Saar Kirmayer, and **Jeffrey J. Urban**, *Macromolecules*, **42(23)**, 9205-9216 (2009).

Role in work: Contributed both to optical and electronic characterization sections.

**Article selected for cover art, December 8, 2009.**

12. “Size-controlled synthesis and optical properties of monodisperse colloidal magnesium oxide nanocrystals”, Hoi Ri Moon, **Jeffrey J. Urban**, and \*Delia J. Milliron, *Angewandte Chemie*, **48(34)**, 6278-6281 (2009).

Role in work: Contributed both to nanocrystal synthesis and optical properties characterization.

**Work selected as “hot paper” by editor.**

**Work highlighted in *Photonics Spectra* (Nov. 2009)**

**Work highlighted in Reuters press coverage (Nov. 2009)**

11. “Label-free in situ imaging of lignification in the cell wall of low lignin transgenic *Populus trichocarpa*,” Martin Schmidt, Adam M. Schwartzberg, Pradeep N. Perera, Alex Weber-Bargioni, Andrew Carroll, Purbasha Sarkar, Elena Bosneaga, **Jeffrey J. Urban**, Jingyuan Song,

Mikhail Y. Balakshin, Ewellyn A. Capanema, Manfred Auer, Paul D. Adams, Vincent L. Chiang, and \*P. James Schuck, *Planta*, **230**, 589-597 (2009).

Role in work: Contributed to development of confocal Raman microscopy tools used here.

Moved to LBNL (December 2007)

---

10. "Synergism in binary nanocrystal superlattices leads to enhanced *p*-type conductivity in self-assembled PbTe/Ag<sub>2</sub>Te thin films," \***Jeffrey J. Urban**, Dmitri V. Talapin, Elena V. Shevchenko, Cherie R. Kagan, and \*C.B. Murray, *Nature Materials* **6(2)** 115-121 (2007).

**Work highlighted in Nature 445 492-493 (2007).**

9. "Superfluidity and superconductivity magnetic switching of phase-slip dissipation in NbSe<sub>2</sub> nanobelts," Abram Falk, Mandar M. Deshmukh, Amy L. Prieto, **Jeffrey J. Urban**, Andrea Jonas, and \*Hongkun Park, *Phys. Rev. B.* **75** 020501(R) (2007)
8. "Observation of optical nonlinearities in strongly quantum confined PbS nanocrystals for all-optical tunable nanophotonics," Charlton J. Chen, J.I. Dadap Jr., **Jeffrey J. Urban**, C.B. Murray, and \*C.W. Wong, *Proc. of Optics East*, 63930E (2006).
7. "Self-assembly of PbTe quantum dots into nanocrystal superlattices and glassy films," \***Jeffrey J. Urban**, Dmitri V. Talapin, Elena V. Shevchenko, and \*C.B. Murray, *J. Am. Chem. Soc.* **128(10)**, 3248-3255 (2006).

**Work highlighted in Photonics Spectra, April 2006**

6. "Ferroelectric phase transitions in individual single-crystalline BaTiO<sub>3</sub> nanowires," Jonathan E. Spanier, Alexie M. Kolpak, **Jeffrey J. Urban**, Ilya Grinberg, Wan Soo Yun, Lian Ouyang, Andrew M. Rappe, and \*Hongkun Park, *Nano Lett.* **6**, 735-739 (2006).
5. "Synthesis of single-crystalline La<sub>1-x</sub>Ba<sub>x</sub>MnO<sub>3</sub> nanocubes with adjustable doping," **Jeffrey J. Urban**, Lian Ouyang, Moon-Ho Jo, Dina S. Wang and \*Hongkun Park, *Nano Lett.* **4**, 1547-1550 (2004).
4. "Single-Crystalline Barium Titanate Nanowires," **Jeffrey J. Urban**, Jonathan, E. Spanier, Lian Ouyang, Wan Soo Yun, and \*Hongkun Park, *Adv. Mater.* **15**, 423-426 (2003).
3. "Ferroelectric properties of individual barium titanate nanowires investigated by scanned probe microscopy," Wan Soo Yun, **Jeffrey J. Urban**, Qian Gu and \*Hongkun Park, *Nano Lett.* **2**, 447-450 (2002).

