
JAYASIMHA ATULASIMHA
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1. GENERAL INFORMATION

ACADEMIC QUALIFICATIONS

Doctor of Philosophy, Aerospace Engineering, 2003- 2006,
University of Maryland, College Park.

Dissertation Title:

“Characterization and Modeling of the Magnetomechanical behavior of Iron-Gallium alloys”
Thesis Advisor: Prof. Alison Flatau.

Master of Science (Non-thesis), Aerospace Engineering, 2001-2003,
University of Maryland, College Park.
Advisor: Prof. Inderjit Chopra.

Bachelor of Technology, Mechanical Engineering, 1997-2001,
Indian Institute of Technology, Madras, India.

WORK/ RESEARCH EXPERIENCE

a. *Qimonda Associate Professor of Mechanical and Nuclear Engineering*, July 2013-current
Associate Professor of Electrical and Computer Engineering (Courtesy appointment), July 2013-current
Virginia Commonwealth University (VCU).

b. *Assistant Professor*, August 2008 to June 2013 (*Qimonda Assistant Prof. July 2012-June 2013*)
Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University (VCU).

c. *Research Associate*, 2007-2008
Center for Research in Scientific Computation/ Department of Mathematics,
North Carolina State University, Raleigh, U.S.A. *Non-linear behavior of magnetostrictive materials.*

d. *Consultant*, Hindustan Aeronautics Ltd., August 2007
Worked on environmental control system for the Intermediate Jet Trainer.

e. *Postdoctoral Research Fellow*, 2006- 2007
Center for Smart Structures and Materials, Royal Military College & CMACN, Queens University,
Kingston, Canada: *Modeling Magneto-electric composites and Magnetic Shape Memory Alloys.*

PROFESSIONAL ORGANIZATIONS

Senior Member, IEEE- Institute of Electrical and Electronics Engineers.

Member, ASME-American Society of Mechanical Engineers.
(Also serve on the ASME Adaptive Structures and Material Systems Technical Committee).

Member, APS- American Physical Society (also APS GMAG Topical Group on Magnetism and its Applications).

AWARDS/SCHOLARSHIPS/HIGHLIGHTS MEDIA REPORTS

1. NSF CAREER award, 2013.
2. Appointed to the VCU Qimonda Endowed Chair Professorship, July 2012 (3 year appointment).
3. Elected as IEEE Senior Member, November 2011.

4. Work on straintronics: ultra low power computing with multiferroic nanomagnets appeared on Nature highlights http://www.nature.com/nature/journal/v476/n7361/full/476375c.html?WT.ec_id=NATURE-20110825 EE Times www.eetimes.com/electronics-news/4219545/Researchers-aim-for-energy-harvesting-CPU Physics World <http://physicsworld.com/cws/article/news/44910>.
5. Corresponding author on papers selected as IOP Nanotechnology 2011 Highlight and IOP Smart Materials and Structures 2011 Highlight.
6. PRIP (VCU Presidential Research Incentive Program) award: grant \$50,000 (my share \$25,000), July 2010 and Qimonda Discretionary Funds for Junior Faculty Development (\$2000), 2011.
7. *Best Student Paper Award* for the talk titled “Effect of Stoichiometry on Sensing Behavior of Iron-Gallium”, at the SPIE-The International Society of Optical Engineering Conference on Smart Structures and Materials, San Diego, March 2004.
8. *Member of the Design Team that won the First Place* at the American Helicopter Society International’s Graduate Design Competition for designing an Urban Disaster Response Vehicle, 2003.
9. *Graduate School Fellowship*, Department of Aerospace Engineering, University of Maryland, College Park, September 2001- May 2002.
10. *Junior Summer Research Fellow, Indian Academy Sciences*. Worked with Prof P.L. Sachdev, Applied Mathematics, Indian Institute of Science on “Analytical and Numerical solution of non-linear Burger’s equation” in summer 2000.
11. *Awarded the National Talent Scholarship in 1997*. A scholarship awarded annually to 750 high school students in grade 10 by the government of India to pursue a career in Engineering/Science/Social Science.

STUDENT AWARDS

1. Mohammad Salehi Fashami and Noel D’Souza won doctoral dissertation fellowships in 2013.
2. Noel D’Souza was awarded a student travel grant for APS March 2013 and featured in a student spotlight in ASME & AIAA Adaptive Structures & Material Systems Newsletter 2013.
3. Noel D’Souza won the best student paper award (multifunctional materials, SMASIS 2011).

RESEARCH ACTIVITIES

1. **Hybrid spintronics-straintronics paradigm for nanomagnetic memory and logic**
 - Acoustically clocked nanomagnetic logic
 - 2-state multiferroic memory and logic
 - 4-state multiferroic logic and image processing
2. **Nanoscale magnetization dynamics**
 - Stress induced magnetization dynamics
 - Magnetization dynamics in complex dipole coupled nanomagnetic chains
 - Stochastic magnetization dynamics
3. **Strain sensing with magnetostrictive nanowires/spin transport in nanowires**
4. **Nonlinear behavior of magnetostrictive, piezoelectric, magnetoelectric materials**
 - Experimental study/modeling of ΔE -effect (magnetostrictive), magnetoelectric response, etc
 - Coupling nonlinear constitutive material models with structural models
5. **Magnetostrictive FeGa alloys: single and polycrystalline behavior**
 - Experimental characterization and modeling of magnetomechanical behavior
 - Actuator and sensor applications

2. RESEARCH WORK

PEER REVIEWED JOURNAL ARTICLES: PUBLISHED (IN-PRINT) 35, UNDER REVIEW 5

* Indicates corresponding author Underlined indicates my graduate student
H-index =18 (Google Scholar); <http://scholar.google.com/citations?user=PPvWn3oAAAJ&hl=en>
H-index =12 ("Atulasimha" OR "Atulasima" [ISI Web of Science] journals ONLY)

UNDER REVIEW (5)

