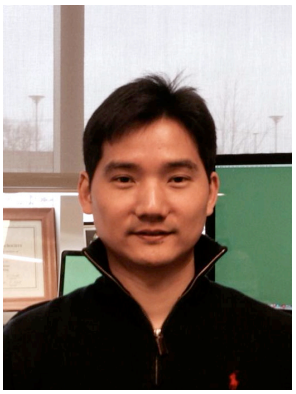

SEUNGBUM HONG
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Materials Science Division (bldg 241/a-166)
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EDUCATION:

B.S. (*summa cum laude*, 1994) in Ceramic, M. S. (1996) and Ph. D. (2000) in Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Korea

PRESENT POSITION:

Scientist [tenured staff scientist & principal investigator], Nanoscience and Technology Division, Argonne National Laboratory

Adjunct Professor, Department of Materials Science & Engineering, KAIST, Korea

PROFESSIONAL EXPERIENCE:

Scientist [RD4], Nanoscience, '12 - present

Adjunct Professor, KAIST, '12 – present

Invited Professor, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland, June 1 -30, 2014

Materials Scientist [RD3, tenured since 2007], '07- '12

Member of Research Staff & Project Leader,
Samsung Advanced Institute of Technology, Korea, '00-'07

Post-doctoral researcher, EPFL, Lausanne, Switzerland, '00–'01

SELECTED AWARDS:

Frontier Awards, Samsung Advanced Institute of Technology, 2007

Young Investigator Outstanding Achievement Award, International Symposium on Integrated Ferroelectrics, 2008

Frontier Scientist, The Korean Academy of Science and Technology (KAST), 2014

SELECTED PROFESSIONAL ACTIVITIES:

Symposium co-organizer and financial chair of MRS Spring Meeting (Symposium VV: Novel Development and Applications of Scanning Probe Microscopy), 2010

Symposium co-organizer of EMA (S13: Body Energy Harvesting for Intelligent Systems), 2013

Symposium co-organizer of focused topic (APS-DMP: Electron, Ion, and Exciton Transport in Nanostructures), APS March Meeting, 2013

SELECTED TEACHING EXPERIENCE:

Students/Post-docs advised or supervised: Dr. Y. Kim (Sungkyunkwan Univ.), Dr. S. Buehlmann (Imperial College London, UK), Dr. M. Park (KAIST), Dr. J. Kim (Samsung Corning), Dr. H. Choi (LG Chem), Ms. H. Lee (Ewha Womans Univ., Korea), Dr. M. Kim (KRISS), Mr. D. Kim (KAIST), Mr. G. An (KAIST), Ms. Suran Kim (KAIST), Dr. Woon Ik Park (Pusan National University, Korea), Dr. YoonYoung Choi (Argonne National Laboratory), Dr. Jongjin Kim (Argonne National Laboratory), Mr. Jeongjae Ryu (KAIST)

Lectures: Introduction to Electromagnetism and Its Application to Materials Science (1 week, 10 hours, KAIST ('08, '09. '10, '11, '12, '14, '15), Seoul National Univ. ('10, '11, '13), Kookmin Univ. ('08, '09, '10), Univ. Puerto-Rico ('10)), Univ. Illinois, Chicago ('13, PHYS594, 3 credits), EPFL ('14, MSE640, 2 credits)

RESEARCH INTERESTS:

- Ferroelectric/Ferromagnetic Domain Imaging
- Nanoscale Functional Materials for MEMS or NEMS Devices
- Electromechanical Energy Harvesting

SELECTED PLENARY AND INVITED TALKS AT CONFERENCES (of 30):

"Nanoscale Studies of Ferroelectric Domains for Future Non-volatile Memories," *Materials Research Society Spring Meeting*, *San Francisco*, April 25 – April 29, 2011 [Invited Talk]

"Visualization and Manipulation of Polarization Variants," *International Symposium on Integrated Functionalities*, Hong Kong, China, June 17 – June 22, 2012 [Plenary Talk]

