

RAMESH ADHIKARI

Assistant Professor
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PROFESSIONAL APPOINTMENTS

- Assistant Professor, Department of Physics, Jacksonville University. 2016 - Present
- Research Assistant, Department of Physics, University of Massachusetts Amherst. 2012-2016
- Teaching Assistant, Department of Physics, University of Massachusetts Amherst. 2011-2016

EDUCATION

- **University of Massachusetts Amherst** Amherst, MA
PhD, Physics September, 2016
Dissertation: Study of Charge Transport Mechanism in Microbial Nanowires
- **University of Massachusetts Amherst** Amherst, MA
MS, Physics February, 2014
- **Berea College** Berea, KY
BA, *magna cum laude*, Physics & Mathematics May, 2011

PROFESSIONAL TEACHING EXPERIENCE

- Assistant Professor, Department of Physics,
Jacksonville University, Jacksonville, FL. August, 2016 - Present
Courses Taught:
 - PHYS 101: Freshmen Physics Seminar
 - PHYS 151: General Physics - Mechanics
 - PHYS 152: General Physics - Electricity & Magnetism
 - PHYS 250: Research Methods in Physics
 - PHYS 300: Modern Physics
 - PHYS 332: Advanced Labs
 - PHYS 405: Thermal and Statistical Physics
 - PHYS 410: Senior Physics Seminar
 - PHYS 413: Quantum Mechanics
- iCons Teaching Assistant,
University of Massachusetts, Amherst, MA. January-May, 2013
 - Facilitated student driven learning, multidisciplinary teamwork, peer-to-peer mentoring and problem solving at student centered Integrated Concentration of Science (iCons) class on renewable energy.
- Head Graduate Teaching Assistant,
University of Massachusetts, Amherst, MA. August- December, 2012
 - Supervised teaching assistants (TAs), planned and presented lesson plan for the lab courses and ensured grading standards are consistent among TAs in charge of different sections.
- Graduate Teaching Assistant,
University of Massachusetts, Amherst, MA. August 2011- May 2012
 - Lab instructor for electronics and introductory physics, tutoring and grading.
- Teaching Assistant,
Berea College, Berea, KY. August 2007- May 2011
 - Lab instructor for introductory physics classes, grading, tutoring and lab setups.

PROFESSIONAL RESEARCH EXPERIENCE**Jacksonville University**, Jacksonville, FL

Assistant Professor

August 2016 - Present

Project

- Study of charge propagation through polymer infused xylem network for plant based biodegradable electronics.
- Fabric based triboelectric generators.
- Self-assembled Peptide Nanostructures.

Undergraduate Students

Misha Chalkley '18
 Kenneth Huffman '20
 Courtney Purcell '20
 Blessing Akintunde '20

University of Massachusetts Amherst, MA

Graduate Research Assistant

August 2011- July 2016

- Charge transport through microbial nanowires.
- Understanding mechanism of degradation of perovskite solar cells.
- Organic fluoropolymers for corrosion protection.

Fermi National Accelerator Laboratory (Fermilab), Batavia, IL

Lee Teng Intern

June-August, 2010

- Project: Quench localization in superconducting radio-frequency cavities.

Univeristy of Kentucky, Lexington, KY

Summer Research Student

June-August, 2009

- Magnetic shielding techniques for neutron electric dipole moment (EDM) experiment.

Berea College, Berea, KY

Summer Research Student

June-August, 2008

- Study of periods of RR Lyrae variable stars.

UNIVERSITY SERVICES**Committees**

- Member - Academic Standards Committee Fall 2017 - Present
- Member - Experiential Learning Committee Fall 2017 - Present
- Member - Resource Faculty: Access Service Librarian Search Committee Spring 2018
- Member - Math Faculty Search Committee Spring 2018
- Member - Grade Appeal Committee January, 2018
- Member - Resource Faculty: Emerging Technologies and Health Sciences Librarian Search Committee Fall 2017
- Member - Ad Hoc Committee on Student and Student Athlete Excused Absence for the Faculty Athletics Committee Spring 2017

Faculty-In-Residence, North Hall

Fall 2017-Present

OTHER SERVICE AND OUTREACH ACTIVITIES**Jacksonville University**, Jacksonville, FL

