

**B. Reeja Jayan, Curriculum Vitae**  
Associate Professor, Carnegie Mellon University  
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### **A. EDUCATION/TRAINING**

**Postdoctoral Training, Chemical Engineering** 6/1/2013-5/31/2015  
Massachusetts Institute of Technology (MIT), USA  
**Advisor:** Prof. Karen K. Gleason

**Ph.D., Materials Science and Engineering** 6/1/2008-8/1/2012  
The University of Texas at Austin (UT-Austin), USA  
*Certification in the Graduate Portfolio Program in Nanoscience and Nanotechnology*  
**Advisor:** Prof. Arumugam Manthiram

M.S., Electrical Engineering 8/15/2006-6/1/2008  
The University of Texas at Austin (UT-Austin), USA  
**Advisors:** Prof. Miguel Jose Yacaman, Prof. Sanjay K. Banerjee

B.Tech., Electronics and Telecommunication Engineering 8/1/1998-5/1/2002  
University of Kerala, India

### **B. SELECTED AWARDS AND HONORS**

CMU Engineering Dean's Early Career Fellow	2020
54 <sup>th</sup> Annual Keynote Speaker, International Microwave Power Institute (IMPI)	2020
Invited attendee at Roundtable on Biomedical Engineering Materials and Applications (BEMA), U.S. National Academy of Engineering (NAE)	2020
U.S. Department of Energy (DOE) Faculty Research Program Participant - National Energy Technology Laboratory (NETL), ORISE/ORAU	2020
Faculty Fellow, Scott Institute for Energy Innovation	2019
George Tallman Ladd Research Award	2019
National Science Foundation (NSF) CAREER Award	2018
Army Research Office (ARO) Young Investigator Award	2017
Pittsburgh Magazine 40 Under 40 Award	2017
The Incline Who's Next: Technology Award – 18 People Transforming Pittsburgh	2017
Donald L. and Rhonda Struminger Faculty Fellow in Mechanical Engineering	2017
Berkman Faculty Development Fund	2017
Air Force Office of Scientific Research (AFOSR) Young Investigator Award	2016
Wimmer Faculty Fellowship	2016
MIT IMPACT Fellow	2015
Doctoral Fellowship, American Association of University Women (AAUW)	2010
Cockrell School of Engineering Student Leadership Award, UT-Austin	2010
Mike Hogg Endowed Doctoral Fellowship, UT-Austin	2010
H.H. The Maharaja of Cochin Endowment Prize, University of Kerala, India	2002

### **C. PERSONAL STATEMENT**

I direct the Far-From-Equilibrium Materials Laboratory (FEMLAB) at Carnegie Mellon University that pursues a multi-faceted approach to investigate the effect of electromagnetic (EM) fields in materials processing. In particular, we are developing a combined experimental, computational, and data-driven approach for exploring the potentially non-thermal physics occurring under field excitation. In the long-term our goal is to harness external fields to synthesize materials that access regions of the free energy/phase space diagram, hitherto unavailable to conventional synthesis routes. One goal is applying EM fields to engineer a novel platform that additively manufactures or “3D prints” ceramics at low temperatures. Another long-term goal is to establish a world-class research group that can precisely engineer a broad palette of materials and architectures using EM fields. For instance, low temperature processing can be extended to delicate materials such as polymers and can even realize novel polymer-ceramic and metal-ceramic composites. These efforts are supported by the shared Chemical Vapor Deposition (CVD) polymerization facility I direct at CMU, which can grow over 70 polymer chemistries ranging from dielectric to highly conducting. Finally, our low temperature methods allow for direct processing of such hybrid, multifunctional material assemblies on flexible, light-weight substrates for technologies related to energy storage and sensing.

I have over 13 years of experience applying solution and gas phase synthesis methods for molecular scale engineering of multifunctional ceramic and polymeric thin film materials. We were honored to have our work in these areas published in a number of journals including Nature Scientific Reports, Journal of Materials Chemistry A, Macromolecules, Journal of Physical Chemistry C, Advanced Energy Materials, Additive Manufacturing, Advanced Engineering Materials and cited over 1152 times. I have multidisciplinary training in electrical and computer engineering (ECE), electromagnetics, materials science, mechanical, and chemical engineering. My dual ECE and materials background helps our lab to combine electromagnetics engineering with the thermodynamics of materials processing and multiscale material structure characterization to bring a unique perspective to field-assisted materials synthesis. My Ph.D. work pioneered the use of electromagnetic fields for crystallizing ceramic films at low temperatures. In my independent career, my research group has obtained experimental evidence of away from equilibrium field-assisted effects: high-resolution synchrotron x-ray studies demonstrating the first experimental evidence that microwave fields stabilize a different phase(s) in ceramic oxides like  $ZrO_2$  and  $TiO_2$ , compared to conventional, high temperature furnace based synthesis.

By organizing seminal workshops, symposia, and authoring multiple review articles, I have also led the efforts to establish a multidisciplinary community spanning experimental and theoretical/computational research groups from academia, government labs, and industry to collaboratively identify the fundamental mechanisms behind away from equilibrium, non-thermal, chemical, and phase transformations under external fields. My multidisciplinary background is also critical to the machine learning initiative in my lab, which supports the CMU vision to continue to foster exceptional collaborations between the colleges of engineering and computer science. CMU's leading computer science program and the top machine learning department in the country are also integral to the success of my research program.

## **D. POSITIONS AND EMPLOYMENT**

**Associate Professor, Mechanical Engineering** 7/1/2020-  
*Courtesy appointments in Materials Science and Engineering, Chemical Engineering, Electrical and Computer Engineering*  
Carnegie Mellon University (CMU), USA

**Assistant Professor, Mechanical Engineering** 8/1/2015-6/30/2020  
*Courtesy appointments in Materials Science and Engineering, Chemical Engineering, Electrical and Computer Engineering*  
Carnegie Mellon University (CMU), USA

**Postdoctoral Associate** 6/1/2013-5/31/2015  
Chemical Engineering, MIT  
*Synthesis of functional and conformal polymer films by Chemical Vapor Deposition (CVD) polymerization for hybrid silicon photovoltaics and three-dimensional (3D) lithium ion battery architectures. Successfully led multi-disciplinary and multi-university collaborative projects.*

**Postdoctoral Fellow** 8/1/2012-5/31/2013  
Energy Frontier Research Center (DOE-EFRC), UT-Austin  
*Experimental investigation of charge separation and transfer at organic-inorganic interfaces in hybrid polymer photovoltaic devices.*

