Radhika Barua, Ph.D.

Department of Mechanical & Nuclear Engineering
Virginia Commonwealth University, Richmond, VA
E-mail: rbarua@vcu.edu; radhika.barua@gmail.com
Phone (Mobile): [716] 380-7055
LinkedIn: ***www.linkedin.com/in/baruar***

PERSONAL STATEMENT

Research scientist with background in material science and interdisciplinary research; Scientific expertise centers on development & characterization of advanced functional materials and related devices for diverse applications in the power and energy sector; Deeply invested in applying social science research to develop mentoring networks for undergraduate students in STEM fields of study.

EDUCATION

Ph.D. in Chemical Engineering, Northeastern University, Boston **June 2014**
Thesis: *Pathways for tailoring the magnetostructural phase transition in FeRh-based systems*

M.S. in Chemical Engineering, Northeastern University, Boston **June 2011**
Thesis: *Magnetic signature of structural asymmetry in* $La_{0.67}Sr_{0.33}MnO_3$ *thin films*

M.S. in Biotechnology, University at Buffalo, The State University of New York **December 2007**
Thesis*: Determination of volatile organic compounds in biological fluids & tissues using headspace solid-phase microextraction in conjunction with gas chromatography*

B.S. in Chemical Engineering, Visveswaraiah Technological University, India **July 2004**

PROFESSIONAL EXPERIENCE

- Assistant Professor, Virginia Commonwealth University, Richmond, VA — Start Date: January 2019
- Affiliate Assistant Professor, Northeastern University, Boston, MA — November 2018 – Present
- Adjunct Faculty, Simmons College, Boston, MA — June 2018 - Present
- Visiting Research Scientist, Ames Laboratory, Ames, IA — October 2016 - May 2018
- Postdoctoral Research Scientist, Northeastern University, Boston, MA — July 2014 – December 2017
- Graduate Research Assistant, Northeastern University, Boston, MA — September 2008 - April 2014
- Graduate Teaching Assistant, University at Buffalo, Buffalo, NY — September 2005 - June 2007
- Process Scale-up Engineer, Akzonobel Coatings, India — May 2004 - July 2005

AWARDS AND HONORS

- Outstanding Dissertation in Magnetism Research Award, American Physical Society (Topical Group in Magnetism and its Applications, GMAG), 2014.
- Excellence in Research Award, College of Engineering, Northeastern University, 2014.
- Travel Grant Award to attend the 58th Annual Magnetism & Magnetic Materials Conference in Denver, IEEE Magnetics Society, 2013.
- Student Travel Grant Award to attend the IEEE Magnetic Society Summer School in Dresden (Germany), IEEE Magnetics Society, 2010.
- "Mark Diamond Research Grant" awarded for conducting part of Graduate Research, University at Buffalo, 2006.
- Western New York Scholarship for Occupational Safety, Western New York Safety Council, 2006.
- Best Oral Presentation Award for Undergraduate Research, IIChE chapter of Rashtra Vidyalaya College of Engineering in India, 2004.

PATENTS & DISCLOSURES

- L.H. Lewis, R. Barua, M. J. Kramer and R. W. McCallum, Provisional patent application (#62/518, 856), "*Iron Aluminium Boride-based materials for thermomagnetic energy management applications*".
- L.H. Lewis and R. Barua, Provisional patent application (#62/008, 573), "*Thermal management and waste heat energy harvesting using hybrid magnetostructural systems*".

ACADEMIC PUBLICATIONS

- **R. Barua**, G. Stephens, X. Zhang, B. Lejeune and L.H. Lewis, "*Pressure-tuned magnetocaloric effect in $AlFe_2B_2$*" (Manuscript in preparation)
- R. Ott, E. L. Levin, B. Jensen, **R. Barua**, B. Lejeune, R. W. McCallum, M. J. Kramer and L.H. Lewis, "*Combinatorial bulk synthesis of intermetallic borides using additive manufacturing technology*" (Manuscript in preparation)
- B. Lejeune, **R. Barua**, M. J. Kramer and L.H. Lewis, "*An empirical model to predict the magnetofunctional response of elementally-substituted AlT_2B_2 compounds*" (Manuscript under review, J. Magn. And Mag. Matl.)
- **R. Barua**, B. Lejeune, E. L. Levin, R. W. McCallum, M. J. Kramer and L.H. Lewis, "*Enhanced magnetocaloric effect and tunable magnetic properties in Ga- and Ge-substituted compositional variants of $AlFe_2B_2$ alloys*", J. Alloys and Comp. 777, 1030, 2019.
- **R. Barua**, P. Taheri, A. Koblischka-Veneva, M. Koblischka, L. Jiang and V. Harris, "*Giant Enhancement of Magnetostrictive Response in Directionally-Solidified $Fe_{83}Ga_{17}Er_x$ Compounds.*", Materials, 11(6), 1039, 2018

