Seung Sae Hong

Department of Materials Science and Engineering
University of California, Davis
One Shields Ave, Davis, CA 95616, United States
Email: sshong@ucdavis.edu
Phone: (530) 754-1551

Education

Stanford University, Stanford, CA
PhD in Applied Physics (2014)
Dissertation: *Electronic transport in topological insulator nanostructures*

Seoul National University, Seoul, Korea
BS in Physics (minor in Electrical Engineering), *summa cum laude* (2007)
Thesis: *Demonstration and calibration of NEMS torsional resonators combined with carbon nanotubes*

Research Interests

Materials physics: Complex oxide heterostructures and interfaces; Low-dimensional quantum materials; Correlated electronic systems in the reduced dimension; Nanomaterials and devices for energy applications

Research Positions

UC Davis	Assistant Professor, Materials Science and Engineering	(2020 – present)
Stanford University	Postdoctoral Research Scholar (Advisor: Harold Hwang)	(2014 – 2019)
Stanford University	Graduate Research Assistant (Advisor: Yi Cui)	(2007 – 2013)
Seoul National University	Undergraduate Research Assistant	(2006 – 2007)

Professional Activities

Member of American Physical Society (APS), Materials Research Society (MRS)
Journal reviewer for Nano Letters, Nature Communications, Scientific Reports, Physics Review Materials, APL journals, ACS journals.

Awards

Graduate Student Award Gold medal, Materials Research Society (Fall MRS Meeting, Boston 2012)
Academic excellence full scholarship, Seoul National University (2006)

Teaching

UC Davis	Instructor/course design, Sustainable Energy Technology Lab (EMS 170L, 2020)
UC Davis	Instructor, Structure and Characterization of Engineering Materials (EMS 162, 2020)
Stanford University	Advised/trained six graduate students during PhD/Postdoctoral periods
Stanford University	Teaching assistant, Classical Mechanics Lab (Physics 42, 2013)
Stanford University	Tutoring staff, Physics tutoring center (2013),

Publications (Google Scholar profile)

31. *Strain-induced room-temperature ferroelectricity in $SrTiO_3$ membranes*
R. Xu, J. Huang, E. Barnard, S. S. Hong, P. Singh, E. Wong, T. Jansen, V. Harbola, J. Xiao, B. Y. Wang, S. Crossley, D. Lu, S. Liu, & H. Y. Hwang
Nature Communications, 11, 3141 (2020).

30. *Extreme tensile strain states in $La_{0.7}Ca_{0.3}MnO_3$ membranes*
S. S. Hong, M. Gu, M. Verma, V. Harbola, B. Y. Wang, D. Lu, A. Vailionis, Y. Hikita, R. Pentcheva, J. M. Rondinelli, & H. Y. Hwang
Science, 368, 71 (2020).

29. *Freestanding crystalline $YBa_2Cu_3O_{7-x}$ heterostructure membranes*
Z. Chen, B. Y. Wang, B. H. Goodge, D. Lu, S. S. Hong, D. Li, Y. Hikita, L. F. Kourkoutis, & H. Y. Hwang
Physical Review Materials, 3, 060801 (2019).

28. *Large-area crystalline $BaSnO_3$ membranes with high electron mobilities*
P. Singh, A. Swartz, D. Lu, S. S. Hong, K. Lee, A. F. Marshall, K. Nishio, Y. Hikita, & H. Y. Hwang
ACS Applied Electronic Materials, 1, 1269 (2019).

27. *Delta-doped $SrTiO_3$ top-gated field effect transistor*
H. Inoue, H. Yoon, T. A. Merz, A. G. Swartz, S. S. Hong, Y. Hikita, & H. Y. Hwang
Applied Physics Letters, 114, 231605 (2019).

26. *Two-dimensional limit of crystalline order in perovskite membrane films*
S. S. Hong, J. H. Yu, D. Lu, A. F. Marshall, Y. Hikita, Y. Cui, & H. Y. Hwang
Science Advances, 3, eaao5173 (2017).

25. *Synthesis of freestanding single-crystal perovskite films and heterostructures by etching of sacrificial water-soluble layers*
D. Lu, D. J. Baek, S. S. Hong, L. F. Kourkoutis, Y. Hikita, & H. Y. Hwang
Nature Materials, 15, 1255 (2016).