**Graduate Research Assistant** 6/1/2008-7/31/2012  
Materials Science and Engineering, UT-Austin  
*Microwave-assisted, low-temperature synthesis of thin films. Surface modification of lithium ion battery electrode surfaces for enhanced electrochemical performance.*

**Graduate Teaching Assistant** 1/1/2008-5/31/2008  
Electrical and Computer Engineering, UT-Austin  
*Assisted in teaching undergraduate courses on Solar Conversion Devices and Solid State Electronics.*

**Graduate Research Assistant** 8/19/2006-1/1/2008  
Electrical and Computer Engineering, UT-Austin  
*Synthesis and characterization of ZnO nanostructures for optoelectronic devices*

**Spacecraft Integration Scientist** 2/1/2004-8/1/2006  
Indian Space Research Organization (ISRO), Bangalore, India  
*Investigation of materials for electromagnetic and electrostatic shielding of telecommunication sub-systems on spacecrafts.*

**Software Engineer** 4/1/2002-1/31/2004  
Technopark, Kerala, India  
*Development of telecommunication software for optical wireless networks*

## **E. PROFESSIONAL MEMBERSHIPS AND LEADERSHIP**

### **Professional Affiliations**

- **Materials Research Society (MRS)** - member and meeting symposium organizer (2018), MRS Bulletin volume organizer (January 2021)
- **American Ceramics Society (ACerS)** - member of MS&T conference Programming Committee for the Electronics Division (EDiv), Medal for Leadership in the Advancement of Ceramic Technology Award Committee
- **American Institute of Chemical Engineers (AIChE)** - member and co-chair of T9 Sensors Topical

### **Peer Reviewer of Manuscripts & Conference Abstracts**

*Scientific Reports (Nature), Applied Physics Letters (APL), Journal of the American Ceramics Society, Ceramics International, Solid State Ionics, ACS Applied Materials and Interfaces, Macromolecules, Solar Energy Materials and Solar Cells, Thin Solid Films, Energy Harvesting and Systems, ACS Sustainable Chemistry & Engineering, Journal of Nanoparticle Research, Nanoscience and Nanotechnology Letters, International Journal of Physical Sciences, MRS Symposia proceedings, IEEE Recent Advances in Intelligent Computational Systems (RAICS), American Institute of Chemical Engineers (AIChE) abstracts and symposia*

### **Peer Reviewer of Research Grants**

- Department of Defense (DoD) Reviewer – Vannevar Bush Faculty Fellowship
- Air Force Office of Scientific Research (AFOSR) peer-review
- National Science Foundation (NSF) Panel Reviewer, Graduate Research Fellowship Program (GRFP)
- NSF Panel Reviewer for multiple programs –
  - Energy for Sustainability, Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET)
  - Innovations at the Nexus of Food, Energy, Water Systems (INFEWS)
  - Materials Engineering and Processing (MEP) and Major Research Instrumentation (MRI) - Civil, Mechanical and Manufacturing Innovation (CMMI)
- NSF ad-hoc reviewer for Division of Materials Research (DMR)
- Elected member of Users' Executive Committee (UEC) for photon sciences at Brookhaven National Laboratory (Department of Energy DOE)

### **Editorial Roles**

- Associate Editor, **Science Advances**, Journal published by the American Association for the Advancement of Science (AAAS), since January 2019.
- Associate Technical Editor - **MRS Bulletin**, Flagship journal of the Materials Research Society (MRS), 2012-2015.

### **Leadership Role in Professional Societies**

- Symposium Chair - Machine Learning for Discovery of Structure-Process-Property Relations in Electronic Materials, Fall 2020 Materials Science & Technology Conference & Exhibition (MS&T20), Pittsburgh, PA, USA, 4 Oct-8 Oct 2020.
- Symposium Chair - Electromagnetic Fields in Materials Synthesis: Far From Equilibrium Effects, Fall 2018 MRS Meeting, Boston, MA
- Area Chair, Co-Chair Technical program committee member, technical reviewer, and session Chair, Co-Chair, Topical Conference: Sensors program at the Annual Meeting of the American Institute of Chemical Engineers (AIChE), 2015-present
- Science reporter, MRS Meeting Scene e-newsletters, 2011  
*Reports emailed to over 16000 members worldwide*
- Special contributor - MRS Bulletin, 2011
- Founding President - MRS Student Chapter at UT-Austin, 2009-2010

### Other Research Leadership Activities

- Lead organizer - Workshop on Electromagnetic Effects in Materials Synthesis – sponsored by NSF, ONR, and several industry partners, 5-6 June 2017
- Panelist (Multifunctional Fibers) - Greater Philadelphia Smart Fabrics Conference, Drexel University, 2017
- Advisory committee member, International Conference on Advances in Materials and Manufacturing Applications (IConAMMA-2016), Amrita Vishwa Vidyapeetham University, India.
- Co-founder - MIT Think Tank (<http://thinktank.mit.edu/>), 2013-2015  
*MIT Think Tank is an organization promoting inter-disciplinary problem solving*
- Postdoctoral advisory committee member – MIT Innovation Initiative, 2013-2015

## **F. SCIENTIFIC CONTRIBUTIONS: PUBLICATIONS, PATENT APPLICATIONS AND PRESENTATIONS**

### **Peer-Reviewed Journal Articles** (\* denotes shared first-authorship)

**Number of Citations:** 1152, **h-index:** 15, Google Scholar, 16 July 2020

<https://scholar.google.com/citations?user=NNSeBe4AAAAJ&hl=en>

*Students and postdocs advised at CMU are underlined.*

1. **N. Nakamura, L. Su**, J. Bai, S. Ghose, B. Reeja-Jayan, “In-Situ Synchrotron Pair Distribution Function Analysis to Monitor Synthetic Pathways Under Electromagnetic Excitation,” *Journal of Materials Chemistry A*, in press (2020). ***Invited article for 2020 Emerging Investigators Themed Issue.***

**Synopsis:** *We experimentally demonstrate that the application of electromagnetic (EM) fields influence ceramic nanoparticle synthesis via distortions introduced in the local atomic structure. Such distortions do not occur during conventional hydrothermal synthesis. A critical limitation of prior studies was the inability to monitor structural changes while the EM field was applied, resulting in a lack of information about dynamic, field-driven changes in local atomic structure. We used a custom-designed microwave reactor enabling in-situ synchrotron x-ray pair distribution function analysis. This configuration allows us to monitor EM field-induced changes in atomic structure in real-time during synthesis of metal oxides. Specifically, we find that the enhanced growth of crystalline rutile SnO<sub>2</sub> nanoparticles during EM field exposure is predated*

by structural reordering of the oxygen sub-lattice. In contrast, nanoparticles synthesized under conventional hydrothermal (high temperature) conditions exhibit no such structural changes and experience limited particle growth compared with EM field-assisted conditions.