1. Noel D'Souza, Mohammad Salehi Fashami, Supriyo Bandyopadhyay and **Jayasimha Atulasimha*** "Strain Induced Clocking of Nanomagnets for Ultra Low Power Boolean Logic, under review", [arXiv:1404.2980v1](https://arxiv.org/abs/1404.2980v1)
2. Md Mamun Al-Rashid, Jayasimha Atulasimha, Supriyo Bandyopadhyay, "Geometry Effects in Switching of Nanomagnets with Strain: Reliability, Energy Dissipation and Clock Speed in Dipole-Coupled Nanomagnetic Logic", under review
3. Md. Iftexhar Hossain, Saumil Bandyopadhyay, **Jayasimha Atulasimha** and Supriyo Bandyopadhyay, "Modulation of D'yakonov-Perel' spin relaxation in InSb nanowires with infrared illumination at room temperature", under review.
4. Ayan K. Biswas, **Jayasimha Atulasimha** and Supriyo Bandyopadhyay, "An error-resilient non-volatile magneto-elastic universal logic gate with ultralow energy-delay product", under review.
5. Kamaram Munira, Souheil Nadri, Mark B. Forgues, Mohammad Salehi Fashami, **Jayasimha Atulasimha**, Supriyo Bandyopadhyay and Avik W. Ghosh, "Reducing error rates in straintronic multiferroic dipole-coupled nanomagnetic logic by pulse shaping", under review, <http://arxiv.org/pdf/1405.4000.pdf>

IN-PRINT

• 2014

6. Ayan K. Biswas, Supriyo Bandyopadhyay, and **Jayasimha Atulasimha**, "Complete magnetization reversal in a magnetostrictive nanomagnet with voltage-generated stress: A reliable energy-efficient non-volatile magneto-elastic memory ", Appl. Phys. Lett. **105**, 072408 (2014). <http://dx.doi.org/10.1063/1.4893617>
7. Saumil Bandyopadhyay, Hasnain Ahmed, **Jayasimha Atulasimha** and Supriyo Bandyopadhyay*, "Coherent spin transport and suppression of spin relaxation in InSb nanowires at room temperature", Small, 2014 (Posted online: Jul 22. doi: 10.1002/sml.201401022). <http://onlinelibrary.wiley.com/doi/10.1002/sml.201401022/full> (*This work was a result of my mentoring Saumil Bandyopadhyay's high school science project*).
8. Ayan K. Biswas, Supriyo Bandyopadhyay, and **Jayasimha Atulasimha**, "Energy-efficient magnetoelastic non-volatile memory", *Applied Physics Letters*, **104**, 232403, 2014. <http://dx.doi.org/10.1063/1.4882276>

• 2013

9. Mohammad Salehi Fashami, **Jayasimha Atulasimha***, Supriyo Bandyopadhyay, "Energy dissipation and error probability in fault-tolerant binary switching", *Nature Scientific Reports*, **3**, 3204, 2013. <http://www.nature.com/srep/2013/131113/srep03204/full/srep03204.html>
10. Ayan Biswas, Supriyo Bandyopadhyay, **Jayasimha Atulasimha**, "Acoustically assisted spin-transfer-torque switching of nanomagnets: An energy-efficient hybrid writing scheme for non-volatile memory", *Applied Physics Letters*, **103**, 232401, 2013.
11. Kuntal Roy*, Supriyo Bandyopadhyay, **Jayasimha Atulasimha**, "Binary switching in a 'symmetric' potential landscape", *Nature Scientific Reports*, **3**, 3038, 2013. <http://www.nature.com/srep/2013/131024/srep03038/full/srep03038.html>
12. Mohammad Salehi Fashami, Kamaram Munira, Supriyo Bandyopadhyay, Avik W Ghosh and **Jayasimha Atulasimha***, "Switching of Dipole Coupled Multiferroic Nanomagnets in the Presence of Thermal Noise: Reliability of Nanomagnetic Logic", *IEEE Transactions on Nanotechnology*, **12**, 1206, 2013. [10.1109/TNANO.2013.2284777](http://dx.doi.org/10.1109/TNANO.2013.2284777)
- **2012**
13. Noel D'Souza, **Jayasimha Atulasimha***, Supriyo Bandyopadhyay, "An Ultrafast Image Recovery and Recognition System Implemented With Nanomagnets Possessing Biaxial Magnetocrystalline Anisotropy", *IEEE Transactions on Nanotechnology*, **11**, 896, 2012. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6218197>
14. Mohammad Salehi Fashami, **Jayasimha Atulasimha***, Supriyo Bandyopadhyay, "Magnetization Dynamics, Throughput and Energy Dissipation in a Universal Multiferroic Nanomagnetic Logic Gate with Fan-in and Fan-out", *Nanotechnology*, **23**, 105201, 2012. <http://iopscience.iop.org/0957-4484/23/10/105201>
15. Kuntal Roy*, Supriyo Bandyopadhyay and **Jayasimha Atulasimha**, "Metastable state in a shape-anisotropic single-domain nanomagnet subjected to spin-transfer-torque" *Applied Physics Letters*, **101**, 162405, 2012. http://apl.aip.org/resource/1/applab/v101/i16/p162405_s1
16. Yezuo Wang, Y. and **Jayasimha Atulasimha***, "Nonlinear magnetoelectric model for laminated cantilever structures", *Smart Materials and Structures*, **21**, 085023, 2012. <http://iopscience.iop.org/0964-1726/21/8/085023>
17. Kuntal Roy*, Supriyo Bandyopadhyay, and **Jayasimha Atulasimha**, "Energy dissipation and switching delay in stress-induced switching of multiferroic devices in the presence of thermal fluctuations", *Journal of Applied Physics*, **112**, 023914, 2012. http://jap.aip.org/resource/1/japiau/v112/i2/p023914_s1
18. Noel D'Souza*, **Jayasimha Atulasimha**, Supriyo Bandyopadhyay, "An energy-efficient Bennett clocking scheme for 4-state multiferroic logic", *IEEE Trans. on Nanotechnology*, **11**, 418, 2012. [10.1109/TNANO.2011.2173587](http://dx.doi.org/10.1109/TNANO.2011.2173587)