**Work highlighted in Chemical and Engineering News, March 4, 2002.**

2. "Synthesis of single-crystalline perovskite nanowires composed of barium titanate and strontium titanate," **Jeffrey J. Urban**, Wan Soo Yun, Qian Gu and \*Hongkun Park, *J. Am. Chem. Soc.* **124**, 1186 (2002).

**Work highlighted in Chemical and Engineering News, March 4, 2002.**

1. "A Modular Synthetic Approach Toward Exhaustively Stereodiversified Ligand Libraries," Tiffany M. Gierasch, Milan Chytil, Mary T. Didiuk, Julie Y. Park, Jeffrey J. Urban, Steven P. Nolan, \*Gregory L. Verdine, *Org. Lett.* **2**, 3999-4002 (2000).

## Book Chapters and Invited Editorial and Review Articles

1. "Introduction" to *Royal Society of Chemistry Book on Organic Thermoelectric Materials*, Jaeyoo Choi, Madeleine P. Gordon, Pengyu Yuan, Hyungmook Kang, Edmond W. Zaia, and Jeffrey J. Urban, in press (2019)
2. "New design rules for polymer-based thermoelectric materials", Nelson E. Coates, and \*Jeffrey J. Urban, invited book chapter in *Innovative Thermoelectric Materials: Polymer, Nanostructure, and Composite Thermoelectrics*, pg. 107-130 (World Scientific, 2016).
3. "Future prospects for hydrogen storage in designer nanocomposites", Anne M. Ruminski, Rizia Bardhan, Alyssa Brand, and \*Jeffrey J. Urban, invited editorial, *Biofuels*, **2(6)**, 591-594 (2011).
4. "The Physics and Chemistry of Quantum-Dot Based Photovoltaics", Delia J. Milliron and Jeffrey J. Urban, invited book chapter appearing in *Colloidal Quantum Dot Devices: Sensors, Sources, and Solar Cells* (Cambridge University Press, 2014).
5. "Integrated Miniaturized Materials—From Self-Assembly to Device Integration," Jeffrey J. Urban et al., invited book chapter appearing in *Materials Research Society Symposium Proceedings, Spring 2010, Volume 1272* (Materials Research Society Press, 2011).
6. "Ferroelectric Nanowires," Jonathan E. Spanier, Jeffrey J. Urban, Lian Ouyang, Wan Soo Yun, and Hongkun Park, invited book chapter appearing in *Nanowires and Nanobelts: Materials, Properties, and Devices: Volume 2* (Kluwer, Netherlands, 2003).

## Awards and Honors

Selected by the National Academy of Engineering (NAE) as one of the top 60 scientists under age 45 for 2013 CAFOE program (2013)  
Selected for "Early Career Scientist" training at U.C. Berkeley Haas Business School (2012)  
Lawrence Berkeley National Lab, Outstanding Performance Award, Materials Sciences Division (2011)  
Nominated for Eni Award (2015), "Nobel Prize of Green Energy"  
Invited participant, Global Grand Challenges of Engineering Summit (jointly hosted by NAE, RAE, and CAE), Beijing, China (2015)  
Winner of Nano Micro Letters Researcher Award (2016), Other winners from MIT, Stanford, etc.  
Katerva Award, Finalist in Environmental Category (2017)  
Recipient of NRS Excellence in Science Award (2018)  
Lawrence Berkeley National Lab, SPOT Award for Safety Collaboration (2018)

## Journal Editorships

Co-editor, special issue for *Materials Science and Engineering B* (Elsevier): “Nanomaterials and Upscaling Processes in Hydrogen Technology and Carbon Capture Storage” (with Prof. Sofoklis Makridis) (2015)

Co-editor, special issue for *MRS Communications* on “Hard Functional Materials” (2016)

Editor, special issue of *Current Opinions in Chemical Engineering* for Water-Energy Nexus (2019)

## Filed Patents and Disclosures

### *Issued patents*

1. "Transition metal oxide nanowires and devices incorporating them," Hongkun Park, **Jeffrey J. Urban**, Wan Soo Yun, Qian Gu, *US Patent 7,918,935 B2* (2007).
2. "Inorganic Nanostructure-Organic Polymer Heterostructures Useful for Thermoelectric Devices," Kevin C. See, Nelson E. Coates, Shannon K. Yee, Rachel A. Segalman, and **Jeffrey J. Urban**, International Patent *Application PCT/US2011/037816*, *U.S. Patent Application 13/685,505*, *LBNL Disclosure IB-2859* (2012). Patent number: 9831008
3. “Nanostructured layers of thermoelectric materials”, Jared Lynch, Nelson E. Coates, Jason D. Forster, Ayaskanta Sahu, Boris Russ, **Jeffrey J. Urban**, ROI filing *BK-2015-145*, *2015-085*, *Provisional Patent 62/256,786* (2015). Patent issued 2018, Patent Number: 9882108.