- Jacksonville Chapter Advisor for Society of Physics Students (SPS). August, 2016 - Present
- Participated as an expert in Eclipse Watch Party at Jacksonville Ronald McDonald House for Children. August 21, 2017
- Presented interactive talk on "Physics of Everyday Life" at Murray Hill Public Library. July 8, 2017
- Building Captain - Acquire training for emergency preparation and evacuations, and monitor the safety status of assigned building. Spring, 2017
- Organize Sigma Pi Sigma honor ceremony for Physics students at JU. Spring 2017
- Faculty Marshal for Commencements. April, 2017, 2018

- Generated interest in science through demonstrative interactions with students Duval Country Public School (DCPS) Science Fair. January, 2017
- University of Massachusetts, Amherst, MA**
- Trained graduate students in the department to use various equipment such as Stratasys 3D printer, impedance spectrometer, thermal evaporator and AFM for their research. 2011 - 2016
 - Mentored and held discussion sessions for REU students, and new graduate students. 2011 - 2016
 - Organize annual lab tours and perform nanotechnology demonstrations for:
 - ScienceQuest: Annual event for 10 - 12th graders from across Northeast. 2011 - 2016
 - Nanotechnology Institute: Summer institute for high school STEM teachers.
 - Member of experimental High Energy Physics Faculty Search Committee Spring, 2016
 - Admission Committee Member in Physics Department Spring, 2015
 - Member of experimental Condensed Matter Physics Faculty Search Committee Spring, 2014
- Berea College, Berea, KY**
- From a member to President, Berea College chapter of Society of Physics Students (SPS) 2008 - 2011
 - Developed and executed organization operation skills such as managing accounts, fund-raising, engaging members, organizing visits to research universities, and promoting public understanding of science through participatory activities while leading Society of Physics Students chapter for multiple years with service in various positions starting from a member to a president.
 - International Student Orientation Team Leader 2009, 2010
 - Organized group activities to promote social interaction between the members of incoming class and adjustment to their life to new academic and social culture.

AWARDS, GRANTS & HONORS

Grants:

- Faculty Sponsor, Undergraduate Research Grant (\$1000)
Project: Developing Low Cost Triboelectric Device for Harvesting Residual Mechanical Energy Spring 2018
- Co-Investigator, Florida Entrepreneurism, Policy, Innovation & Commerce (Florida EPIC) grant (\$18,350)
Project: Eye Tracking During Programming Activities
(PI: Dr. W. Brian Lane, Physics Department, & Co-I: Dr. Daniel Furnas, Communication Sciences and Disorders Department) Fall 2017
- PI - Florida Entrepreneurism, Policy, Innovation & Commerce (Florida EPIC) grant (\$6,000)
Project: An exploratory study of the use of plant based materials for sustainable electronics. (Co-I: Dr. Huihui Wang, Engineering Department) Fall 2017

Awards:

- **Faculty Development Award**, Jacksonville University
Awarded to travel and present at:
 - 2017 AAPT Summer Meeting. 2017
 - 2017 American Association of Physics Teacher (AAPT) Winter Meeting. 2016
- **Graduate Student Travel Grant**, University of Massachusetts, Amherst: Awarded to fund

travel to recognized conferences for presentations of results of research conducted during graduate work. Maximum of six grants offered annually. 2016

- **Arthur Quinton TA Award**, University of Massachusetts, Amherst: Awarded annually to an outstanding Teaching Assistant. 2012
- **Waldemar Noll Prize in Physics**, Berea College, KY: Presented annually to the senior Physics major with the highest scholastic standing in the major field. 2011
- **Inducted in Phi Kappa Phi**: National collegiate honor society with invitation only membership for top 10% of graduating seniors. 2011
- **Lilli Brann Scholarship in Physical Sciences**, Berea College, KY: Awarded annually to a student in the physical sciences who has demonstrated superior scholarship in his or her chosen field. 2010
- **First position for oral presentation at Kentucky Academy of Sciences (KAS) Annual Meeting**, Western Kentucky University, Bowling Green, KY. 2010
- **Inducted in Sigma Pi Sigma and Pi Mu Epsilon Honor Societies**: National honor societies that honor students with outstanding scholarship in Physics and Mathematics respectively. 2010
- **Second position for oral presentation at Kentucky Academy of Sciences (KAS) Annual Meeting**, University of Kentucky, Lexington, KY. 2008
- **Mahatma Gandhi Scholarship**, Embassy of India in Kathmandu, Nepal: Awarded annually as monthly stipends for up to two years to students selected on the basis of academic performance at national school leaving certificate (SLC) examinations in Nepal. 2004-2006