- B. Lejeune, X. Du, **R. Barua**, J. C. Hao and L.H. Lewis, "*Anisotropic thermal properties of $AlFe_2B_2$ single crystals*", Materilia 1, 150, 2018
- E. L. Levin, B. Jensen, **R. Barua**, B. Lejeune, R. W. McCallum, M. J. Kramer and L.H. Lewis, "*Effects of Al content and annealing on the phases formation, lattice parameters, and magnetization of alloys*", Phys. Rev. Matl. 2(3), 033403, 218
- **R. Barua**, B. Lejeune, E. L. Levin, R. W. McCallum, M. J. Kramer and L.H. Lewis, "*Anisotropic effects in the functional response of $AlFe_2B_2$*", J. Alloys and Comp. 745, 505, 2018
- W. Shengyun, Y. Ping, C. Zhang, **R. Barua**, S. Zijuan and V. Harris, *"An insight into formation mechanism of rapid chemical Co-precipitation for synthesizing yttrium iron garnet nano powders"*, Matl. Chem, and Phys. 208, 169, 2018
- M. Loving, **R. Barua**, C. LeGraet, C. Kinane, D. Heiman, S. Langridge, C. Marrows and L. H. Lewis, "*Strain-tuning of the Magnetocaloric Transition Temperature in Model FeRh Films*" Invited Paper, J. Phys. D.: Appl. Phys. 51(2), 024003, 2018
- B. Lejeune, **R. Barua**, A. Gabay, G. Hadjipanayis and L. H. Lewis, "*Engineering tetragonality in Fe_5SiB_2 compounds*", J. Alloys and Comp. 731, 995, 2018.
- E. Stern-Taulats, **R. Barua**, L. H. Lewis, L. Mañosa, A. Planes, S. Pramanick and S. Majumdar, "*Multicaloric effects in $Fe_{49}Rh_{51}$*", Phys. Rev. B. 94, 104494, 2017.
- K. Korolev, **R. Barua**, Y. Chen and V. Harris, "*Millimeter wave transmittance/ absorption measurements on micro- and nano -hexaferrites*", AIP Advances 7, 10.1063, 2017.
- **R. Barua**, I. Mc. Donald, F. Jimenez-Villacorta, D. Heiman, and L.H. Lewis, "*Multivariable tuning of the magnetostructural phase transformation process in a Ni-modified FeRh compound*", J. Alloys and Comp. 689, 1044, 2016.
- L.H. Lewis, **R. Barua** and B. Lejeune, "*Developing a new magnetofunctional compound: Coupled magnetic and structural phase changes in $AlFe_2B_2$*", J. Alloys and Comp. 650, 482, 2015.
- P. Taheri, **R. Barua**, M. Zamanpour, Y. Chen and V. Harris, "M*agnetostrictive properties of mechanically alloyed $Fe_{81}Ga_{19}$*", J. Alloys and Comp. 661, 306, 2015.
- **R. Barua,** "*Fundamentals of kinetics of phase transformations: An overview of nucleation and growth mechanisms in metals and alloys*" Invited article, Annual Newsletter of the Indian Thermal Analysis Society (ITAS), December Issue, 2014.
- **R. Barua**, F. Jimenez-Villacorta, and L.H. Lewis, "*Towards tailoring the magnetocaloric behavior of chemically-modified FeRh alloys*", J. Appl. Phys. 115, 17A903, 2014.
- **R. Barua**, F. Jimenez-Villacorta, and L.H. Lewis, "*Predicting magnetostructural trends in FeRh-based ternary alloys*", Appl. Phys. Lett. **103**, 102407, 2013.
- **R. Barua**, F. Jimenez-Villacorta, J. E. Shield, D. Heiman, and L.H. Lewis, "*Nanophase stability in granular FeRh-Cu system*", J. Appl. Phys. **113**, 17B523, 2013.