"Visualization and Manipulation of Electric Polarization and Charges using Atomic Force Microscopy," invited tutorial, 2013 Joint UFFC, EFTF and PFM Symposium, Prague, Czech Republic, July 21 – 25, 2013 [Invited Tutorial]

"Visualization and Manipulation of Electric Polarization and Charges using Atomic Force Microscopy," *invited tutorial,* **S. Hong***, 2014 Joint IEEE International Symposium on the Applications of Ferroelectric, International Workshop on Acoustic Transduction Materials and Devices & Workshop on Piezoresponse Force Microscopy*, State College, PA, May 12, 2014 [Invited Tutorial]

SELECTED BOOK EDITIONS (of 5):

"Nanoscale Phenomena in Ferroelectric Thin films," ed. **S. Hong**, Kluwer, Boston, 2004 (http://www.amazon.com/Nanoscale-Phenomena-Ferroelectric-Multifunctional-Series/dp/1402076304/ref=sr_1_1?ie=UTF8&qid=1345068965&sr=8-1&keywords=nanoscale+phenomena+in+ferroelectric+thin+films)

"Emerging Non-volatile Memories," edited by **S. Hong**, O. Auciello, D. Wouters. Springer, New York, 2014

http://www.amazon.com/Emerging-Non-Volatile-Memories-Seungbum-Hong/dp/1489975365/ref=sr_1_2?ie=UTF8&qid=undefined&sr=8-2&keywords=Seungbum+Hong

SELECTED PUBLICATIONS (of 97 peer reviewed papers and 3 book chapters in print. Over 1,700 career citations, h-index: 18, full list: http://www.researcherid.com/rid/B-7708-2009)

"Principle of Ferroelectric Domain Imaging using Atomic Force Microscope," **S. Hong***, J. Woo, H. Shin, J.-U. Jeon, Y. E. Pak, E. L. Colla, N. Setter, E. Kim and K. No, *J. Appl. Phys*. **89**, 1377-1386 (2001)

"Resistive Probe Storage: Read/Write Mechanism," Ch 4.6 in *Scanning Probe Microscopy: Electrical and Electromechanical Phenomena at the Nanoscale*, **S. Hong***, N. Park, ed: S. Kalinin and A. Gruverman, Springer, New York, 2006

"Ferroelectric Thin Films: Review of Materials, Properties and Applications," N. Setter, D. Damjanovic, L. Eng, G. Fox, S. Gevorgian, **S. Hong**, H. Kohlstedt, A. Kingon, N. Y. Park, G. B. Stephenson, I. Stolitchnov, A. K. Tagantsev, D. V. Taylor, T. Yamada, S. Streiffer, *J. Appl. Phys.* **100**, 051606 (2006)

"Coexistence of Weak Ferromagnetism and Ferroelectricity in the High Pressure $LiNbO_3$-type Phase of $FeTiO_3$," T. Varga, A. Kumar, E. Vlahos, S. Denev, M. Park, **S. Hong**, T. Sanehira, Y. Wang, C. J. Fennie, S. K. Streiffer, X. Ke, P. Schiffer, V. Gopalan, J. F. Mitchell, *Phys. Rev. Lett.* **103**, 047601 (2009)

"Effects of Cantilever Buckling on Vector Piezoresponse Force Microscopy Imaging of Ferroelectric Domains in $BiFeO_3$ Nanostructures," R. Nath*, **S. Hong**, J. A. Klug, A. Imre, M. J. Bedzyk, R. S. Katiyar, O. Auciello, *Appl. Phys. Lett.* **96**, 163101 (2010) [Journal Cover]

"Three-dimensional ferroelectric domain imaging of epitaxial $BiFeO_3$ thin films using angle-resolved piezoresponse force microscopy," M. Park, **S. Hong***, J. A. Klug, M. J. Bedzyk, O. Auciello, K. No*, A. Petford-Long, *Appl. Phys. Lett.* **97**, 112907 (2010)

