

LAMARTINE MEDA

Professor of Inorganic Chemistry and Materials Science

Director: Materials and Interfaces Center for High Energy Storage and Sensing (MICHESS)

Department of Chemistry
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EDUCATION

- 2001 NASA Postdoctoral Fellow, College of Engineering (Florida State University-Florida Agricultural and Mechanical University), Tallahassee, FL
Topic: Residual Stress and Strain Measurements in Thin Films Using X-ray Diffraction Methods
Advisor: Professor Hamid Garmestani
- 1998 Doctor of Philosophy in Inorganic and Materials Chemistry, Northeastern University, Boston, MA *Thesis Title: "Organometallic Chemical Vapor Deposition of Nanocrystalline Metal Oxides Thin Films Prepared from Novel Precursors."*
Advisor: Professor Rein U. Kirss
- 1992 Bachelor of Science in Chemistry, Salem State University, Salem, MA

PROFESSIONAL POSITIONS

- 2020-present Director, Materials and Interfaces Center for High Energy Storage and Sensing
- 2019-present, Professor (Full) of Chemistry, Xavier University of Louisiana, New Orleans
- 2014-2019, Associate Professor of Chemistry, Xavier University of Louisiana, New Orleans
- 2012-present, Assistant Professor of Chemistry GRATIS, University of New Orleans
- 2016-2020, Director, NASA MIRO Solid High Energy Lithium Battery (SHELiB)
- 2009-2016, Director, Partnerships for Research and Education in Materials (PREM)
- 2008-2014, Assistant Professor of Chemistry, Xavier University of Louisiana
- 2006-2008, Visiting Assistant Professor of Chemistry, Auburn University, Auburn, AL
- 2006 Visiting Scholar, Georgia Institute of Technology, School of Materials Science Engineering, Atlanta, GA
- 2002-2006 Senior Research Scientist, Excellatron Solid State, LLC, Atlanta, GA

MAJOR ACCOMPLISHMENTS

Director, Materials and Interfaces Center for High Energy Storage and Sensing (MICHESS) (2015-present)

MICHESS is the new name for the Solid High Energy Lithium Battery (SHELiB) Center, which is primarily funded by NASA. The Director is the chief executive officer (CEO) for the Center who is responsible for all technical and non-technical aspects of the program:

- Managing \$6.6 million between thirteen faculty at Xavier, GaTech, Stony Brook University, Auburn University, Tulane University, NASA, and Army Research Lab (ARL);
- Forging great relationships with program managers across all federally funded agencies
- Leading the strategic planning for the research center to ensure that the Center's objectives are aligned with the Chemistry Department and University's mission and strategic plans;

- Overseeing all the administrative duties of the research center, including supervising personnel, financial management, and operations; and delegating some aspects of the Center such as Education to other faculty;
- Developing strong linkages between the ACS program in the Department of Chemistry and Physics and the Dual Degree Engineering program;
- Promoting and facilitating leading-edge research, including collaborative and interdisciplinary research in energy storage, sensing, and photovoltaics;
- Developing networks between the research center and external collaborators in the private sectors and national laboratories
- Sustaining student recruitment and retention by enriching the research environment at Xavier providing interdisciplinary research training and mentoring for undergraduate students and postdocs;
- Working effectively with the Center's governance committees, including the executive committee, which is made of four Xavier faculty and three external faculty, an internal advisory board which is composed of four Department chairs and two faculty, and the external advisory board;
- Encouraging and supporting the raising of funds for research conducted by the research center

Director, Partnerships of Research and Integration in Materials (PREM) (2009-2015)

Since joining Xavier in 2008, my vision has remained the same: to significantly raise the visibility of the ACS program and start a materials research program and recruit talented undergraduate students. Three new courses (General Chemistry I and II for Chemists and Engineers and Materials Chemistry) were offered by the Department of Chemistry to satisfy the demands of the students in the materials research program.

New Materials Research Program

- Instituted a materials research program
- Recruited over 20 talented students to the ACS program
- Increased in graduation rate and more students have been accepted to graduate schools
- Collaborated with the Admissions office to recruit talented high school students nationwide

Improvement in Scholarly Activity

- Improved research and infrastructure activities have grown and matured at Xavier
- Created a new research culture among the faculty in the program
- Developed interdisciplinary research programs with teams of faculty collaborating in material synthesis, energy storage technologies, and sensor
- Exceeded our expectations in peer-reviewed publications has been increased steadily

ADMINISTRATIVE ASSIGNMENTS

University-Wide Service Committee (selected committees)

- University Graduate Academic Council, College of Arts and Science: Review proposals impacting the graduate academic programs and policies. 2018-present
- University Academic Council: The Academic Council is an executive committee of the Academic Assembly that exercises the Assembly's authority concerning most academic matters in the University. (2020-present)

- University Standing Committee-Admissions: The committee evaluates records of applicants for admission to the University and recommends guidelines and policies regarding undergraduate admissions. 2013-2014, 2017-present
- Tenure and Promotion Appeals Committee: The responsibility of the tenure and promotion appeals committee is to review the recommendations of the tenure and promotion committee if requested by a faculty. 2020-present
- College of Arts and Sciences Coordinating Committee: The Coordinating Committee prepares the agenda for the College of Arts Sciences. 2016-2018
- Faculty Load Advisory Committee: The Committee gathers information on faculty workload across disciplines to prepare an annual report for the faculty and the administration, including recommendations for near-term action and long-term strategic planning to provide increasing opportunities for release time for teaching, service, and scholarship, 2014-2016