### Patents in prosecution

1. “Room temperature hydrogen storage using composites of magnesium nanoparticles containing metal catalysts encapsulated in gas-selective polymer”, Anne M. Ruminski, Alyssa Brand, Rizia Bardhan, and **Jeffrey J. Urban**, *ROI filing 2013-065* (2013).
2. “Self-doping materials for n-type organic thermoelectric applications”, Boris Russ, Fulvio Brunetti, Craig Hawker, Michael Chabiny, **Jeffrey J. Urban**, and Rachel A. Segalman, *UCB Disclosure BK-2014-134-1* (2014).
3. “Self-doping materials and methods”, Boris Russ, Fulvio Brunetti, Craig J. Hawker, Michael L. Chabiny, **Jeffrey J. Urban**, Rachel A. Segalman, *US Prov. Patent App. # 61/942,511 UC2014-633/BK2014-134* (2014).
4. “Graphene oxide/metal nanocrystal laminates: the atomic limit for safe, selective gas storage”, Eun Seon Cho, Anne M. Ruminski, Shaul Aloni, and **Jeffrey J. Urban**, ROI filing *2015-017*, *Provisional Patent 62/203,198* (2015).
5. “Surface doping of nanostructures”, Ayaskanta Sahu, Boris Russ, Miao Liu, Jason Forster, Fan Yang, Raffaella Buonsanti, Chris Dames, Kristin Persson, Nelson E. Coates, Rachel A. Segalman, and **Jeffrey J. Urban**, ROI filing *2015-086* (2015). US Patent Application: 15/254,148
6. “Nanostructured graphene and magnesium composites for hydrogen storage”, Felix Fischer, **Jeffrey J. Urban**, Eun Seon Cho, Anne M. Ruminski, Ryan Cloke, Tomas Marangoni, and Cameron Rogers *UCB Invention Disclosure, BK-2015-135; Our Ref.: 00012-035P01* (2015).

7. “Generalized method for producing dual transport pathway membranes”, Norman C. Su, Daniel T. Sun, Christine M. Beavers, David K. Britt, Wendy L. Queen, and **Jeffrey J. Urban**, ROI filing 2016-108-01, Application Number 62/417,954 (2016).
8. “Self-doping materials for n-type organic thermoelectric applications”, Boris Russ, Maxwell Robb, Craig J. Hawker, Michael L. Chabinye, **Jeffrey J. Urban**, Rachel A. Segalman, *U.S. Patent Filed 2014-633/BK 2014-134 / SLW Ref: 4171.003USI* (2015).
9. “Thermoelectric polymer aerogels and methods of fabrication thereof”, Edmond W. Zaia, Madeleine P. Gordon, Preston Zhou, Boris Russ, Nelson Coates, Ayaskanta Sahu, and **Jeffrey J. Urban**, ROI filing 2016-120-02, Application Number 62/337,958 (2016).
10. “Transparent metal-organic framework/polymer mixed matrix membranes as water vapor barriers”, Wendy L. Queen, Youn Jue Bae, Eun Seon Cho, Fen Qiu, Daniel T. Sun, Teresa E. Williams, and **Jeffrey J. Urban**, ROI filing 2016-143-01, Application Number 62/485,241 (2016).

#### Invention Disclosures currently in process

1. “Low-energy, low-cost forward osmosis water desalination via ionic liquids/water phase separation”, Robert Kostecki and **Jeffrey J. Urban** ROI filed 2015-099 (Disclosure in 2015)
2. “Flexible, Thin Film, Solution-Processable Peltier Device and Application Thereof”, Boris Russ, David Brown, G. Jeffrey Snyder, **Jeffrey J. Urban**, ROI filing (Disclosure in 2015).
3. “Functionalized metal-organic frameworks/polymer mixed matrix membranes”, Canghai Ma and **Jeffrey J. Urban** ROI filing (Disclosure in 2018)
4. “Cross-linked metal-organic frameworks/polymer mixed matrix membranes”, Canghai Ma and **Jeffrey J. Urban** ROI filing (Disclosure in 2018)