"High Resolution Field Effect Sensing of Ferroelectric Charges," H. Ko, K. Ryu, H. Park, C. Park, Y. K. Kim, J. Jung, D. -K. Min, Y. Kim, H. Shin, **S. Hong***, *Nano Lett.* **11**(4), 1428-1433 (2011)

"Size effect of flexible proof mass on the mechanical behavior of micron-scale cantilevers for energy harvesting applications," M. Kim*, **S. Hong**, D. J. Miller, J. Dugundji, B. L. Wardle, *Appl. Phys. Lett.* **99**, 243506 (2011)

"Ambient effects on electric-field-induced local charge modification of TiO_2," H. Kim, **S. Hong***, and D.-W. Kim*, *Appl. Phys. Lett.* **100**, 022901 (2012)

"Magnetic interactions and reversal of artificial square spin ices," C. Phatak*, M. Pan, A. K. Petford-Long, **S. Hong**, and M. De Graef, *New. J. Phys.* **14**, 075028 (2012)

"Spring-type piezoelectric energy harvester," D. Kim, **S. Hong***, D. Lee, H. S. Roh, G. Ahn, J. Kim, M. Park, J. Hong, T.-H. Sung, and K. No*, *RSC Advances* **3**, 3194 (2013)

"Visualization and Manipulation of Meta-stable Polarization Variants in Multiferroic Materials," M. Park, K. No*, and **S. Hong***, *AIP Advances* **3**, 042114 (2013)

"Imaging local polarization in ferroelectric thin films by coherent x-ray Bragg projection Ptychography," S. O. Hruszkewycz*, M. J. Highland, M. V. Holt, D. Kim, C. M. Folkman, Carol Thompson, A. Tripathi, G. B. Stephenson, **S. Hong**, and P. H. Fuoss, *Phys. Rev. Lett.* **110**, 177601 (2013)

"X-ray Irradiation Induced Reversible Resistance Change in Pt/TiO_2/Pt Cells," S. H. Chang, J. Kim*, C. Phatak, K. D'Aquila, S. K. Kim, J. Kim, S. J. Song, C. S. Hwang, J. A. Eastman, J. W. Freeland, and **S. Hong***, *ACS Nano* **8**, 1584 – 1589 (2014)

"Charge gradient microscopy," **S. Hong***, S. Tong, W. I. Park, Y. Hiranaga, Y. Cho, and A. Roelofs*, *Proc. Natl. Acad. Sci. USA* **111**, 6566 – 6569 (2014)

"Tunable and rapid self-assembly of block copolymers using mixed solvent vapors," W. I. Park, S. Tong, Y. Liu, I. W. Jung, A. Roelofs, and **S. Hong***, *Nanoscale **6**,* 15216–15221 (2014)

"Ferroelectric Probe Storage Devices," Chapter 7 in Emerging Non-volatile Memories, **S. Hong*** and Y. Kim, eds: S. Hong, O. Auciello, and D. Wouters, Springer, New York, 2014.

"Enhancement of Local Piezoresponse in Polymer Ferroelectrics *via* Nanoscale Control of Microstructure," Y.-Y. Choi, P. Sharma, C. Phatak, D. J. Gosztola, Yunya Liu, J. Lee, B. Lee, J. Li, A. Gruverman, S. Ducharme, and **S. Hong***, *ACS Nano* (2015)[in press]

SELECTED PATENTS (of 75):

"Method of Fabricating Semiconductor Probe with Resistive Tip," H. Park, J. Jung, **S. Hong**, US 7,338,831 (2008), JP 4217218 (2008), EP 1611607 (2008), CN 100356542 (2007), KR 0537508 (2005), AU 2003282399 (2004)

"Semiconductor Probe Having Wedge Shape Resistive Tip and Method of Fabricating the Same," H. Ko, J. Jung, **S. Hong**, H. Park, C. Park, US 7,994,499 (2011), KR 0829565 (2008)

"Ferroelectric Hard Disk System," **S. Hong**, S.-H. Choa, J. Jung, H. Ko, Y. K. Kim, US 8,248,906 B2 (2012)(issued)