2. **L. Su, S. K. Jha**, X. L. Phuah, J. Xu, **N. Nakamura**, H. Wang, J. S. Okasinski, and B. Reeja-Jayan, "Engineering Lithium-ion Battery Cathodes for High-Voltage Applications Using Electromagnetic Excitation," *Journal of Materials Science*, in press (2020).
3. **E. M. Jimenez**, D. Ding, **L. Su**, A. R. Joshi, A. Singh, B. Reeja-Jayan, J. Beuth, "Parametric Analysis to Quantify Process Input Influence on the Printed Densities of Binder Jetted Alumina Ceramics," *Additive Manufacturing*, 100864, (2019).
4. D. Liu, **L. Su**, J. Liao, B. Reeja-Jayan, C. Majidi, "Rechargeable Soft-Matter EGaIn-MnO<sub>2</sub> Battery for Stretchable Electronics," *Advanced Energy Materials*, 9, 1902798 (2019).
5. **S. K. Jha, N. Nakamura, S. Zhang, L. Su, P. M. Smith**, X. L. Phuah, H. Wang, J. S. Okasinski, A. J. H. McGaughey, B. Reeja-Jayan, "Defect-mediated Anisotropic Lattice Expansion of Ceramics as Evidence for Non-thermal Coupling between Electromagnetic Fields and Matter," *Advanced Engineering Materials* 21, 1900762 (2019)

**Synopsis:** *Through a combination of in-situ and ex-situ experimental characterization, as well as molecular dynamics simulations, this paper demonstrates that electromagnetic fields like 2.45 GHz microwave radiation can induce away from equilibrium behavior in ceramic oxides like TiO<sub>2</sub> via a defect-mediated, field-driven, non-thermal effect. Specifically, anisotropic lattice expansion and de-crystallization (loss of long-range atomic order) under externally applied fields provide direct evidence for non-thermal coupling between external fields and matter. Understanding such non-thermal, field-driven processes has implications in engineering low temperature processes for integrating ceramics with delicate polymeric materials for flexible electronics and in tailoring ceramic properties for energy generation and storage applications.*

6. **M. R. Telmer**, M.S. Hilario, B.W. Hoff, M.T. Lanagan and B. Reeja-Jayan, "Anisotropy of W-band Complex Permittivity in Al<sub>2</sub>O<sub>3</sub>," *Journal of Physics: Condensed Matter*, **31**, 225702 (2019).
7. **N. Nakamura** and B. Reeja-Jayan, "Synchrotron X-ray Characterization of Materials Synthesized Under Microwave Irradiation," *Journal of Materials Research*, **34**, 194-205 (2019). **Invited review article for Early Career Scholars in Materials Science 2019.**
8. **S. K. Jha**, X.L. Phuah, J. Luo, C.P. Grigoropoulos, H. Wang, E. García, B. Reeja-Jayan, "The Effects of External Fields in Ceramic Sintering," *Journal of the American Ceramic Society*, **102**, 5-31 (2019). **Article was selected as front cover of journal for January 2019.**
9. A. Lassnig, **N. Nakamura**, T. Jörg, B. Reeja-Jayan, M. J. Cordill, "Molecularly Grafted, Structurally Integrated Multifunctional Polymer Thin Films with Improved Adhesion," *Surface and Coatings Technology*, **349**, 963-968 (2018).
10. **L. Su, P. M. Smith**, P. Anand, B. Reeja-Jayan, "Surface Engineering of a LiMn<sub>2</sub>O<sub>4</sub> Electrode Using Nanoscale Polymer Thin Films via Chemical Vapor Deposition Polymerization.," *ACS Applied Materials & Interfaces* **10**, 27063-27073 (2018).

11. **P. M. Smith**, **L. Su**, W. Gong, **N. Nakamura**, B. Reeja-Jayan, S. Shen, “Thermal Conductivity of Poly (3,4-ethylenedioxythiophene) Films Engineered by oxidative Chemical Vapor Deposition (oCVD),” *RSC Advances*, **8**, 19348-19352 (2018).
12. **N. Nakamura**, M. W. Terban, S. J. L. Billinge, B. Reeja-Jayan, “Unlocking the structure of mixed amorphous-crystalline ceramic oxide films synthesized under low temperature electromagnetic excitation,” *Journal of Materials Chemistry A* **5**, 18434-18441 (2017).

**Synopsis:** *This work used high-resolution synchrotron x-ray studies to demonstrate the first experimental evidence that 2.45 GHz microwave fields stabilize a different atomic structural arrangements or phase(s) in ceramics like TiO<sub>2</sub>, compared to conventional, high temperature furnace based synthesis. Substitutional and interstitial defects, lattice distortions, precipitates, grain boundaries, and pores created during microwave exposure disturb the strict periodic order of an ideal crystal. Scattering contributions due to such disorder will show up in the diffuse scattering, unlike sharp Bragg peaks which arise from periodicity. These structural differences are not detectable by conventional x-ray diffraction (XRD), as XRD is unable to provide quantitative analysis of the diffuse scattering from partially disordered and nanoscale materials. For such materials, real-space high-resolution x-ray pair distribution function (PDF) analysis is of significant interest because it enables structural characterization of both crystalline and non-crystalline materials by collecting data from both Bragg and diffuse scattering. This allows analysis of the crystal structure of our microwave-grown samples without assuming periodicity, enabling accurate characterization of internal and surface atomic packing, defects, and lattice strain. Our PDF results thus provided definitive proof that microwave fields can induce structural changes, leading to crystallization of ceramic oxides like TiO<sub>2</sub> at temperatures as low as 150 °C.*