#### Invention Disclosures no longer in prosecution

1. “Gallium nitride nanowires as a low-power directional nanoscale light source”, Adam M. Schwartzberg and **\*Jeffrey J. Urban**, *LBNL Disclosure IB-2860* (2010).
2. “Composites of air-stable magnesium nanoparticles and gas-selective polymer for hydrogen storage”, Ki-Joon Jeon, Hoi Ri Moon, Anne M. Ruminski, and **\*Jeffrey J. Urban**, *US Patent Application Number 61/437,456, LBNL Disclosure IB-2918* (2010).
3. “Thermoelectrochromic coatings”, Nelson E. Coates, Shannon K. Yee, **Jeffrey J. Urban**, and Rachel A. Segalman, *LBNL Disclosure IB-3134* (2011).
4. “Lanthanide-doped upconverting nanocrystals with brightness optimized for single-molecule imaging”, Bruce E. Cohen, James P. Schuck, Daniel J. Gargas, Emory M. Chan, Alexis D. Ostrowski, **Jeffrey J. Urban**, and Delia J. Milliron, *LBNL Disclosure IB-2013-146-01* (2014).
5. “Graded Thermoelectric Materials and Application Thereof”, Boris Russ, David Brown, Jared Lynch, Travis Day, Nelson E. Coates, Ayaskanta Sahu, Jason D. Forster, G. Jeffrey Snyder, Rachel A. Segalman, **Jeffrey J. Urban**, *BK-2015-144* (2015).

## **Professional Service (Past Year and Future Commitments)**

### Leadership Roles:

Facility Director, Inorganic Nanostructures, Molecular Foundry (2012-Present)  
Acting Program lead, LBL Thermoelectrics (2013-2016)  
MURI Thrust Lead, Organic and Hybrid Thermoelectrics (2011-2016)  
Co-lead, LBL Water-Energy Initiative (2014-Present)  
Berkeley Lead, HyMarc Hydrogen Storage Hub (2015 – 2018)  
Molecular Foundry, Divisional Staff Committee (2016-Present)  
Molecular Foundry, Awards Committee Chair (2016-Present)

### Professional Evaluation:

Invited external letter writer for tenure promotion case at the University of Wisconsin, Department of Electrical Engineering (2017)  
Invited external letter writer for associate professor promotion case at NJIT, Department of Electrical and Computer Engineering (2019)

### Editor Roles:

Guest editor, MRS Communications special issue on “Hard Functional Materials” (co-editors are Prof. McIntyre, Stanford and Dr. Alec Talin, Sandia National Labs)  
Guest editor, Current Opinions in Chemical Engineering special issue on “Water-Energy Nexus” (2019)

### Review and Organizer Roles:

Reviewer for 2019 EERE FCTO  
Reviewer for 2019 Erwin Schrodinger Fellowship, Austrian Science Fund  
Reviewer for ARO CSD proposal on MOF-based membranes  
Reviewer for 2018 ARPA-E Open Call  
Reviewer for 2018 Israel Science Foundation Proposal Call  
Member of 2018 International Advisory Board for CIMTEC Symposium on Thermoelectrics (Italy)  
Requested reviewer for 2017 NSF/TTP Thermal Transport Program (conflict, declined)  
Reviewer for 2017 DOE Early Career Program Proposals (request Refik Kortan)  
Co-organizer for 2017 ICMAT thermoelectrics symposium (Singapore)  
Reviewer for 2016 DOE BES program on organic thermoelectrics (request Refik Kortan)  
Reviewer for 2016 Polish National Science Center  
Reviewer for 2016 NSF Panel on Thermoelectric materials  
Reviewer for 2016 Army Research Office (ARO) proposal on gas-selective membranes  
Reviewer for 2016 DOE EERE proposals on Hydrogen storage  
Reviewer for 2016 Cyclotron Road entrepreneurial scientist cohort  
Organizer for 2016 APS session on thermoelectrics  
Co-organizer for 2016 MRS fall meeting on organic and hybrid thermoelectrics (with Howard Katz)  
Reviewer for 2015 LBNL Visiting Faculty Program proposals  
Reviewer for 2015 NSF Chemistry proposals (request Marjorie Langell)  
Reviewer for 2015 DOE BES Program on Thermoelectric Materials (request Refik Kortan)  
Co-organizer and session chair, 2015 ACCGE crystal growth conference (Montana)  
On-site Reviewer 2015 ARPA-E program on thermodevices (GENSETS)  
Reviewer for 2015 MSD LDRDs (request Xiang Zhang)