• **2011**

19. Mohammad Salehi Fashami, Kuntal Roy, **Jayasimha Atulasimha***, Supriyo Bandyopadhyay, "Magnetization dynamics, Bennett clocking and associated energy dissipation in multiferroic logic", *Nanotechnology*, **22**, 155201, 2011. (*IOP Nanotechnology 2011 Highlight*).
<http://iopscience.iop.org/0957-4484/22/15/155201>
 20. K. Roy*, S. Bandyopadhyay and **J. Atulasimha**, "Hybrid spintronics and straintronics: A magnetic technology for ultra low energy computing and signal processing", *Applied Physics Letters*, **99**, 063108, 2011. http://apl.aip.org/resource/1/applab/v99/i6/p063108_s1
(*Appeared as a Nature Highlight: Nature 476, 375, 2011*).
 21. **Noel D'Souza***, **Jayasimha Atulasimha**, Supriyo Bandyopadhyay "Four-state nanomagnetic logic using multiferroics", *Journal of Physics D: Applied Physics*, **44**, 265001, 2011.
<http://iopscience.iop.org/0022-3727/44/20/205301>
 22. Kuntal Roy*, Supriyo Bandyopadhyay, **Jayasimha Atulasimha**, "Switching dynamics of a magnetostrictive single-domain nanomagnet subjected to stress", *Physical Review B*, **83**, 224412, 2011.
<http://prb.aps.org/abstract/PRB/v83/i22/e224412>
 23. **J. Atulasimha** and S. Bandyopadhyay*, "An ultrasensitive spintronic strain sensor", *Journal of Physics D: Applied Physics*, **44**, 205301 2011.
<http://iopscience.iop.org/0022-3727/44/20/205301>
 24. **Jayasimha Atulasimha*** and Alison Flatau, "TOPICAL REVIEW: A review of magnetostrictive iron-gallium alloys", *Smart Materials and Structures*, **20**, 043001, 2011. (*Feature Article/IOP Smart Materials 2011 Highlight*).
<http://iopscience.iop.org/0964-1726/20/4/043001>
- **2010**
25. **J. Atulasimha*** and S. Bandyopadhyay, "Bennett clocking of nanomagnetic logic using multiferroic single-domain nanomagnets", *Applied Physics Letters*, **97**, 173105, 2010.
<http://link.aip.org/link/doi/10.1063/1.3506690>
 26. Y. Wang*, **J. Atulasimha**, R. Prasoon, "Quasistatic non-linear magnetoelectric behavior of Terfenol-PZT laminate composites" *Smart Materials and Structures*, **19**, 125005, 2010.
<http://dx.doi.org/10.1088/0964-1726/19/12/125005>
 27. C. Mudivarthi*, S. Datta, **J. Atulasimha**, P. G. Evans, M. J. Dapino, A. B. Flatau, "Anisotropy of constrained magnetostrictive materials", *Journal of Magnetism and Magnetic Materials*, **322**, 3028, 2010. [doi:10.1016/j.jmmm.2010.05.024](https://doi.org/10.1016/j.jmmm.2010.05.024)
 28. Supratik Datta*, **Jayasimha Atulasimha**, Chaitanya Mudivarthi and Alison B. Flatau, "Stress and magnetic field dependent Young's modulus in single crystal iron-gallium alloys" *Journal of Magnetism and Magnetic Material*, **322**, 2135, 2010.
[doi:10.1016/j.jmmm.2010.01.046](https://doi.org/10.1016/j.jmmm.2010.01.046)
- **2009**

29. M. Stuebner*, **J. Atulasimha** and R. C. Smith, "Quantification of Hysteresis and Nonlinear Effects on the Frequency Response of Ferroelectric and Ferromagnetic Materials", *Smart Materials and Structures*, **18**, 104019, 2009. <http://iopscience.iop.org/0964-1726/18/10/104019/>
30. Supratik Datta*, **Jayasimha Atulasimha**, and Alison B. Flatau, "Figures of merit of magnetostrictive single crystal iron-gallium alloys for actuator and sensor applications", *Journal of Magnetism and Magnetic Materials*, **321**, 4017, 2009. <http://jim.sagepub.com/content/20/9/1121.abstract>
31. Supratik Datta*, **Jayasimha Atulasimha**, Chaitanya Mudivarthi and Alison B. Flatau, "Modeling of magnetomechanical actuators in laminated structures", *Journal of Intelligent Material Systems and Structures*, **20**, 1121, 2009. <http://jim.sagepub.com/content/20/9/1121.abstract>
- **2008**
32. **Jayasimha Atulasimha***, Alison B. Flatau and James R. Cullen "Energy-based Model for Actuation and Sensing Behavior of Single-crystal Iron-gallium Alloys", *Journal of Applied Physics*, **103**, 014901, 2008. http://jap.aip.org/resource/1/japiau/v103/i1/p014901_s1
33. **Jayasimha Atulasimha***, Alison B. Flatau, and James Cullen "Analysis of the effect of gallium content on the magnetomechanical behavior of single-crystal iron-gallium alloys using an energy-based model", *Smart Materials and Structures*, **17**, 025027, 2008. <http://iopscience.iop.org/0964-1726/17/2/025027>
34. **Jayasimha Atulasimha***, George Akhras and Alison B. Flatau, "Comprehensive three dimensional hysteretic magnetomechanical model and its validation with experimental <110> single-crystal iron-gallium behavior", *Journal of Applied Physics*, **103**, 07B336, 2008. http://jap.aip.org/resource/1/japiau/v103/i7/p07B336_s1
35. **Jayasimha Atulasimha*** and Alison B. Flatau "Experimental Actuation and Sensing Behavior of Single-Crystal Iron-Gallium Alloys", *Journal of Intelligent Materials Systems and Structures*, **19**, 1371, 2008. <http://jim.sagepub.com/content/19/12/1371.abstract>
36. Supratik Datta*, **Jayasimha Atulasimha**, Chaitanya Mudivarthi and Alison B. Flatau, "The modeling of magnetomechanical sensors in laminated structures", *Smart Materials and Structures*, **17**, 025010, 2008. <http://iopscience.iop.org/0964-1726/17/2/025010>
37. Chaitanya Mudivarthi*, Supratik Datta, **Jayasimha Atulasimha** and Alison B. Flatau, "A bidirectionally coupled magnetoelastic model and its validation using a Galfenol unimorph sensor", *Smart Materials and Structures*, **17**, 035005, 2008. <http://iopscience.iop.org/0964-1726/17/3/035005>
- **2007**
38. **Jayasimha Atulasimha***, Alison B. Flatau, Eric Summers, "Characterization and Energy-based Model of the Magnetomechanical Behavior of Polycrystalline Iron-Gallium Alloys", *Smart Materials and Structures*, **16**, 1265, 2007. <http://iopscience.iop.org/0964-1726/16/4/039>