13. **N. Nakamura**, **J. Seepaul**, J. Kadane, B. Reeja-Jayan, “Design for Low-Temperature Microwave-Assisted Crystallization of Ceramic Thin Films”, *Applied Stochastic Models in Business and Industry*, **33**, 314-321 (2017).
14. M. L. Castillo, A. Ugur, H. Sojoudi, **N. Nakamura**, Z. Liu, F. Lin, R. E. Brandt, T. Buonassisa, B. Reeja-Jayan, K. K. Gleason, “Organic Passivation of Silicon Through Multifunctional Polymeric Interfaces”, *Solar Energy Materials and Solar Cells*, **160**, 470-475 (2017).
15. D. H. Galvan, G. Alonso, M. Tejada, A. Torres, B. Reeja-Jayan, D. Ferrer, A., Posada-Amarillas, D. Barraza-Jimenez, and M. José-Yacamán, “Experimental and Theoretical Analyses of ZnO Nanoparticles Deposited onto Single-Wall Carbon Nanotubes,” *Fullerenes, Nanotubes and Carbon Nanostructures*, **24**, 541 (2016).
16. N. Chen, B. Reeja-Jayan, A. Liu, J. Lau, B. Dunn, and K. K. Gleason, “iCVD Cyclic Polysiloxane and Polysilazane as Nanoscale Thin-Film Electrolyte: Synthesis and Properties”, *Macromolecules Rapid Communications*, **37**, 446 (2016).
17. B. Reeja-Jayan, N. Chen, J. Lau, J. A. Kattirtzi, P. Moni, A. Liu, I. G. Miller, R. Kayser, A. P. Willard, B. Dunn, and K. K. Gleason, “A Group of Cyclic Siloxane and Silazane Polymer Films as Nanoscale Electrolytes for Microbattery Architectures”, *Macromolecules*, **48**, 5222 (2015).
18. B. Reeja-Jayan, K. A. Koen, R. J. Ono, D. A. Vanden Bout, C. W. Bielawski, and A. Manthiram, “Oligomeric Interface Modifiers in Hybrid Polymer Solar Cell Prototypes

- Investigated by Fluorescence Voltage Spectroscopy”, *Physical Chemistry Chemical Physics*, **17**, 10640 (2015).
19. N. Chen\*, B. Reeja-Jayan\*, J. Lau, P. Moni, A. Liu, B. Dunn, and K. K. Gleason, “Nanoscale, Conformal Polysiloxane Thin Film Electrolytes for Three-Dimensional Battery Architectures”, *Materials Horizons*, **2**, 309 (2015). **Article selected as back cover.**
  20. B. Reeja-Jayan, P. Moni, and K. K. Gleason, “Synthesis of Insulating and Semiconducting Polymer Films via Initiated Chemical Vapor Deposition”, *Nanoscience and Nanotechnology Letters*, **7**, 33 (2015). **Invited article for special issue on nanostructured functional polymers.**
  21. B. Reeja-Jayan, P. Kovacic, R. Yang, H. Sojoudi, A. Ugur, D. H. Kim, C. D. Petruczuk, X. Wang, A. Liu, and K. K. Gleason, “A Route towards Sustainability through Engineered Polymeric Interfaces”, *Advanced Materials Interfaces*, **1**, 1400117 (2014). **Invited review article, selected as frontispiece cover.**
  22. C. L. Wang, C. C. Wang, B. Reeja-Jayan, and A. Manthiram, “Low-cost, Mo(S,Se)<sub>2</sub>-free superstrate-type solar cells fabricated with tunable band gap Cu<sub>2</sub>ZnSn(S<sub>x</sub>Se<sub>1-x</sub>)<sub>4</sub> nanocrystal-based inks and the effect of sulfurization”, *RSC Advances*, **3**, 19946-19951 (2013).
  23. B. Reeja-Jayan, N. Folse, and A. Manthiram, “Development of Scalable, Low-cost Polymer Solar Cell Test Platform”, *Journal of Solar Energy Engineering*, **135**, 041004 (2013).
  24. B. Reeja-Jayan and A. Manthiram, “Effects of Bifunctional Metal Sulfide Interlayers on Photovoltaic Properties of Organic-Inorganic Hybrid Solar Cells”, *RSC Advances*, **3**, 5412-5421 (2013).
  25. B. Reeja-Jayan, T. Adachi, R. J. Ono, D. A. Vanden Bout, C. W. Bielawski, and A. Manthiram, “Effect of Interfacial Dipoles on Charge Traps in Organic-Inorganic Hybrid Solar Cells”, *Journal of Materials Chemistry A*, **1**, 3258-3262 (2013).
  26. B. Reeja-Jayan\*, K. L. Harrison\*, K. Yang, Chih-Liang Wang, A. Yilmaz, and A. Manthiram, “Microwave-assisted Low Temperature Thin Film Growth in Solution”, *Scientific Reports*, **2**, 1003 (2012). **Highlighted by the Materials Research Society (MRS) on their Materials360 Online news website.**
  27. B. Reeja-Jayan and A. Manthiram, “Understanding the Improved Stability of Hybrid Polymer Solar Cells Fabricated with Copper Electrodes”, *ACS Applied Materials & Interfaces*, **3**, 1492-1501 (2011).
  28. Jun Liu, Qiongyu Wang, B. Reeja-Jayan, and A. Manthiram, “Carbon-coated High Capacity Layered Li[Li<sub>0.2</sub>Mn<sub>0.54</sub>Ni<sub>0.13</sub>Co<sub>0.13</sub>]O<sub>2</sub> Cathodes”, *Electrochemistry Communications*, **12**, 750-753 (2010).
  29. Jun Liu, B. Reeja-Jayan, and A. Manthiram, “Conductive Surface Modification with Aluminum of High Capacity Layered Li[Li<sub>0.2</sub>Mn<sub>0.54</sub>Ni<sub>0.13</sub>Co<sub>0.13</sub>]O<sub>2</sub> Cathodes”, *Journal of Physical Chemistry C*, **114**, 9528-9533 (2010).
  30. B. Reeja-Jayan and A. Manthiram, “Influence of Polymer-Metal Interface on the Photovoltaic Properties and Long-term Stability of nc-TiO<sub>2</sub>-P3HT Hybrid Solar Cells”, *Solar Energy Materials and Solar Cells*, **94**, 907-914 (2010).
  31. S. Sepulveda-Guzman, B. Reeja-Jayan, E. De la Rosa, U. Ortiz-Mendez, C. Reyes-Betanzo, R. Cruz-Silva, and M. J. Yacaman, “Room-Temperature Deposition of Crystalline Patterned



ZnO Films by Confined Dewetting Lithography”, *Applied Surface Science*, **256**, 3386-3389 (2010).

32. S. Sepulveda-Guzman, B. Reeja-Jayan, E. de la Rosa, A. Torres-Castro, V. Gonzalez-Gonzalez, and M. J. Yacaman, “Synthesis of Assembled ZnO Structures by Precipitation Method in Aqueous Media”, *Materials Chemistry and Physics* **115**, 172-178 (2009). ***Selected as top 25 Hottest Articles published between January to March 2009.***
33. B. Reeja-Jayan, E. de la Rosa, S. Sepulveda-Guzman, R.A. Rodriguez, and M. J. Yacaman, “Structural Characterization and Luminescence of Porous Single Crystalline ZnO Nanodisks with Sponge-like Morphology”, *Journal of Physical Chemistry C* **112**, 240-246 (2008).
34. E. de la Rosa, S. Sepulveda-Guzman, **B. Reeja-Jayan**, A. Torres, P. Salas, N. Elizondo, and M. J. Yacaman, “Controlling the Growth and Luminescence Properties of Well-Faceted ZnO Nanorods”, *Journal of Physical Chemistry C* **111**, 8489-8495 (2007).