Reviewer for 2014 ARPA-E program on Thermodevices (GENSETS)  
Reviewer for 2014 DOE BES Program on Thermoelectric Materials and Devices (request Refik Kortan)  
Reviewer for 2014 NSF proposal from DMRE on Materials Genome  
Reviewer for 2014 DOE BES Early Career Research Proposals  
Reviewer for 2014 NSF proposal in SSMC  
Reviewer for Petroleum Research Fund, Thermoelectric interfaces, 2014  
Co-organizer, National Academy of Engineering US-Japan FOE Symposium, June 2014  
Reviewer for NWO, Netherlands Scientific Programs, March 2013  
Reviewer for DOE-BES Program Renewal in OPV for FY14, February 2013  
Co-organizer, October 2012, DOE NSRC meeting on nanocrystals, Argonne, IL  
Co-organizer, LBL, October 2012, Molecular Foundry Symposium on Energy Storage  
Co-organizer, EMS, April 2012, Electronic Materials Symposium  
Co-organizer, APS, 2012, Thermoelectric Materials Physics  
Co-Organizer, EMS, April 2011, Electronic Materials Symposium  
Session Chair, ASHRAE, February 2011, Low-GWP Refrigerants  
Session Chair, Gordon Research Conference, July 2010, Nanofabrication: Self-Assembly  
Co-Organizer, EMS, April 2010, Electronic Materials Symposium  
Co-Organizer, MRS, April 2010, Directed Assembly and Self-Assembly  
Session Chair, MRS, April 2010, Directed Assembly and Self-Assembly: Device Applications  
Session Chair, MRS, April 2010, Thermoelectric Materials  
Co-Organizer, LBL, April 2010, Nanoscale Transport Phenomena  
Session Chair, APS, March 2009, Photoexcited Charge Transport at Interfaces  
Session Chair, APS, March 2009, Organic Electronics and Photovoltaics  
Co-Organizer, EMS, April 2009, Electronic Materials Symposium  
Co-Organizer, LBL, October 2009, Nanostructured Materials for Photovoltaics  
Co-Organizer, MRS, March 2010, Directed Self-Assembly and Self-Assembly  
Co-Organizer, LBL, April 2010, Transport Phenomena  
Co-Organizer, EMS, April 2010, Electronic Materials Symposium

### **Consulting and Scientific Advising:**

Reviewer for *Nature*, *Nature Materials*, *Nature Nanotechnology*, *Nature Communications*, *JACS*, *Nano Letters*, etc.

Requested for Scientific Advisory Board, Viaex, Inc.  
Consulting for Propel(X)  
Consulting for Artiman Ventures  
Consulting scientific advisor for Twente Dutch Solar Car Racing Team  
Consulting for TPG Capital on Electrochemical Energy Storage Technologies  
Joined scientific committee for MRE (Materials Research for Energy)  
Consulting for Research Gate on Scientific Publishing and Reputational Indices  
Consulting for RusNano (Russia) on Energy Conversion Technologies  
Consulting for Total (France) on Energy Conversion Technologies  
Consulting for Lux Research, Gas Storage Technologies  
Reviewer, FY12 UC Discovery Grants (Engineering, Electronics, and New Materials Panel)  
Reviewer, 2012 LDRD Pool, MSD Submissions for LDRD Funding  
Joined Scientific Advisory Board for Clean Tech Institute, Santa Clara, CA, April 2011  
Consulting for TPG Capital on Thermoelectrics Startup Company, March 2011  
Reviewer (2009-2010) France-Berkeley Fund  
Reviewer, 2010 ARPA-E proposals on building thermodevices  
Committee Member, 2010, Photovoltaics Installation at ALS Assessment Team  
Committee Member, 2010-2012, Heat Island Group  
Committee Member, 2009-2010, White Roofs Strategic Planning Initiative