24. *Lateral and vertical two-dimensional layered topological insulator heterostructures*
Y. Li, J. Zhang, G. Zheng, Y. Sun, S. S. Hong, F. Xiong, S. Wang, H. R. Lee, & Y. Cui
ACS Nano, 9, 10916 (2015).

23. *Topological insulator nanostructures*
S. S. Hong & Y. Cui
Book chapter in ***Topological Insulators***, John Wiley & Sons (2015).

22. *Vertical heterostructure of two-dimensional MoS_2 and WSe_2 with vertically aligned layers*
J. H. Yu, H. R. Lee, S. S. Hong, D. Kong, H.-W. Lee, H. Wang, F. Xiong, S. Wang, & Y. Cui
Nano Letters, 15, 1031 (2015).

21. *Physical and chemical tuning of two-dimensional transition metal dichalcogenides*
H. Wang, H. Yuan, S. S. Hong, Y. Li,& Y. Cui
Chemical Society Reviews, 44, 2664 (2015).

20. *Topological insulator nanostructures*
S. S. Hong, D. Kong, & Y. Cui

***MRS Bulletin**,* 39, 873 (2014).

19. *One-dimensional helical transport in topological insulator nanowire interferometers*
S. S. Hong, Y. Zhang, J. J. Cha, X.-L. Qi, & Y. Cui
***Nano Letters**,* 14, 2815 (2014).

18. *Ambipolar field effect in Sb-doped Bi_2Se_3 nanoplates by solvothermal synthesis*
D. Kong, K. J. Koski, J. J. Cha, S. S. Hong, & Y. Cui
***Nano Letters**,* 13, 632 (2013).

17. *Progress, challenges, and opportunities in two-dimensional materials beyond graphene*
S. Z. Butler, S. M. Hollen, L. Cao, Y. Cui, J. A. Gupta, H. R. Gutiérrez, T. F. Heinz, S. S. Hong, J. Huang, A. F. Ismach, E. Johnston-Halperin, M. Kuno, V. V. Plashnitsa, R. D. Robinson, R. S. Ruoff, S. Salahuddin, J. Shan, L. Shi, M. G. Spencer, M. Terrones, W. Windl, & J. E. Goldberger
***ACS Nano**,* 7, 2898 (2013).

16. *Silicon nanowires and related nanostructures as lithium-ion battery anodes*
L. Hu, L. Cui, S. S. Hong, J. McDonough, & Y. Cui
Book chapter in ***Silicon and Silicide Nanowires**,* Pan Stanford Publishing (2013).

15. *Unconventional Josephson effect in hybrid superconductor-topological insulator devices*
J. R. Williams, A. J. Bestwick, P. Gallagher, S. S. Hong, Y. Cui, A. S. Bleich, J. G. Analytis, I. R. Fisher, & D. Goldhaber-Gordon
***Physical Review Letters**,* 109, 056803 (2012).

14. *Ultra-low carrier concentration and surface dominant transport in antimony-doped Bi_2Se_3 topological insulator nanoribbons*
S. S. Hong, J. J. Cha, D. Kong, & Y. Cui
Nature Communications, 3, 757 (2012).

13. *Effects of magnetic doping on weak antilocalization in narrow Bi_2Se_3 nanoribbons*
J. J. Cha, M. Claassen, D. Kong, S. S. Hong, K. J. Koski, X.-L. Qi, & Y. Cui
Nano Letters, 12, 4355 (2012).

12. *Weak antilocalization in $Bi_2(Se_xTe_{1-x})_3$ nanoribbons and nanoplates*
J. J. Cha, D. Kong, S. S. Hong, J. G. Analytis, K. Lai, & Y. Cui
***Nano Letters**,* 12, 1107 (2012).

11. *In situ X-ray diffraction studies of (De)lithiation mechanism in silicon nanowire anodes*
S. Misra, N. Liu, J. Nelson, S. S. Hong, Y. Cui, & M. F. Toney
***ACS Nano**,* 6, 5465 (2012).