SKILLS & TECHNIQUES

- **Nanofabrication in Cleanroom Environment:**
 - **Fabrication:** E-Beam Lithography, Photolithography with Mask Alignment, Nano-imprint Lithography
 - **Process:** E-beam and Thermal Evaporation, Atomic Layer Deposition (ALD), Reactive Ion Etching (RIE), Plasma Enhanced Chemical Vapor Deposition (PECVD), Electroplating
 - **Characterization:** AFM, SEM, TEM, Ellipsometer, Profilometer, Two- and Four-Point Probe Measurements in Probe Station, Electrochemical Impedance Spectrometer (EIS), UV-Vis, FTIR, XRD
- **Low Noise Transport Measurement:** Experienced in performing low signal electrical transport measurements and improving signal to noise ratio by using lock-in and shielding techniques.
- **Instruments Installation and Maintenance:** Installed and maintain EIS and AFM. Maintain vacuum systems such as evaporator and SEM. Write operational instructions and train users.
- **Electronics:** Experienced in designing and building analog electronics involving MOSFETs, operational amplifiers and logic gates, with some precision circuits and low noise techniques.
- **Automation of Experimental Processes:** Experienced in automating experimental processes, improving measurement precision and reducing data extraction time using LabVIEW, C++ and Python.
- **Computer Skills:** Python, LabVIEW, C++, R, L^AT_EX, Linux, HTML.
- **Building prototypes:** Using 3D printer for building prototypes and machining techniques such as milling, drilling, band saw, lathe and sandblasting to build parts for experiments.

PATENTS

- Microbial nanowires with increased conductivity and reduced diameters.(US Serial No.: 62/194,329) 2015 Derek Lovley, Nikhil S. Malvankar, **Ramesh Adhikari**, Yang Tan, Joy Ward, Kelly Nevin

PUBLICATIONS

1. R. Hudson, **R.Y. Adhikari**, M. T. Tuominen, I. Hanzu, M. Wilkening; S. Thayumanavan; J. Katz “ Evaluation of carboxylic, phosphonic and sulfonic acid protogenic moieties on tunable poly(meta-phenylene oxide) ionomer scaffolds ”, *Polymer*, submitted (2018).
2. D.J.F. Walker, **R.Y. Adhikari**, D.E. Holmes, J. E. Ward, T. L. Woodard, K. P. Nevin, and D.R. Lovley “Electrically conductive pili from pilin genes of phylogenetically diverse microorganisms”, *The ISME Journal*, 12, 48-58 (2018).
3. Y. Tan, **R.Y. Adhikari**, N.K. Malvankar, S. Pi, J. E. Ward, T. L. Woodard, K. P. Nevin, and D.R. Lovley “Expressing the *Geobacter metallireducens* PilA in *Geobacter sulfurreducens* Yields Pili with Exceptional Conductivity”, *mBio*, 8(1), e02203-16 (2017).
4. Y. Tan*, **R.Y. Adhikari***, N.K. Malvankar, S. Pi, J. E. Ward, T. L. Woodard, K. P. Nevin, Q. Xia, M. T. Tuominen and D.R. Lovley “Synthetic Biological Protein Nanowires with High Conductivity”, *Small*, 12 (33), 4481-4485 (2016). * **Co-first authors**.
5. Y. Tan, **R.Y. Adhikari**, N.K. Malvankar, J. E. Ward, K. P. Nevin, T. L. Woodard, J. A. Smith, O. Snoeyenbos-West, A. E. Franks , M. T. Tuominen and D.R. Lovley “Low Conductivity of *Geobacter uraniireducens* Pili Associated with Electron Shuttling Mechanism for Extracellular Electron Transfer”, *Frontiers in Microbiology*, 7, 980 (2016).
6. **R.Y. Adhikari**, N.S. Malvankar, M. T. Tuominen and D.R. Lovley “Conductivity of individual *Geobacter* pili”, *RSC Advances*, 6, 8354-8357 (2016).
7. T. C. Bayram, N. Orbey, **R.Y. Adhikari** and M. T. Tuominen “Fluoropolymer Based Formulations as Protective Coatings in Oil/Gas Pipelines”, *Progress in Organic Coatings*, 88, 54-63 (2015).
8. M. Bag, L. A. Renna, **R.Y. Adhikari**, S. Karak, F. Liu, P. M. Lahti, T. P. Russell, M. T. Tuominen and D. Venkataraman “Kinetics of Ion Transport in Perovskite Active Layers and its Implications for Active Layer Stability”, *Journal of the American Chemical Society (JACS)*, 137 (40), 13130-13137 (2015).
9. K. K. Yee, Y. L. Wong, M. Zha, **R.Y. Adhikari**, M. T. Tuominen, J. Hec and Z. Xu “Room-Temperature Acetylene Hydration by a Hg(II)-laced Metal-Organic Framework”, *Chemical Communications*, 51, 10941-10944 (2015).
10. S. Malkowski, **R.Y. Adhikari**, J. Boissevain, C. Daurer, B.W. Filippone, B. Hona, B. Plaster, D. Woods and H. Yan ”Overlap Technique for End-Cap Seals on Cylindrical Magnetic Shields”, *IEEE Transactions on Magnetics*, 49(1), 651-653 (2013).
11. S. Malkowski, **R. Adhikari**, B.Hona, C. Mattie, D. Woods, H. Yan and B. Plaster “Technique for High Axial Shielding Factor Performance of Large-scale, Thin, Open-ended, Cylindrical Metglas Magnetic Shields”, *Review of Scientific Instruments*, 82, 075104 (2011).