39. Supratik Datta*, **Jayasimha Atulasimha** and Alison B. Flatau, "Modeling of Magnetostrictive Galfenol Sensor and Validation under Four-Point Test", *Journal of Applied Physics*, **101**, 09C521, 2007. http://jap.aip.org/resource/1/japiau/v101/i9/p09C521_s1

- **2006**

40. **Jayasimha Atulasimha***, Alison B. Flatau and Rick A. Kellogg, "Sensing Behavior of Varied Stoichiometry Single Crystal Fe-Ga", *Journal of Intelligent Materials Systems and Structures*, **17**, 97, 2006. <http://jim.sagepub.com/content/17/2/97.short>

BOOK CHAPTERS

*Corresponding author

1. J. Atulasimha* and S. Bandyopadhyay, "Hybrid spintronics and straintronics: A super energy-efficient computing paradigm based on interacting multiferroic nanomagnets" in *Spintronics in Nanoscale Devices*. Ed. Eric Robert Hedin and Yong S. Joe, Pan Stanford Publishers. Published August 2013.
2. Noel D'Souza, Jayasimha Atulasimha*, Supriyo Bandyopadhyay "Four-state hybrid spintronics-straintronics: Extremely low-power information processing with multiferroic nanomagnets possessing biaxial anisotropy" in *Emerging VLSI Circuits*, Editors Tomasz Wojcicki & Krzysztof Iniewski (editors) to be published by CRC press, accepted, 2014.

BOOKS EDITED

1. Editors J. Atulasimha and S. Bandyopadhyay, "Nanomagnetic and spintronics devices and phenomena for energy-efficient computing", *edit in progress*, Wiley, New York. Scheduled to appear in 2015.

INVITED TALKS

a. Invited talks given as presenting author

1. "Boolean and non-Boolean information processing with strain clocked nanomagnets: Ultra-low-energy Hybrid Spintronics-Straintronics" International Conference on Small Science (ICSS 2014), Hong Kong, China, 8-11, December, 2014 (confirmed).
2. Hybrid Spintronics-Straintronics: Simulations and Experiments on Ultra Energy Efficient Computing with Multiferroic Nanomagnets, International Materials Research Congress, Cancun, Mexico, August, 2014.
3. "The role of magnetostrictive materials in smart structures and its emerging applications in nanoelectronics and nanoscale strain sensing", Plenary Talk, International Conference on Emerging Materials and Applications, ICEMA 2014, Indian Institute of Technology, Roorkee (Golden Jubilee, Saharanpur Campus), India, April 5-6, 2014. (PLENARY TALK)

4. "Hybrid Spintronics-Straintronics: An extremely energy efficient strain-clocked nanomagnetic computing paradigm", IEEE Nano Materials and Devices Conference, Tainan, Taiwan, October 2013.
5. "Hybrid Spintronics-Straintronics: An ultra energy efficient nanomagnetic computing paradigm", Indian Institute of Science, Bangalore, India, June, 2013.
6. "An ultra-energy efficient approach to nanomagnetic memory and logic devices ", Advanced Light Source User Workshop, Lawrence Berkeley National Lab, October 2012.
7. "Hybrid spintronic/straintronics: A super energy efficient computing scheme based on interacting multiferroic nanomagnets", IEEE Nanotechnology Conference, Birmingham, UK, August, 2012.
8. "Hybrid Spintronics-straintronics: low power electronics with multiferroic materials", INTERMAG Conference, Vancouver, Canada, May, 2012.
9. " Ultra low-energy hybrid spintronics and straintronics: multiferroic nanomagnets for memory, logic and ultrafast image processing " American Physical Society, March Meeting, Boston, USA, 2012.
10. " Multiferroic straintronics: Ultra-low power computing and image processing ", Army Research Lab, Adelphi, MD, Dec 12th 2011.
11. "Straintronics: Ultra low-power computing with multiferroic nanomagnets", University of Virginia, September 13th, 2011.
12. "Ultra low-power computing with multiferroic nanomagnets", National Institute of Standards and Technology (NIST), July 21st, 2011.
13. "Electrically Switchable Multiferroic Nanomagnets: A new Paradigm for Low Power Nanomagnetic Computing, Villa Conference on Interactions Among Nanostructures (VCIAN 2011), Las Vegas, NV, April, 2011.
14. "Magnetomechanical Behavior of Iron-Gallium Alloys", Materials Research Society, Fall Conference, Boston, MA, Dec 1st, 2008.
15. "Armstrong's Contribution to the Modeling of Magnetostrictive Materials" Armstrong Memorial Session, SPIE Conference on Smart Structures and Materials, San Diego, March, 2007.
16. "Role of Magnetostrictive Iron-Gallium in Smart Structures and Microsystems"
Indian Institute of Science, Bangalore, India, September 2007.
Arizona State University, Phoenix/Tempe, AZ, USA, March 2007.
Clarkson University, Potsdam, NY, USA, February 2007.
17. "Role of Magnetostrictive Materials in Smart Structures"
Hindustan Aerospace Limited (HAL), Bangalore, India, January 2005.
National Aerospace Laboratory (NAL), Bangalore, India, January 2005.

Note: On talks 1-13, S. Bandyopadhyay was listed as a co-author, on talks 3 and 14, A.B. Flatau was listed as a co-author and on talk 15, A.B. Flatau and G. Akhras were listed as co-authors.

b. Invited talks as a co-author

18. S. Bandyopadhyay (*presenting author*) and J. Atulasimha, "Hybrid spintronics and straintronics: An ultra-energy efficient nanomagnetic computing architecture", International Conference on Communications, Devices and Intelligent Systems, Calcutta, India, 2012. (*Plenary talk*)
19. S. Bandyopadhyay(*presenting author*) and J. Atulasimha, "Hybrid spintronics and straintronics: an ultralow energy computing paradigm to extend Moore's law beyond the year 2020", Device Research Conference, Pennsylvania State University, June 2012.