- **R. Barua**, X. Jiang, F. Jimenez-Villacorta, J. E. Shield, D. Heiman, and L.H. Lewis, "*Tuning the magnetostructural properties of FeRh nanocomposites*", J. Appl. Phys. **113**, 023910, 2013.
- **R. Barua**, D. Heiman, and L.H. Lewis, "*Magnetic signature of symmetry reduction in epitaxial $La_{0.67}Sr_{0.33}MnO_3$ films*", Appl. Phys. Lett. **99**, 062501, 2011.
- H. G. Johnson, S. P. Bennett, **R. Barua**, L.H. Lewis, and D. Heiman, "*Universal properties of linear magnetoresistance in strongly disordered MnAs-GaAs composite semiconductors*", Phys. Rev. **B 82** 085202, 2010.
- **R. Barua**, L. Chi, R. Fitzpatrick, D. Gillard, and P.J Kostyniak, "*Determination of volatile organic compounds in biological samples using headspace solid-phase microextraction and gas chromatography: toluene and styrene*", J. Anal. Tox. **32**, 379, 2008.

SEMINARS & PRESENTATIONS

Over 50 presentations at international conferences, industrial seminars and research institutes. Only **invited oral presentations** are highlighted below:

- **R. Barua**, "*Processing of intermetallic alloys using Directed Energy Deposition (DED) additive manufacturing technique*", presented at Carpenter Technologies, Reading PA, May 16th 2018.
- **R. Barua**, "*Prospects of intermetallic borides for thermal management applications*", presented at Alfred University, Alfred NY, March 13th 2018.
- **R. Barua**, "*Multivariable tuning & optimization of the functional response in layered intermetallic compounds*", presented at Rochester Institute of Technology, Rochester NY, March 8th 2018.
- **R. Barua**, "*New Ideas and New Materials for Solid State Cooling*", presented at Jawaharlal Nehru University (JNU), New Delhi, India, January 19th 2018.
- R. Barua, "*Tailoring intermetallic alloys for thermal management applications: Effects of processing, composition and strain*", presented at Nanyang Technological University (NTU), Singapore, December 29th 2017.
- **R. Barua**, "*Recent advances in processing advanced functional materials for clean energy applications*", presented at Analog Devices, Wilmington, Massachusetts, August 19th 2016.
- **R. Barua**, "*Layered magnetofunctional materials systems for clean energy applications*", presented at Simmons College, Boston, Massachusetts, April 16th 2016.
- P. Taheri, **R. Barua**, Y. Chen, A. Koblischka, M. Koblischka, L. Jiang and V. G. Harris, "*Enhanced magnetostriction in Er-doped FeGa compounds*", presented at the 13th Joint MMM-Intermag Conference, San Diego, California, January 15th 2016.
- **R. Barua** and L. H. Lewis, "*Exploring novel magnetocaloric compounds: Coupled structural and magnetic phase changes in 1-2-2 type intermetallic compounds*", presented at the Workshop on Advancing Caloric Materials for Efficient Cooling (ACME), University of Maryland at College Park, April 28th 2015.

- **R. Barua**, "*Thermal management using magnetocaloric materials*", presented at Rogers Corporation, Burlington, Massachusetts, June 20th 2014.
- **R. Barua,** "*Predicting the FeRh magnetostructural transition response – Old material, new tricks*", presented at University of Massachusetts at Dartmouth, March 11th 2014.
- **R. Barua,** "*Pathways for tailoring the magnetostructural response of FeRh-based systems*", presented at the 2014 American Physical Society (APS) March Meeting, Denver, CO, March 7th 2014.

PROFESSIONAL & OUTREACH ACTIVITIES

- Editor, IEEE Magnetics Transactions (Intermag Conference Publications), 2017-Present
- Editorial Board Member, IEEE Magnetics Letters, 2017-Present
- Local Treasurer, 2019 IEEE Magnetics Society Summer School to be held at Virginia Commonwealth University, June 2-7, 2019
- Session Chair, "*Soft Magnetic Materials Session*", Joint Intermag-MMM Conference Washington DC, January 14-19 (2019)
- Secretary, Boston Chapter of IEEE Magnetics Society, July 2015-August 2018
- Session Chair, "*Magnetocaloric Materials Session*", International Conference on Magnetism (ICM), San Francisco, July 15-20 (2018)
- Session Chair, "*Microwave & Magnetocaloric Materials*", Magnetism and Magnetics Materials Conference (MMM), New Orleans, November 1-4 (2016)
- Poster Judge, Student Poster Session, American Association for Advancement of Science (AAAS) Conference, Boston, February 17-19 (2017)
- Reviewer: Journal of Applied Physics, Journal of Alloys and Compounds, Journal of magnetism & magnetic Materials IEEE Transactions On Magnetics, IEEE Magnetics Letters, Journal of Materials Chemistry, Journal of Superconductivity, Journal of Analytical Toxicology & AIP Advances.
- Member: Institute of Electrical & Electronic Engineers (IEEE), American Physical Society (APS), Materials Research Society (MRS)