**Patents (Issued and Pending)** - *Students and postdocs advised at CMU are underlined.*

1. "Electrode Surface Engineering in Lithium Ion Batteries”, B. Reeja Jayan, **Laisuo Su**, US Patent Application Application # 16/886,948.
2. “Simplify Water Management of Catalyst Layer in Fuel Cells using Nanoscale Hydrophobic Polymer Coatings via Chemical Vapor Deposition Polymerization”, B. Reeja Jayan, **Laisuo Su**, Shawn E. Litster, M. Aman Uddin, Provisional Patent Application filed by CMU, Nov 27, 2018.
3. "Hybrid Materials, Devices, Software, and Platforms for Electrically Responsive Allergen Detection, Monitoring, and Processing", B. Reeja Jayan, Aarti Singh, Pulkit Grover, Provisional Patent Application filed by CMU, April 4, 2017.
4. “Development of Ultra-thin and Conformal Polymer Electrolyte for 3D Batteries”, N. Chen, B. Reeja-Jayan, B. Dunn, K. Gleason, US Patent Application #14/918,533
5. “Fabrication and Passivation of Silicon Surfaces”, R. Yang, B. Reeja-Jayan, T. Buonassisi, K. K. Gleason, **Issued U.S. Patent No. 9,656,294**
6. “Low Temperature Microwave-Assisted Thin Film Deposition”, B. Reeja-Jayan, K. L. Harrison, A. Manthiram, International Patent Application #PCT/US13/54888
7. "High Capacity Layered Oxide Cathodes with Enhanced Rate Capability", J. Liu , B. Reeja-Jayan, A. Manthiram, International Patent Application #PCT/US2011/026776

**Conference and Invited Presentations** - *Students and postdocs advised at CMU are underlined.*

**After the appointment at CMU**

- “Why Microwave-Heating is More than Just Heating,” *Invited Keynote Speaker*, 54th Annual Microwave Power Symposium, **International Microwave Power Institute (IMPI)**, 15 June 2020.
- “Engineering Far-From-Equilibrium Materials Using Electromagnetic Fields,” *Invited Speaker*, Basic Research Forum, **US Department of Defense**, 13 Feb 2020.

- “Engineering Materials Away from Equilibrium: 3D Printing Ceramics and Beyond,” *Invited Speaker*, Mechanical Engineering, **University of California, Berkeley**, 11 April 2019.
- “Engineering Materials Away from Equilibrium: 3D Printing Ceramics and Beyond,” *Invited Speaker*, **Lawrence Berkeley National Laboratory**, 12 April 2019.
- “Engineering Materials Away from Equilibrium: 3D Printing Ceramics and Beyond,” *Invited Speaker*, Mechanical and Aerospace Engineering, **Ohio State University**, 19 April 2019.
- “Engineering Materials Away from Equilibrium: 3D Printing Ceramics and Beyond,” *Invited Speaker*, Materials Science and Engineering, **Case Western Reserve University**, 15 April 2019.
- “Low Temperature Ceramic Crystallization via Electromagnetic Field Interactions at Interfaces”, *Invited talk in Rustum Roy Symposium, Materials Science & Technology Conference & Exhibition (MS&T18)*, Columbus, USA, 14 Oct-18 Oct 2018.
- "Low Temperature Ceramic Crystallization via Electromagnetic Field Interactions at Interfaces" **Invited Speaker, Gordon Research Conference on Solid State Studies in Ceramics**, Mount Holyoke College, 12-17 August 2018.
- “Electromagnetic Fields Coupling to Matter. How can we distinguish thermal and field effects?,” **Invited Seminar at US Naval Research Laboratory (NRL)**, Alexandria, Virginia, 10 July 2018.
- “Vapor Phase Engineering of Nanoscale Polymeric Interfaces to Reduce Electrode-Electrolyte Interactions in Lithium Ion Batteries,” **Invited Talk at European Materials Research Society (EMRS) Meeting**, Strasbourg, France, 17-20 June-12 2018.
- “Far-from-Equilibrium Structures and Processes using Electromagnetic Fields,” **Invited Speaker**, Texas Materials Institute, **The University of Texas at Austin**, 4 Jan 2018.
- “Electromagnetic Fields Coupling to Matter: How do we distinguish thermal and field effects for advanced manufacturing?,” **Invited Speaker**, Materials Science & Engineering, Advanced Technology Center, **Lockheed Martin Space Systems Company**, 12 Dec 2017.
- “Far-from-Equilibrium Structures and Processes using Electromagnetic Fields,” **Invited Speaker**, Materials Science & Engineering, **Massachusetts Institute of Technology**, 30 Nov 2017.
- “Mechanistic Insights into Low Temperature Ceramic Thin Film Growth and Crystallization Using Microwave Radiation”, **Invited Talk in Rustum Roy Symposium at MS&T17**, Pittsburgh, USA, 09 Oct-12 Oct 2017.
- “Far-from-Equilibrium Structures and Processes using Electromagnetic Fields”, **Invited Seminar at Shinshu University**, Nagano, Japan, 8 September 2017.
- Mariela Castillo, Asli Ugur, Hossein Sojoudi, **Nathan Nakamura**, Zhe Liu, Fen Lin, Riley E. Brandt, Tonio Buonassisi, B. Reeja Jayan, Karen K. Gleason “Organic Passivation of Silicon Through Multifunctional Polymeric Interfaces”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 27 Nov-2 Dec 2016.

- **Maxwell Telmer, Indorica Sutradhar, Bartłomiej Kolodziejczyk, B. Reeja-Jayan**, “Highly sensitive gluten sensing platform based on conducting polymers bio-functionalized with gluten antibodies”, *Annual Meeting of the American Institute of Chemical Engineers (AIChE)*, San Francisco, USA, 13-18 Nov 2016.
- “Engineering Ceramic, Polymer, and Hybrid Thin Film Nanomaterials and Interfaces”, **Invited Seminar at Anton Para Inc.**, Graz, Austria, 8 August 2016.
- “Molecular Scale Engineering of Materials for Structurally Integrated Energy Applications”, **Invited Seminar at US Army Research Laboratory (ARL)**, Aberdeen, Maryland, 9 June 2016.
- “Molecular Scale Engineering of Hybrid Thin Film Materials for Energy Applications”, **Invited Seminar at Royal Institute of Technology**, Stockholm, Sweden, 14 March 2016.
- “Molecular Scale Engineering of Hybrid Thin Film Materials for Energy Applications”, **Invited Seminar in Mechanics and Materials at Swiss Federal Institute of Technology in Zurich**, Switzerland, 10 March 2016.
- “Molecular Scale Engineering of Hybrid Thin Film Materials for Energy Storage”, **Invited Seminar at General Motors Battery Systems Group**, 26 Oct 2015.
- “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at Indian Institute of Science (IISc)**, Chemical Engineering Seminar, 9 July 2015.