PRESENTATIONS

Invited Talks

1. “Electron Transport in Microbial Nanowires: Things We Have Learned from Nature’s Electron Breathers.”, *Colloquium*, University of North Florida, Jacksonville, FL. November, 2017
2. “Could bacteria lead us to the frontiers of bionanoelectronics? Things that we can learn from bacteria that breathe out electrons.”, *Science and Engineering Lecture Series (SELS)*, Jacksonville University, Jacksonville, FL. April, 2017

Contributed Talks

1. “Studying Response-Shift Bias in the CLASS with a Retrospective Study”, *American Association of Physics Teachers (AAPT) Summer Meeting*, Cincinnati, OH. July, 2017
2. “Student Confidence and Performance Outcomes in an Introductory Physics Class”, *American Association of Physics Teachers (AAPT) Winter Meeting*, Atlanta, GA. February, 2017

3. "Relevance of Aromatic Amino Acids for Electron Conduction along Geobacter Pili Protein.", *American Physical Society (APS) Meeting*, Baltimore, MD. March, 2016
4. "Quench localization in Superconducting Radio-Frequency Cavities.", *Kentucky Academy of Science (KAS) Annual Meeting*, Western Kentucky University, Bowling Green, KY. November, 2010
5. "Magnetic Shielding for Neutron EDM Experiments., *KAS Annual Meeting*, Northern Kentucky University, Highlands Height, KY. November 2009
6. "Study of the period of variable star at Berea College Observatory.", *KAS Annual Meeting*, University of Kentucky, Lexington, KY. November, 2008

Posters

1. "Bioelectronics: Nanowires, Capacitors and Artificial Photosynthesis", *North American Center for Research on Advanced Materials (NORA) meets BASF Challenges*, Cambridge, MA. November, 2015
2. "Electrically Conducting Microbial Nanowires", *Materials Research Science and Engineering Centers (MRSEC)*, UMass Amherst, MA. October, 2015
3. "Conductivity Measurements on Individual Geobacter sulfurreducens Pili Reveal Conductivities Sufficient to Explain Rates of Extracellular Electron Transfer.", *Gordon Research Conferences (GRC) - Applied & Environmental Microbiology*, Mt. Holyoke College, South Hadley, MA July, 2015
4. "Electron Transport Along Individual Microbial Nanowire.", *Center for Hierarchical Manufacturing (CHM)*, University of Massachusetts, Amherst, MA. March, 2015
5. "High Mobility Transistor Based on a Single Protein Nanowire.", *Gordon Research Conferences (GRC) - Nanostructure Fabrication*, University of New England, Biddeford, ME July 2014

PROFESSIONAL ASSOCIATIONS

- American Physical Society (APS), Member
- American Association of Physics Teachers (AAPT), Member