CONFERENCE PRESENTATIONS: (Total 30, Published proceedings 15, abstract only 15)

CONFERENCE PRESENTATIONS WITH PROCEEDINGS (not peer reviewed)

*** Presenting author**

1. Noel D'Souza*, Jayasimha Atulasimha and Supriyo Bandyopadhyay, "Four state straintronics: Extremely low power nanomagnetic logic using multiferroic with biaxial anisotropy", ***Best student paper award for symposium on multifunctional materials***, Proceedings of the ASME 2011 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS2011, September 18-21, 2011, Phoenix, Arizona, USA.
2. Yezuo Wang*, Jayasimha Atulasimha, "A dexterous surgical manipulation tool using self-sensing magnetoelectric actuators", Proceedings of ASME 2010 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS 2010, October, 2010, Philadelphia, PA, USA.
3. Yezuo Wang*, Jayasimha Atulasimha, Joshua Clarke Vishnu, Baba Sundaresan, "SS10-SSN04-46: Thickness ratio effects on quasistatic actuation and sensing behavior of laminate Magnetoelectric cantilevers", Proceedings of SPIE Smart Structures/NDE 2010 7-11 March 2010, San Diego, CA, USA.
4. Jayasimha Atulasimha*, Yezuo Wang, Vishnu Baba Sundaresan, "SMASIS2009-1351 Magnetoelectric Cantilever for Collocated Actuation and Sensing Applications: Experimental Study, Model and Scaling Laws", Proceedings of ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS 2009 September 21 - 23, 2009, Oxnard, California, USA.
5. Jayasimha Atulasimha*, J.Xie, M. Richeson, K.M.Mossi, "SMASIS2009-1371: Pyroelectric Materials: Scaling of Output Power with Dimensions and Substrate Clamping", Proceedings of the ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS2009, September 20-24, 2009, Oxnard, California, USA.
6. Vishnu Baba Sundaresan* and Jayasimha Atulasimha, "SMASIS2009-1350: Characterization of Magnetoelectric Cantilever for use as an Ablation Tool in Minimally Invasive Surgery", Proceedings of ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS 2009 September 21 - 23, 2009, Oxnard, California, USA.
7. Michael Stuebner*, Jayasimha Atulasimha, Ralph C. Smith "Frequency Response of Piezoelectric and Magnetostrictive Hysteretic Nonlinear System", Proceedings of SMASIS08 2008 ASME 2008 Conference on Smart Materials, Adaptive Structures and Intelligent Systems October 28-30, 2008, Ellicott City, MD, USA.

8. S. Datta, J. Atulasimha, C. Mudivartha and A. B. Flatau* "Stress and magnetic field dependent Young's modulus in single crystal iron-gallium alloys", Proceedings of 19th International Conference on Adaptive Structures Technologies (ICAST), Switzerland, Oct 6-9, 2008.
9. Chaitanya Mudivartha*, Supratik Datta, Jayasimha Atulasimha, Alison B. Flatau, Phillip Evans, and Marcelo Dapino "Equivalence of magnetoelastic, elastic, and mechanical work energies with stress-induced anisotropy and its use in the Armstrong model for magnetostriction" Proceedings of SPIE Conference on Smart Structures and Materials, San Diego, March, 2008.
10. Jayasimha Atulasimha* and Alison B. Flatau, "A generalized model for the behavior of magneto-electric composites", Proceedings of SPIE Conference on Smart Structures and Materials, San Diego, March, 2007.
11. Jayasimha Atulasimha* and Alison B. Flatau, "Energy-based Model for the Magnetostrictive behavior of Polycrystalline Iron-Gallium alloys", Proceedings of the SPIE Conference on Smart Structures and Materials, San Diego, March, 2006.
12. Jayasimha Atulasimha* and Alison B. Flatau, "Energy-based constitutive Model for Magnetostrictive Materials and its application to Iron-gallium alloys", Proceedings of the 49th MRS Fall Symposium, Boston, Dec 2005.
13. Jayasimha Atulasimha* and Alison B. Flatau, "Quasistatic Actuation Characteristics of Varied Stoichiometry Single Crystal Iron-Gallium", Proceedings of the 5th International Conference on Adaptive Structures Technologies (ICAST), Bar Harbor, Maine, October 2004.
14. Jayasimha Atulasimha*, Alison B. Flatau, Inderjit Chopra and Rick A. Kellogg, "Effect of Stoichiometry on Sensing Behavior of Iron-Gallium", Proceedings of the SPIE Conference on Smart Structures and Materials, San Diego, March, 2004. (*Best student paper award*).
15. Jayasimha Atulasimha* and Inderjit Chopra "Torsional Behavior of Shape Memory Alloys", Proceedings of the AIAA/ASME/AHS Conference on Structural Dynamics and Materials (SDM), Norfolk, April 2003.

ASME-American Society of Mechanical Engineers
SIAM-Society of Industrial and Applied Mathematics
SPIE-The International Society of Optical Engineering
MRS- Materials Research Society

CONFERENCE PRESENTATIONS/POSTERS WITH ABSTRACT ONLY

1. Supriyo Bandyopadhyay, Jayasimha Atulasima*, "Hybrid Straintronics and Spintronics: An ultra-energy-efficient route to Boolean and non-Boolean information processing", CMOS Emerging Technologies Symposium, CEA-MINATEC, Grenoble, France, July, 2014. (Talk and abstract only).
2. Mohammad Salehi Fashami, Supriyo Bandyopadhyay, Jayasimha Atulasima, "Ultra low-power hybrid spintronics-straintronics clocked with Surface Acoustic Waves (SAW)", American Physical Society, March Meeting, Denver, USA, 2014. (Talk and abstract only).
3. Noel D'Souza, Mohammad Salehi Fashami, Supriyo Bandyopadhyay, Jayasimha Atulasima "Experiments on straintronic nanomagnetic logic with two-state elliptical and four-state diamond and concave magnetostrictive nanomagnets" American Physical Society, March Meeting, Denver, USA, 2014. (Talk and abstract only).