#### **Before the appointment at CMU**

1. **B. Reeja-Jayan**, A. Ugur, M. L. Castillo, T. Buonassisi, and K. K. Gleason, “Surface Passivation of Silicon Solar Cells Using Polymeric Interfaces”, Annual Meeting of the American Institute of Chemical Engineers (AIChE), Salt Lake City, USA, 9 Nov-13 Nov 2015.
2. “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at Boston University**, ME and MSE Seminar Series, 25 Feb 2015.
3. “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at Carnegie Mellon University**, Mechanical Engineering Seminar Series, 12 Feb 2015.
4. “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at Columbia University**, Chemical Engineering Seminar, 3 Feb 2015.
5. “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at the North Carolina State University**, Chemical and Biomolecular Engineering Seminar Series, 23 Jan 2015.
6. **B. Reeja-Jayan**, A. Ugur, M. L. Castillo, T. Buonassisi, and K. K. Gleason, “Surface Passivation of Inorganic Substrates by Multifunctional Polymeric Interfaces”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 30 Nov-5 Dec 2014. (**Talk selected as meeting highlight in MRS Meeting Scene e-newsletter**)

7. **B. Reeja-Jayan**, N. Chen, J. Lau, P. Moni, A. Liu, B. Dunn, K. K. Gleason, “Ultra-thin, Conformal Polymer Electrolyte for Three-Dimensional Battery Architectures”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 30 Nov-5 Dec 2014.
  8. “Engineering Thin Film Materials and Interfaces for Flexible, Miniaturized Energy Devices”, **Invited Seminar at the Washington State University**, Mechanical and Materials Engineering Seminar Series, 30 Oct 2014.
  9. “Engineering Hybrid Polymeric Interfaces for Energy Harnessing and Storage”, **Invited Seminar at the University of Connecticut**, Nano Energy Seminar Series, 27 Jun 2014.
  10. “Initiated Chemical Vapor Deposition of Electron and Ion Conducting Polymer Films”, **Invited Speaker** at Fikile Brushett research group, Chemical Engineering, **Massachusetts Institute of Technology**, 10 Apr 2014.
  11. **B. Reeja-Jayan**, K. L. Harrison, K. Yang, Chih-Liang Wang, A. Yilmaz, and A. Manthiram, “Experimental and Computational Insights into Microwave-assisted Low-temperature Growth of Thin Films in Solution”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 2-5 Apr 2013.
  12. Addressing Fundamental and Technological Challenges in Organic-Inorganic Hybrid Solar Cells”, **Invited Speaker** at Rene Janssen research group, Department of Chemistry and Physics, **Eindhoven University of Technology, Netherlands**, 21 Dec 2012.
  13. “Effect of Interfacial Dipoles on Charge Traps in Organic-Inorganic Hybrid Solar Cells”, Invited Speaker at the **UT-Austin ERFC Annual Retreat**, 15 Dec 2012.
  14. **B. Reeja-Jayan** and A. Manthiram, “Influence of Bond Ionicity on Interfacial Energetics and Photovoltaic Properties of Nanostructured Solid State Hybrid Solar Cells”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 9-13 Apr 2012.
  15. **B. Reeja-Jayan**, K. L. Harrison, and A. Manthiram, “Low temperature, Microwave-assisted Deposition of Nanostructured Titanium Dioxide Networks for Flexible Thin Film Devices”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 28 Nov-2 Dec 2011.
  16. K. L. Harrison, **B. Reeja-Jayan**, and A. Manthiram, “Low Temperature Microwave-Assisted Solvothermal Synthesis of TiO<sub>2</sub> Thin Films”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 28 Nov-2 Dec 2011.
- “Organic-Inorganic Hybrid Solar Cells”, Invited Speaker for Materials Science & Engineering Graduate Student Seminar Series, **UT-Austin**, 21 Oct 2011.
  - **B. Reeja-Jayan** and A. Manthiram, “Understanding the Effect of Interfaces on the Photovoltaic Properties and Long-term Stability of TiO<sub>2</sub> based Hybrid Polymer Solar Cells”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 25-29 Apr 2011.
  - “Efficient, Stable Organic-Inorganic Hybrid Solar Cells”, Invited Speaker, **American Association of University Women (AAUW)**, Austin (Texas) *Branch Meeting*, 8 May 2010.
  - **B. Reeja-Jayan**, E. de la Rosa, S. Sepulveda-Guzman, R.A. Rodriguez, and M. J. Yacaman, “Oriented Attachment Driven Growth of Porous Single Crystalline ZnO Nanodisks with

Sponge-like Morphology”, *2<sup>nd</sup> International Meeting on Developments in Materials, Processing and Applications of Nanotechnology (MPA-2008)*, University of Cambridge, UK, 6-8 Jan 2008.

- S. Sepulveda-Guzman, E. de la Rosa, **B. Reeja-Jayan**, M. Ramirez, D. Ferrer, X. Gao, and M. J. Yacaman, “Synthesis of Assembled ZnO Structures by Precipitation Method in Aqueous Media”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 26-30 Nov 2007.