**Recent Collaborators (Past Year):** P. Yang (UCB/LBL), J. Wu (UCB/LBL), B. McCloskey (UCB/LBL), B. Freeman (U.T. Austin), R. Segalman (UCSB), A. Majumdar (Stanford), R. Ramesh (LBL), Lane Martin (UCB/LBL), Chris Dames (LBL/UCB), Jeffrey B. Neaton (LBL/UCB), M. Chabinye (UCSB), G. Bazan (UCSB), J.G. Snyder (Northwestern), D.G. Cahill (UIUC), P.J. Schuck (LBL), S. Aloni (LBL)

## Graduate and Postdoctoral Advisees

### Postdoctoral Advisees (35 total):

Dr. Carlos Forsythe (2019-present)  
Dr. Chaochao Dun (2019-present)  
Dr. Zhuolei Zhang (2018-present)  
Dr. Pengyu Yuan (2018-present), co-advised Prof. Ma (UCM), Prof. Dames (UCB)  
Dr. Ngoc Bui (2018-present)  
Dr. Jaeyoo Choi (2017-present)  
Dr. Canghai Ma (2017-present)  
Dr. Selene Coria Monroy (2016-present)  
Dr. Chih-hao Hsu (2016 –2019)  
Dr. Zhuonan Song (2016 –2017), currently a scientist at Gore technologies  
Dr. Sohee Jeong (2016 –present)  
Dr. Youngsang Kim (2015 – 2017), currently an analyst at Lam Research  
Dr. Heng Wang (2015 – 2017), currently an assistant professor at Illinois Institute of Technology,  
Materials Science and Engineering  
Dr. Karol Miszta (2015 – 2016), currently a postdoc at LBNL  
Dr. Fen Qiu (2015 – 2018), currently an analyst at Lam Research  
Dr. Fan Yang (2015 - 2018), currently an assistant professor at the Stevens Institute of Technology,  
Mechanical Engineering  
Dr. Woochul Lee (2014 – 2018), currently an assistant professor at the University of Hawaii,  
Mechanical Engineering  
Dr. Boris Russ (2014 –2016), currently a senior engineer at Apple, Inc.  
Dr. Ayaskanta Sahu (2013-2017), currently an assistant professor at NYU, Chemical Engineering  
Department  
Dr. Eun Seon Cho (2013-2017), currently an assistant professor at KAIST, Chemical and Biological  
Engineering  
Dr. Jason Forster (2012-2017), currently apprenticing in Japanese woodworking  
Dr. Jared Lynch (2012-2013), currently a staff scientist at Nanosys, Inc.  
Dr. Richa Sharma (2010-2013), co-advised with Dr. Delia Milliron, currently at SDR  
(Schlumberger-Doll Research)  
Dr. Nelson Coates (2010-2014), currently an Assistant Professor at California Maritime Academy  
Dr. Emory Chan (2010-2014), Staff Scientist at the Molecular Foundry, LBNL  
Dr. Rizia Bardhan (2010-2012), Assistant Professor at Vanderbilt University  
Dr. Aaron Hammack (2010-2012), co-advised with Dr. Frank Ogletree, currently a staff scientist at  
Hitachi HGST  
Dr. Rueben Mendelsberg (2010-2011), co-advised with Dr. Andre Anders, Dr. Delia Milliron,  
currently a staff scientist at First Solar  
Dr. Anne Ruminski (2009-2015), currently a scientist at Silicium Energy  
Dr. Ki-Joon Jeon (2008-2011), currently an Assistant Professor at Inha University, S. Korea  
Dr. Saar Kirmayer (2008-2010), currently a postdoctoral researcher at the Weizmann Institute

Dr. Adam Schwartzberg (2007-2010), currently a staff scientist at The Molecular Foundry, LBNL, Berkeley, CA

Dr. Kevin See (2008-2010), currently with Lux Research

Dr. Hoi Ri Moon, (2008-2010), currently an Assistant Professor at UNIST, S. Korea

Dr. Robert Wang (2008-2011), currently an Assistant Professor at Arizona State University, co-advised with Dr. Delia Milliron

Masters and Graduate Student Advisees (24 total):