4. *Sanjay Sah¹, Ganapati Myneni, Jayasimha Atulasimha, "Magnetic Materials Characterization and Modeling for Magnetic Shielding of Cryomodules in Particle Accelerators" American Nuclear Society Conference, American Nuclear Society Conference, Dec 2013.*
5. Sudipta Dutta, **Jayasimha Atulasimha**, M.S. Bobji, Arindam Ghosh, "Correlated domain wall motion in frustrated dipole coupled nanowire system: a magnetic force microscopy and magneto resistance study" International Union of Materials Research Society - ICA Conference, Indian Institute of Science, Bangalore, India, December, 2013
6. Jayasimha Atulasimha, "Adaptive Structures Prize Talk: Magnetostrictive materials in smart structures, nanoscale strain sensing and nanoelectronics" SMASIS 2013, September 16-18, 2013, Snow Bird, UT. (Talk and abstract only).
7. Noel D'Souza, Mohammad Salehi Fashami. Supriyo Bandyopadhyay, Jayasimha Atulasima, "Two state and four-state multiferroic nanomagnetic logic devices for super energy-efficient computing", SMASIS 2013, September 16-18, 2013, Snow Bird, UT. (Talk and abstract only).
8. Noel D'Souza*, Mohammad Salehi-Fashami, Kamaram Munira, Avik W. Ghosh, Supriyo Bandyopadhyay Jayasimha Atulasimha, "Multiferroic nanomagnetic logic: ultra low-power hybrid spintronics-straintronics" SPIE Optics and Photonics Conference, August 25-29, 2013. (Poster and abstract only).
9. Noel D'Souza*, Mohammad Salehi-Fashami, Supriyo Bandyopadhyay Jayasimha Atulasimha, "Experimental realization of straintronic nanomagnetic logic using strain-induced magnetization switching in magnetostrictive nanomagnets elastically coupled to PMN-PT", American Physical Society, March Meeting, Baltimore, USA, 2013. (Talk and abstract only).
10. Mohammad Salehi-Fashami*, Noel D'Souza, Jayasimha Atulasimha and Supriyo Bandyopadhyay, "Implications of stochastic magnetization dynamics on reliability of dipole coupled nanomagnetic logic", American Physical Society, March Meeting, Baltimore, USA, 2013. (Talk and abstract only).
11. Noel D'Souza, Mohammad Salehi Fashami, Jaysimha Atulasimha*, Kuntal Roy and Supriyo Bandyopadhyay, "Preliminary experiments on multiferroic nanomagnetic logic devices for ultralow power computing", SMASIS2012, September 19-21, 2012, Stone Mountain, GA. (Talk and abstract only).
12. Noel D'Souza*, Jayasimha Atulasimha and Supriyo Bandyopadhyay, "Four-state straintronics: Ultra low-power collective nanomagnetic computing using multiferroics with biaxial anisotropy", American Physical Society, March Meeting, Boston, USA, 2012. (Talk and abstract only).
13. Mohammad Salehi-Fashami*, Jayasimha Atulasimha and Supriyo Bandyopadhyay, "Ultra low-power straintronics with multiferroic nanomagnets: magnetization dynamics, universal logic gates and associated energy dissipation", American Physical Society, March Meeting, Boston, USA, 2012. (Talk and abstract only).
14. Kuntal Roy*, Supriyo Bandyopadhyay and Jayasimha Atulasimha, " Hybrid spintronics and straintronics: A paradigm for ultra-low-energy computing ", American Physical Society, March Meeting, Boston, USA, 2012. (Talk and abstract only).
15. Kamaram Munira*, Supriyo Bandyopadhyay, Jayasimha Atulasimha Eugene Chen and Avik W. Ghosh, "Reliable switching in MRAM and multiferroic logic", American Physical Society, March Meeting, Boston, USA, 2012. (Talk and abstract only).
16. Jayasimha Atulasimha* and Supriyo Bandyopadhyay, "Ultra Low-power Computing with Multiferroic Nanomagnets", SPIE Smart Structures/NDE 2012, San Diego, CA, USA, March 2012. (Talk and abstract only).

17. Jayasimha Atulasimha* and Supriyo Bandyopadhyay, "Ultrasensitive low-power multifunctional spintronic nanowire sensors for magnetic field, pressure, and strain sensing ", SPIE Smart Structures/NDE 2011, San Diego, CA, USA, March 2011 (Talk and abstract only).
18. S. Datta*, *J. Atulasimha*, C. Mudivarthi and A. B. Flatau, "Effect of stress and magnetic field on the Young's modulus of single crystal iron-gallium alloys", AIAA Region I YPSE, November 21, 2008. (Talk and abstract only).
19. *Jayasimha Atulasimha* and Ralph Smith*, "Magnetostrictive Controller with an Inverse-Materials, Compensator for Milling Applications", SIAM Conference on Mathematical Aspects of Materials, Philadelphia, May, 2008. (Talk and abstract only).
20. *Jayasimha Atulasimha** and Alison B. Flatau, "Experimental Characterization and Free Energy Model for Single Crystal Iron-Gallium Alloy Actuators", 49th Magnetism and Magnetic Materials Conference, Jacksonville, Florida, November 2004. (Talk and abstract only).

WORKSHOP/WEBINAR PRESENTATIONS

1. ONR Workshop on Transducers at Penn State: Couple of years from 2004-2006, 2010
2. Galfenol (pre-MURI) Workshop at UMD: Couple of years from 2004-2006.
3. Webinar on Hybrid Spintronics Straintronics for the NRI (Nanoscale Research Initiative of the Semiconductor Research Corporation), Feb 2012,
4. NRI review meeting in Maryland, Oct, 2012.

INTELLECTUAL PROPERTY GENERATION

US Patents

1. Patent No. 12/889,857 and titled Magnetolectric Surgical Tools for Minimally Invasive Surgery filed with USPTO, Vishnu Baba Sunderasen, *Jayasimha Atulasimha* and Josh Clarke.
2. Patent application 13447431 (application filed with USPTO 04/16/2012, pending review) titled "Planar Multiferroic/Magnetostrictive Nanostructures as Memory Elements, Two-Stage Logic Gates and Four-State Logic Elements for Information Processing" *Jayasimha Atulasimha* and Supriyo Bandyopadhyay.

Invention Disclosures

1. Title: Straintronics: an ultra-low power paradigm for memory, computing and information processing using multiferroic nanomagnets.
Inventors: *J. Atulasimha* and S. Bandyopadhyay. Assigned: March 29th, 2011.
2. Title: An Ultrasensitive Spintronic Strain Sensor
Inventors: Dr. Supriyo Bandyopadhyay and *Dr. Jayasimha Atulasimha*. Assigned: April 2nd, 2010.
3. Title: (a) On the use of Magnetolectric Cantilevers in Minimally Invasive Surgery.
(b) On the use of Magnetolectric Dampers.
Inventors: Dr. Vishnu Baba Sunderasen and *Dr. Jayasimha Atulasimha*. Assigned: April 1st, 2009.