10. *Ambipolar field effect in the ternary topological insulator $(Bi_xSb_{1-x})_2Te_3$ by composition tuning*
D. Kong, Y. Chen, J. J. Cha, Q. Zhang, J. G. Analytis, K. Lai, Z. Liu, S. S. Hong, K. J. Koski, S. K. Mo, Z. Hussain, I. R. Fisher, Z. X. Shen, & Y. Cui
***Nature Nanotechnology**,* 6, 705 (2011).

9. *Hollow carbon nanofiber-encapsulated sulfur cathodes for high specific capacity rechargeable lithium batteries*
G. Zheng, Y. Yang, J. J. Cha, S. S. Hong, & Y. Cui
***Nano Letters**,* 11, 4462 (2011).

8. *One nanometer resolution electrical probe via atomic metal filament formation*
S. S. Hong, J. J. Cha, & Y. Cui
Nano Letters, 11, 231 (2010).

7. *Ultrathin topological insulator Bi_2Se_3 nanoribbons exfoliated by atomic force microscopy*
S. S. Hong, W. Kundhikanjana, J. J. Cha, K. Lai, D. Kong, S. Meister, M. A. Kelly, Z. Shen, & Y. Cui
Nano Letters, 10, 3118 (2010).

6. *New nanostructured Li_2S/silicon rechargeable battery with high specific energy*
Y. Yang, M. T. McDowell, A. Jackson, J. J. Cha, S. S. Hong, & Y. Cui
Nano Letters, 10, 1486 (2010).

5. *Si nanoparticle-decorated Si nanowire networks for Li-ion battery anodes*
L. Hu, H. Wu, S. S. Hong, L. Cui, J. R. McDonough, S. Bohy, & Y. Cui
Chemical Communications, 47, 367 (2010).

4. *Impedance analysis of silicon nanowire lithium ion battery anodes*
R. Ruffo, S. S. Hong, C. K. Chan, R. A. Huggins, & Y. Cui
Journal of Physical Chemistry C, 113, 11390 (2009).

3. *Surface chemistry and morphology of the solid electrolyte interphase on silicon nanowire lithium-ion battery anodes*
C. K. Chan, R. Ruffo, S. S. Hong, & Y. Cui
Journal of Power Sources, 189, 1132 (2009).

2. *Structural and electrochemical study of the reaction of lithium with silicon nanowires*
C. K. Chan, R. Ruffo, S. S. Hong, R. A. Huggins, & Y. Cui
Journal of Power Sources, 189, 34 (2009).

1. *High-frequency micromechanical resonators from aluminum-carbon nanotube nanolaminates*
J. H. Bak, Y. D. Kim, S. S. Hong, B. Y. Lee, S. R. Lee, J. H. Jang, M. Kim, K. Char, S. Hong, & Y. D. Park
Nature Materials, 7, 459 (2008).

Invited talks

11. *Freestanding crystalline oxide membranes and heterostructures*
47th Conference on the Physics and Chemistry of Surfaces and Interfaces, Boulder, Co, January 2020

10. *Freestanding crystalline oxide membranes and heterostructures*
19th International Conference on Crystal Growth and Epitaxy, Keystone, Co, July 2019

9. *Complex oxide membranes: More freedom for artificial materials*
University of California, Davis, Davis, CA, May 2019

8. *Complex oxide membranes: More freedom for artificial materials*
University of Nebraska-Lincoln, Lincoln, NE, March 2019

7. *Complex oxide membranes: More freedom for artificial materials*
College of William and Mary, Williamsburg, VA, January 2019

6. *Extreme strain design to control electromagnetism in complex oxide membranes*
ALS User Meeting Workshop, Berkeley, CA, October 2018

5. *Complex oxide membranes: stretching the boundary of quantum materials*
Geballe Laboratory for Advanced Materials student seminar, Stanford, CA, April 2018

4. *Electronic transport in topological insulator nanostructures*
US-Korea Conference 2014, San Francisco, CA, July 2014

3. *Electronic transport in topological insulator nanostructures*
Seoul National University, Seoul, Korea, February 2014

2. *Topological insulator nanostructures: material design toward a new quantum device*
Energy Materials Nanotechnology meeting, Houston, TX, January 2013

1. *Topological insulator nanostructures*
2D Materials Beyond Graphene Workshop, Columbus, OH, August 2012