- Alex Bruefach (2019-present), graduate student in the Materials Science Department, U.C. Berkeley
- Kyle Haas (2018-present), graduate student in the Chemistry Department, U.C. Berkeley
- Madeleine Gordon (2017-present), (NSF award winner), graduate student in the Applied Science and Technologies Department, U.C. Berkeley
- Hyungmook Kang (2016 - present), graduate student from Mechanical Engineering Department, U.C. Berkeley
- Julius Winter (2016), masters student from ETH, Zurich
- Erin Creel (2015 - present), (NSF award winner), graduate student from Chemistry Department, U.C. Berkeley
- Lukas Hackl (2015 - present), masters student from ETH, Zurich, U.C. Berkeley in Civil and Environmental Engineering (CEE) department co-advised with Prof. Ashok Gadgil
- Aizhao Pan (2015- 2016), student from Chinese Scholarship Council, Xi'an Jiaotong University
- Paul Baade (2015), masters student from ETH, Zurich
- Maxime Szybowski (2015), masters student from ETH, Zurich
- Eddy Zaia (2014-present), (NSF award winner), graduate student from CBE Department, U.C. Berkeley
- Edgar Olivera (2013-2015), undergraduate student from MSE Department, U.C. Berkeley
- Robin Mutschler (2014-2015), masters student from ETH, Zurich
- Norman Su (2011-2016) (NDSEG award winner), graduate student from CBE Department, U.C. Berkeley
- William Chang (2011-2014), graduate student from CBE department, U.C. Berkeley, co-advised with Prof. Rachel Segalman
- Cynthia E. Chen (2011-2014), graduate student from CBE department, U.C. Berkeley, co-advised with Prof. Rachel Segalman, currently a scientist at LAM Research
- Shannon K. Yee (2010-2013), Hertz Fellowship award winner, graduate student from Mechanical Engineering department, U.C. Berkeley, co-advised with Prof. Rachel Segalman, currently an Assistant Professor at Georgia Tech (Department of Mechanical Engineering, 2013-present)
- Boris Russ (2010-2014), (NDSEG award winner), graduate student from CBE department, U.C. Berkeley, partially co-advised with Prof. Rachel Segalman
- Alyssa Brand (2010-2016), currently a EH&S Technician at LBNL
- Ann Katrin-Michel (2011), co-advised with Dr. Delia Milliron
- Anna Bezryadina (2010-2011)
- Bryan McCulloch (2008-2010), graduate student from CBE department, U.C. Berkeley, co-advised with Prof. Rachel Segalman, currently at DOW Chemical
- Joseph P. Feser (2008-2011), graduate student from Mechanical Engineering department, U.C. Berkeley, currently an Assistant Professor in mechanical engineering at the University of Delaware (2013-present), co-advised with Prof. Rachel Segalman
- Wendy X. Gu (2008-2010), (Fulbright and NDSEG award winner), undergraduate student, CBE department, U.C. Berkeley, currently an assistant professor at Stanford, Mechanical Engineering

## Professional References

1. **Professor Hongkun Park**

Department of Chemistry and Chemical Biology  
Harvard University  
12 Oxford St. Cambridge, MA, 02138  
Phone: (617) 496-0815  
Fax: (617) 384-7920  
E-mail: [Hongkun\\_Park@harvard.edu](mailto:Hongkun_Park@harvard.edu)

2. **Professor Christopher B. Murray**

Department of Chemistry and  
Department of Materials Science & Engineering  
University of Pennsylvania  
P.O. Box 394  
231 South 34<sup>th</sup> Street  
Philadelphia, PA, 19104  
Phone: (914) 945-3021  
Email: [cbmurray@sas.upenn.edu](mailto:cbmurray@sas.upenn.edu)

3. **Professor Jeffrey B. Neaton**

Department of Physics  
Director, Molecular Foundry, LBNL  
University of California, Berkeley  
543 Birge Hall  
Berkeley, CA, 94720  
Phone: (510) 486-4527  
Email: [jbneaton@berkeley.edu](mailto:jbneaton@berkeley.edu)

4. **Professor A. Paul Alivisatos**

Department of Chemistry and Materials Science & Engineering  
Vice Chancellor of Research, University of California, Berkeley D83 Hildebrand Hall  
Berkeley, CA, 94720  
Phone: (510) 643-7371  
Email: [alivis@berkeley.edu](mailto:alivis@berkeley.edu)

5. **Prof. Arun Majumdar**

Former head of Advanced Research Projects Agency-Energy (ARPA-E)  
Professor of Mechanical Engineering, Stanford University  
447 Santa Teresa St.  
Stanford University  
Stanford, CA, 94305  
Phone: (650) 724-6973  
Email: [amajumdar@stanford.edu](mailto:amajumdar@stanford.edu)