RESEARCH FUNDING

Agency/ Mechanism	Title	Role	Duration/Amount	Status
NSF: Unsolicited Sensors and Sensing Systems CMMI	Ultra-low power and ultra-sensitive spintronic nanowire strain sensors	PI (co-PIs: Arun Subramanian and Supriyo Bandyopadhyay)	\$330 K of which my share is \$ 87.6 K	Funded
NSF: CAREER	CAREER: Reliable and Fault Tolerant Super Energy Efficient Nanomagnetic Computing in the Presence of Thermal Noise	PI	07/13 to 06/18. \$436.7K over 5 years	Funded
NSF: Nanoelectronics Beyond 2020 ECCS With a NRI supplement gift from SRC (Semiconductor Research Corporation)	Nanoelectronics Beyond 2020: Hybrid Spintronics and Straintronics: A New Technology for Ultra-Low Energy Computing and Signal Processing Beyond the Year 2020.	Co-PI (PI: Supriyo Bandyopadhyay (VCU) and 3 other co-PIs: Pinaki Mazumder (U. Mich), Avik Ghosh (UVA) and Alexander Khitun (UC Riverside).	09/11 to 08/15. NSF: \$1.55 million total, my share of this award comes to \$297 K NRI: \$ 200K total, my share of this award comes to \$42K <i>Including both NSF and NRI gift my share is \$339K of a total of \$1.75 million</i>	Funded
NSF: Unsolicited Software Hardware Fundamentals, CCF, CISE.	SHF: Small: Pipelined and wireless ultra-low power straintronics: An acoustically clocked combinational and sequential nanomagnetic architecture	PI (co-PI: Supriyo Bandyopadhyay)	07/12-07/15 \$440K total, my share of this award comes to \$202 K	Funded
VCU PRIP (Presidential Research Incentive Program)	Non-contact fluid injection system for medical and flow control applications	PI (co-PI: Hooman Tafreshi)	07/10-06/12 \$50K total, my share is \$25K	Completed
Jefferson Laboratory (DOE Lab)	Magnetic shielding for "Continuous Wave Superconducting Radio Frequency System for Nuclear Materials Research"	Sub-contract awardee	2 years (2013, 2014) graduate student support (stipend only).	Funded

Funding Summary: Total awards as PI/co-PI (~\$3 million) with my share (~**\$1.1 million**).

3. TEACHING/MENTORING EXPERIENCE

COURSES TAUGHT

REGULAR COURSES AT VCU

UNDERGRADUATE

1. EGRM 410 Mechatronics: Senior Mechanical Engineering Undergraduate course with lab taught at Virginia Commonwealth University (VCU): Fall 2008, 2009, 2010, 2011.
2. ENGR 201 : Dynamics and Kinematics Fall 2012, 2013, Spring 2013.
3. ENGR 315 : Process Systems Dynamics, Spring 2014.

GRADUATE/SENIOR TECHNICAL ELECTIVE

3. EGRM 555 Smart Materials: Mechanical Engineering Graduate course/ Senior Elective taught at Virginia Commonwealth University (VCU): Spring 2010, 2011.
4. EGRM 691 Advanced Materials (cross listed as EGRM 591 Advanced Material Properties) taught at Virginia Commonwealth University (VCU): Spring 2012.
5. EGRM 691 Advanced Materials/Mechanical and Nuclear Engineering Materials taught at Virginia Commonwealth University (VCU): Spring 2013.

INDEPENDENT STUDY AT VCU

6. EGRM 691 Energy Harvesting: Special Topics course for graduate students, VCU Fall 2008.

REGULAR UNDERGRADUATE COURSE AT NCSU

7. Calculus-3: Vector Calculus, Surface and Volume Integrals, for Sophomores NCSU, Spring 2008.

SENIOR DESIGN PROJECTS AT VCU

- Design and Fabrication of a Remote Controlled Aircraft, Undergraduate Senior Design, 2008, 09, 10, 11, 12, 13.
- Fabrication of SAW device to switch magnetostrictive nanomagnets, 2013-14
- Design of an autonomous quad-copter with GPS navigation, 2012-13
- Design and Characterization of a Pressure Chamber for Needle-less Medicine Injection, 2011 (with Dr. Tafreshi). **This project won the Sternheimer Senior Design Grant.**

MENTORING ACTIVITY

POSTDOCTORAL ADVISING AT VCU (1 postdoctoral fellow, current)

1. Dr. Noel D'Souza, Postdoctoral Fellow, August 2014-current.

DOCTORAL ADVISING AT VCU (2 PhDs completed and 5 PhDs currently advised)

PhDs graduated

Name/Level	Research Area/Thesis Title	Expected graduation
Mohammad Salehi Fashemi/PhD	Two-state Hybrid Spintronics-Straintronic Logic with Multiferroic Nanomagnets	Completed PhD in Spring 2014, now postdoctoral fellow at Univ. of Delaware.
Noel D'Souza/PhD	4-state Hybrid Spintronics-Straintronics and Experimental Demonstration of Multiferroic Nanomagnetic Logic	Completed PhD in Summer 2014, now postdoctoral fellow at VCU

Current PhDs

Name/Level	Research Area/Thesis Title	Expected graduation
Sanjay Sah/PhD	Magnetic shielding for accelerator application	2015
Vimal Ganapathy Sampath /PhD	Acoustic clocking of nanomagnetic logic	2015
Mohammad Al-Rashid/PhD	TBA	Started: Fall 2013.
Pallabi Sutradhar/PhD	TBA	Started: Fall 2014.
Dhitriman Bhattacharya/PhD	TBA	Started: Fall 2014.

UNDERGRADUATE STUDENT INTERNS IN MY LAB AT VCU

UG=undergraduate, MNE=Mechanical and Nuclear Engineering, KGP=Kharagpur

Name/Level	Research Area	Publications
Ruchir Prasoon /UG, IIT-KGP exchange program	Experimental work on multiferroics	1 journal in print
Henry Huang/UG MNE, VCU	Built robot for my Mechatronics course	N/A
Thomas Wittenschlaeger /UG MNE, VCU	Experimental characterization of frequency dependent multiferroic behavior	N/A
Michael Hahn /UG MNE, VCU	Buckling of magnetostrictive plates/ Also developed my webpage	N/A

THESIS COMMITTEE

1. Jingsi Xie (MS in Mechanical Engineering – completed May 2010)
2. Ender Dur (PhD in Mechanical Engineering- completed Dec 2011)
3. Cabir Turan (PhD in Mechanical Engineering- completed Dec 2011)
4. Mevlut Fatih Peker (PhD in Mechanical Engineering- completed Dec 2012)
5. Kuntal Roy (PhD in Electrical Engineering-completed Summer 2012)
6. Hao Zhang (PhD in Mechanical Engineering-completed 2013)
7. Christopher Green (PhD in Mechanical Engineering-present)
8. Ugur Erturun (PhD in Mechanical Engineering-present)

OTHER/TRAINING

University of Maryland: Training graduate students on using the MFM mode of an AFM 2006,
Training graduates and undergraduates in using the Torsion Testing Machine (October 2005).