### **Contributed Conferences (Presentations after joining CMU are underlined)**

1. **B. Reeja-Jayan**, “Defect-Mediated Anisotropic Lattice Expansion in Ceramics as Evidence for Non-Thermal Coupling between Electromagnetic Fields and Matter”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 1 Dec-6 Dec 2019.
2. **B. Reeja-Jayan**, “Low Temperature Ceramics Processing Under Electromagnetic Fields - Decoupling Thermal and Field Effects”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 25 Nov-28 Nov 2018.
3. Mariela Castillo, Asli Ugur, Hossein Sojoudi, Nathan Nakamura, Zhe Liu, Fen Lin, Riley E. Brandt, Tonio Buonassisi, **B. Reeja-Jayan**, Karen K. Gleason “Organic Passivation of Silicon Through Multifunctional Polymeric Interfaces”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 27 Nov-2 Dec 2016.
4. Maxwell Telmer, Indorica Sutradhar, Bartłomiej Kolodziejczyk, **B. Reeja-Jayan**, “Highly sensitive gluten sensing platform based on conducting polymers bio-functionalized with gluten antibodies”, *Annual Meeting of the American Institute of Chemical Engineers (AIChE)*, San Francisco, USA, 13 Nov-18 Nov 2016.
5. **B. Reeja-Jayan**, “Manipulating Mechanical Behavior of Multi-scale Polymeric Thin Films Through Chemical Vapor Deposition (CVD)”, *Gordon Research Conference (GRC) - Thin Film & Small Scale Mechanical*, Bates College in Lewiston, ME USA, 24 July - 29 July 2016.
6. **B. Reeja-Jayan**, “Molecular Scale Engineering of Multifunctional Hybrid Thin Film Materials”, *Gordon Research Conference (GRC) - Multifunctional Materials and Structures*, Ventura, CA USA, 31 Jan - 5 Feb 2016.
7. **B. Reeja-Jayan**, A. Ugur, M. L. Castillo, T. Buonassisi, and K. K. Gleason, “Surface Passivation of Silicon Solar Cells Using Polymeric Interfaces”, *Annual Meeting of the American Institute of Chemical Engineers (AIChE)*, Salt Lake City, USA, 9 Nov-13 Nov 2015.
8. **B. Reeja-Jayan**, A. Ugur, M. L. Castillo, T. Buonassisi, and K. K. Gleason, “Surface Passivation of Inorganic Substrates by Multifunctional Polymeric Interfaces”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 30 Nov-5 Dec 2014. ***Talk selected as meeting highlight in MRS Meeting Scene e-newsletter.***
9. B. Reeja-Jayan, N. Chen, J. Lau, P. Moni, A. Liu, B. Dunn, K. K. Gleason, “Ultra-thin, Conformal Polymer Electrolyte for Three-Dimensional Battery Architectures”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 30 Nov-5 Dec 2014.
10. B. Reeja-Jayan, K. L. Harrison, K. Yang, Chih-Liang Wang, A. Yilmaz, and A. Manthiram, “Experimental and Computational Insights into Microwave-assisted Low-temperature Growth

of Thin Films in Solution”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 2-5 Apr 2013.

11. B. Reeja-Jayan and A. Manthiram, “Influence of Bond Ionicity on Interfacial Energetics and Photovoltaic Properties of Nanostructured Solid State Hybrid Solar Cells”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 9-13 Apr 2012.
12. B. Reeja-Jayan, K. L. Harrison, and A. Manthiram, “Low temperature, Microwave-assisted Deposition of Nanostructured Titanium Dioxide Networks for Flexible Thin Film Devices”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 28 Nov-2 Dec 2011.
13. K. L. Harrison, B. Reeja-Jayan, and A. Manthiram, “Low Temperature Microwave-Assisted Solvothermal Synthesis of TiO<sub>2</sub> Thin Films”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 28 Nov-2 Dec 2011.
14. B. Reeja-Jayan and A. Manthiram, “Understanding the Effect of Interfaces on the Photovoltaic Properties and Long-term Stability of TiO<sub>2</sub> based Hybrid Polymer Solar Cells”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 25-29 Apr 2011.
15. S. Sepulveda-Guzman, E. de la Rosa, B. Reeja-Jayan, M. Ramirez, D. Ferrer, X. Gao, and M. J. Yacamán, “Synthesis of Assembled ZnO Structures by Precipitation Method in Aqueous Media”, *Materials Research Society (MRS) Spring Meeting*, San Francisco, USA, 26-30 Nov 2007.
16. B. Reeja-Jayan, E. de la Rosa, S. Sepulveda-Guzman, R.A. Rodriguez, and M. J. Yacamán, “Oriented Attachment Driven Growth of Porous Single Crystalline ZnO Nanodisks with Sponge-like Morphology”, *2<sup>nd</sup> International Meeting on Developments in Materials, Processing and Applications of Nanotechnology (MPA-2008)*, University of Cambridge, UK, 6-8 Jan 2008.

#### **Conference Presentations by Students, Postdocs Advised at CMU**

1. **N. Nakamura**, **L. Su**, H. Wang, S. K. Jha, H. Wang, S. J. L. Billinge, C. S. Hellberg, B. Reeja-Jayan, “X-ray Synchrotron Investigations of the Away from Equilibrium Crystallization of ZrO<sub>2</sub> under Electromagnetic Excitation”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 1 Dec-6 Dec 2019.
2. **L. Su**, J. Weaver, M. Groenenboom, B. Reeja-Jayan, “Tailoring Electrode-Electrolyte Interfaces in Lithium-Ion Batteries Using Molecularly Engineered Functional Polymers”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 1 Dec-6 Dec 2019.
3. **N. Nakamura**, E. Culbertson, H. Wang, H. Wang, C. S. Hellberg, S. J. L. Billinge, B. Reeja-Jayan, “The Role of Defects in Microwave-Assisted Synthesis of Cubic ZrO<sub>2</sub>”, *Electric Field Enhanced Processing of Advanced Materials II: Complexities and Opportunities*, Tomar, Portugal, 10 Mar-15 Mar 2019.
4. **N. Nakamura**, E. Culbertson, S. J. L. Billinge, B. Reeja-Jayan, “Low-Temperature Phase Transitions in Ceramic Oxides via Electromagnetic Field Exposure”, *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 25 Nov-28 Nov 2018.
5. **S. K. Jha**, N. Nakamura, L. Su, J. S. Okasinski, and B. Reeja-Jayan, "In Situ X-Ray Diffraction Study to Measure Local Temperature During Microwave Radiation-Assisted Synthesis", *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 25 Nov-28 Nov 2018.

6. **L. Su**, B. Reeja-Jayan. “Improving Both Rate Capability and Cycling Stability of LiCoO<sub>2</sub> by Polymer Coatings via One-Step Chemical Vapor Deposition Polymerization Techniques”, *Materials Research Society (MRS) Fall Meeting* Boston, MA, 25 Nov-30 Nov 2018.
7. **N. Nakamura**, E. Culbertson, S. J. L. Billinge, B. Reeja-Jayan, “Electromagnetic Field Effects on Atomic Structure in Ceramic Oxide Thin Films”, *Materials Science & Technology Conference & Exhibition (MS&T18)*, Columbus, USA, 14 Oct-18 Oct 2018.
8. **M. Telmer**, N. Nakamura and B. Reeja-Jayan “Characterizing the Role of Thin Film Interfaces in Field-Assisted Materials Processing”, *Materials Research Society (MRS) Fall Meeting*, Boston, MA, USA, 25 Nov-28 Nov 2018.
9. **P.M. Smith**, L. Su, W. Gong, N. Nakamura, B. Reeja-Jayan, S. Shen, "Thermal Conductivity of Poly (3,4-ethylenedioxythiophene) Films Engineered by oxidative Chemical Vapor Deposition (oCVD)", *Materials Science & Technology Conference & Exhibition (MS&T18)*, Columbus, USA, 14 Oct-18 Oct 2018.
10. **L. Su**, P.M. Smith, B. Reeja-Jayan. “Surface Engineering LiMn<sub>2</sub>O<sub>4</sub> Electrodes via Chemical Vapor Deposition Polymerization”, *Materials Science & Technology Conference & Exhibition (MS&T18)*, Columbus, USA, 14 Oct-18 Oct 2018.
11. **E. M. Jimenez**, D. Ding, B. Reeja-Jayan and J. Beuth, “Optimizing Process Parameters to Binder Jet Ceramics”, *Materials Science & Technology Conference & Exhibition (MS&T18)*, Columbus, USA, 14 Oct-18 Oct 2018.
12. **P.M. Smith**, L. Su, W. Gong, N. Nakamura, B. Reeja-Jayan, S. Shen, "Thermal Conductivity of Poly (3,4-ethylenedioxythiophene) Films Engineered by oxidative Chemical Vapor Deposition (oCVD)", *International Mechanical Engineering Congress Exposition (IMECE)*, David L. Lawrence Convention Center, Pittsburgh, PA USA, 11 Nov - 14 Nov 2018.
13. **E. M. Jimenez**, D. Ding, B. Reeja-Jayan, and J. Beuth, “Optimizing Process Parameters to Binder Jet Ceramics”, *International Mechanical Engineering Congress Exposition (IMECE)*, David L. Lawrence Convention Center, Pittsburgh, PA USA, 11 Nov - 14 Nov 2018.
14. **N. Nakamura**, E. Culbertson, H. Wang, H. Wang, S. J. L. Billinge, B. Reeja-Jayan, “Electromagnetic Field Effects on Atomic Structure and Phase Transitions in Ceramic Oxide Thin Films”, *Gordon Research Conference (GRC) – Solid State Studies in Ceramics*, South Hadley, Massachusetts, 12 Aug-17 Aug 2018.
15. **E. M. Jimenez**, D. Ding, B. Reeja-Jayan and J. Beuth, “Adjusting Process Inputs to Binder Jet Oxide Ceramics”, *Solid Freeform Fabrication Symposium (SFF)*, Austin, USA, 13 Aug-15 Aug 2018.
16. **E. M. Jimenez**, B. Reeja-Jayan and J. Beuth, “Process Development for the Additive Manufacturing (AM) of Ceramic Materials”, *Gordon Research Conference (GRC) – Solid State Studies in Ceramics*, South Hadley, Massachusetts, 12 Aug-17 Aug 2018.
17. **L. Su**, B. Reeja-Jayan. “Improvement of Rate Capability and Cyclability of LiMn<sub>2</sub>O<sub>4</sub> Electrode by Engineering Nanoscale Poly(3,4-ethylenedioxythiophene) (PEDOT) Thin Film via Oxidative Chemical Vapor Deposition”, *Gordon Research Conference (GRC) - Batteries*, Ventura, CA United States. 25 Feb - 02 Mar 2018.

18. **L. Su**, P.M. Smith, B. Reeja-Jayan. "Improvement of Rate Capability and Cyclability of  $\text{LiMn}_2\text{O}_4$  Electrode by Engineering Nanoscale Poly(3,4-ethylenedioxythiophene) (PEDOT) Thin Film via Oxidative Chemical Vapor Deposition", *The American Vacuum Society (AVS) Western Pennsylvania Chapter Meeting*, Pittsburgh, PA, February 23, 2018.
19. **N. Nakamura**, M. W. Terban, S. J. L. Billinge, B. Reeja-Jayan, "Unlocking the structure of mixed amorphous-crystalline ceramic oxide thin films synthesized under electromagnetic excitation", *The 75th Annual Pittsburgh Diffraction Conference*, Indiana, Pennsylvania, 19 Oct-21 Oct 2017.
20. **N. Nakamura**, B. Reeja-Jayan, "Unlocking the structure of mixed amorphous-crystalline ceramic oxide thin films synthesized under electromagnetic excitation", *Air Force Office of Scientific Research (AFOSR) Student Research Day*, Arlington, Virginia, 9 Sep 2017.
21. **N. Nakamura**, B. Reeja-Jayan, "Evolution of Distinct Phase Composition in Ceramic Thin Films Grown under Electromagnetic Excitation", *Materials Science & Technology Conference & Exhibition (MS&T17)*, Pittsburgh, USA, 8 Oct-12 Oct 2017.
22. **L. Su**, B. Reeja-Jayan. "The Effect of Chemical Vapor Deposition Grown Polymer Coatings on the Performance of Cathode Material for Lithium Ion Battery", *Materials Science & Technology Conference & Exhibition (MS&T17)*, Pittsburgh, USA, 8 Oct-12 Oct 2017.
23. **N. Nakamura**, M. Stanley, J. Seepaul, J. Kadane, B. Reeja-Jayan, "Low-Temperature Crystallization of Ceramic Nanoscale Films using Microwave Radiation - Statistically Driven Experimental Design", *Materials Research Society (MRS) Fall Meeting*, Boston, USA, 27 Nov-2 Dec 2016.
24. **P. M Smith**, B. Reeja-Jayan and S. Shen, "High-efficiency, Ultra-thin Silicon Solar Cells by Large-scale Electronic and Optical Interface Engineering", *Gordon Research Conference (GRC) – Thin Film & Small Scale Mechanical*, Bates College in Lewiston, ME USA, 24 July - 29 July 2016.

## **G. COMMUNITY SERVICE & OUTREACH**

- **Minecraft & Manufacturing (M&M) Workshop (2017- present)**  
*A day long camp during which a selected group of middle school children (aged 9-14) from Pittsburgh schools were taught materials science using the game Minecraft. Students learned concepts during the morning session and developed a Minecraft module in the afternoon to demonstrate/model these concepts.*
- **Summer Engineering Experience for Girls (SEE) (2016 - present)**  
*Lecture and activities as part of CMU Engineering's annual summer classes for female students from Pittsburgh schools.*
- **Energy from Everyday Things (CMU Gelfand Center) (2016 - present)**  
*Lecture and activities on using everyday objects (water, fruit juice) to generate energy offered as part of Gelfand Center's Saturday series classes for K-9 students from Pittsburgh schools.*
- **The SciBridge project (connecting African and US scientists) (Dec. 2014)**  
*Invited to give inaugural webinar on "Solar Energy" to undergraduate students studying Physics at Makerere University, Uganda*