4. PROFESSIONAL SERVICE

A. SERVICE AT VCU

University

- Faculty senate alternate (Fall 2011- 2013).
- Participated as a guest speaker in a NSF CAREER mentoring workshop in Nov, 2013.

School of Engineering/University

- Participated in summer discovery program, 2009 and 2010.

Department of Mechanical and Nuclear Engineering

- 2 department level committees: Faculty recruitment 2010-2011 and 2012-2013.
- Mechatronics laboratory upgrade committee, 2012.
- Serve on the Mechanical Engineering Graduate Program Committee (Fall 2010-current).
- Typically advise ~10-12 undergraduate students every year.

B. SERVICE AT PROFESSIONAL ORGANIZATIONS

Work Related to ASME Adaptive Structures and Material Systems (ASMS) Tech. Committee

1. ASME Adaptive Structures and Material Systems (ASMS) Technical Committee (now Branch): member, since Sept 2009.
Active Materials and/or Multifunctional Materials Technical Committee (under ASMS Branch): member, since Sept 2012.
2. Session Chair/Co-Chair responsibility:
 - a. ASME 2008 1st Conference on Smart Materials, Adaptive Structures and Intelligent Systems.
 - b. ASME 2009 2nd Conference on Smart Materials, Adaptive Structures Intelligent Systems.
 - c. SPIE 2010 Conference on Smart Structures, March 2010.
 - d. ASME 2010 3rd Conference on Smart Materials, Adaptive Structures Intelligent Systems.
 - e. SPIE 2012 Conference on Smart Structures, March 2012.
 - f. ASME 2012 5th Conference on Smart Structures, September 2012.
 - g. ASME 2013 6th Conference on Smart Structures, September 2013.
3. Judging Responsibility:
 - Best Journal Paper Award, 2011 ASME Adaptive Struct. and Material Systems Tech Committee
 - Smart Materials, SPIE 2011 and SMASIS, ASME 2010, 2012, 2013 student paper competitions.
 - Best Journal Paper Award, 2013 ASME Adaptive Struct. and Material Systems Tech Committee
4. Student activity: Student trip to the Baltimore aquarium, ASME 2008 SMASIS Conference.

Work Related to Device Research Conference Technical Program Committee

1. Member DRC Technical Program Committee: Dec 2013-

Work related to other societies

5. Session Chair/co-chair: MRS (Materials Research Society) 2008.
6. Conference Program Committee: International program committee for NSTSI Conference, India 2011, cosponsored by IEEE Nanotechnology Council.

C. TECHNICAL SERVICE FOR JOURNALS/PROCEEDINGS/PUBLISHERS

Reviewer for journals: Reviewed ~38 manuscripts for 18 journals in the last 5 years.

1. Nature (1)
2. Physical Review Letters (3)
3. Nanotechnology (3)

4. Nature Scientific Reports (1)
5. Journal of Applied Physics (4)
6. Smart Materials and Structures (5)
7. Journal of Magnetism and Magnetic Materials (4)
8. J. of Intelligent Materials and Smart Structures (4)
9. J. Physics: Condensed Matter (1)
10. J. Phys D: Appl. Phys. (1)
11. IEEE Transaction on Electron Devices (1)
12. IEEE Transactions on Magnetics (4)
13. Sensors and Actuators A: Physical (1)
14. Int. J. of Smart and Nano Materials (1)
15. Microelectronics Journal (1)
16. Finite Elements in Analysis and Design (1)
17. Materials Today (1)
18. Sensors (1)

Reviewer for proposals: Reviewed for NSF, CMMI, 2012.

Reviewed for the Israel Science Foundation, 2013.

Reviewed for NSF, CISE, 2013.

Internal review, Engineering PRQF proposals, VCU.

Reviewer for Conferences:

1. Reviewed 2 papers for Materials Research Society Fall Meeting, December 2008.
2. Reviewed 6 papers for NSTSI Conference, India 2011, cosponsored by IEEE Nanotechnology Council.
3. Reviewed 1 paper for INTERMAG Conference, Vancouver 2012, cosponsored by IEEE Magnetics Society.

Reviewer for publishers:

American Institute of Aeronautics and Astronautics, Summer 2008 (This is yet to be published).

AIAA Progress in Aeronautics and Astronautics Series entitled Adaptive Structures and Structures.

D. OTHER EDUCATIONAL OUTREACH

1. Hosted a hands-on workshop for 30-40 students on energy harvesting and nanomagnetic computing
 - a. "Charging your i-phone while walking: Energy Harvesting", Nov 2010.
 - b. "Nanomagnets for computing", July 2011 and Dec 2012 (with the support of the MATH-SCIENCE Innovation Center in Richmond, VA).
 - c. "Nanomagnets for computing", July 2013 (with support of Math Science center, hosted a work shop that included a package for building gates and using them to design a half-adder).
2. Judge for the Junior (2011) and Senior (2012) Physics Category at Metro Richmond Science Fair.
Judge for the ISEF (Intel Science and Engineering Fair) category, Virginia Science Fair, March 2013.
3. Mentor for Saumil Bandopadhyay's Metro Richmond Science/ISEF (Intel Science and Engineering Fair) project, "Unitary rotation of flying qubits in a nanowire via the Hanle effect: Towards a solid state quantum computer."
4. RAPME (Richmond Area Program for Minorities in Engineering):
 - a. Summer 2011, Mentored Ms. Adeola Adesuyi to work on ~100nm star shaped Ni nanomagnets grown by e-beam lithography followed by Ni deposition.
 - b. Summer 2012, Mentored Naveen Kotha on nanofabrication.
 - c. Summer 2013, Mentored 4 students on nanofabrication and visualization of nanomagnets.