Departmental service

I advised all Dual Degree Chemistry and Chemical Engineering students and served on the following committees:

- Recruitment and Retention Committee, 2009-2019
- Facilities, Space, and Research Committee, 2011- 2012, 2015-2016, 2018-2019
- Curriculum Committee, 2015-2016, 2018-2019
- General Chemistry Ad Hoc Committee, 2014-2015
- Ad Hoc Committee to Develop a Departmental Integrity Policy, 2014-2015
- Advisor, Phi Lambda Upsilon Faculty, 2010-2011
- Safety Committee, 2008-2010

HONORS, AWARDS, AND FELLOWSHIPS

- Finalist for the Norman C Francis Excellence in Scholarship Award, 2013, 2014, 2015
- Distinguished Alumni Award, Department of Chemistry, Northeastern University, Boston, MA, 2005
- General Electric Minority Foundation Graduate Fellow, Department of Chemistry, Northeastern University, Boston, MA, 1994-1998
- Teaching Assistant, Northeastern University, Boston, MA, 1993-1998
- John D. O'Bryant, Graduate Study Academic Excellence Award, Department of Chemistry, Northeastern University, Boston, MA, 1997
- National Science Foundation-Research Experience for Undergraduate (NSF-REU), Department of Chemistry, Lehigh University, Bethlehem, PA, Summer 1991

SCHOLARSHIP ACCOMPLISHMENTS

Scholarly Service

- Peer-reviewed Career proposal for the NSF
- Co-Chaired with Drs. Gleb Yushin and Oleg Borodin "Electrochemical Interfaces" Symposium, ACS DIVISION OF PHYSICAL CHEMISTRY 256th NATIONAL MEETING Boston MA, 19-23 August 2018 Meeting Theme: Nanoscience, Nanotechnology & Beyond
- Chaired the National Science Foundation PREM-MRSEC 10th Anniversary, FALL Materials Research Society Meeting, November 30 –December 2, 2014
- Peer-reviewed proposals for the National Science Foundation, 2013- present

- Served as an External Visiting Committee reviewer for the Yale's Center for Research on Interface Structures and Phenomena (CRISP), an NSF Materials Research Science and Engineering Center (MRSEC), 2012
- Peer-reviewed articles for the Journal of Electrochemistry Society, 2012
- Ad-hoc proposal reviewer for the National Science Foundation - CREST proposals, 2012
- Planned and coordinated the National Science Foundation PREM-MRSEC (Materials Research Science and Education Center) Board of Directors meeting in Puerto Rico, March 2011
- Served as Site Visit Panelist for the National Science Foundation PREM program, 2010
- Served as Panelist for NASA Education proposals, 2010
- Member, External Engagement and Workforce Development (EEWD) Committee for the National Science Foundation-EPSCoR II Grant, Louisiana Board of Regents), 2010-present

Peer-Reviewed Publications/Patents (Undergraduate students are underlined.)

1. Song, A.-Y., Turcheniuk, K., Leisen, J., Xiao, Y., **Meda, L.**, Borodin, O., Yushin, G. Understanding Li-Ion Dynamics in Lithium Hydroxylchloride (Li_2OHCl) Solid State Electrolyte via Addressing the Role of Protons, *Adv. Energy Mater.* **2020**, 1903480. <https://doi.org/10.1002/aenm.201903480>.
2. Gai P. Pandey, Kobi Jones, **Lamartine Meda**. CNFs/ $\text{S}_{1-x}\text{Se}_x$ Composites as Promising Cathode Materials for High-Energy Lithium-Sulfur Batteries. *MRS Advances*, **2019**, 4 (14), 821-828.
3. Yiqun Yang, Jeré A. Williams, Gai P. Pandey, **Lamartine Meda**. Poly(propylene carbonate) Interpenetrating Cross-Linked Poly(ethylene glycol) Based Polymer Electrolyte for Solid-State Lithium Batteries. *ECS Trans.*, **2018**, 85 (13), 53-59.
4. GP Pandey, J Adkins, L. Meda Facile Synthesis of Uniform Carbon Coated $\text{Li}_2\text{S}/\text{rGO}$ cathode for High-Performance Lithium-Sulfur Batteries. *MRS Advances*, **2018**, 3 (60), 3501-3506.
5. Ah-Young Song, Yiran Xiao, Kostiantyn Turcheniuk, Punith Upadhyay, Anirudh Ramanujapuram, Jim Benson, Alexandre Magasinski, Marco Olguin, **Lamartine Meda**, Oleg Borodin, Gleb Yushin. Protons Enhance Conductivities in Lithium Halide Hydroxide/Lithium Oxyhalide Solid Electrolytes by Forming Rotating Hydroxy Groups. *Adv. Energy Mater.*, **2018**, 8 (3), 1700971.
6. GP Pandey, K. Jones, E. Brown, J. Li, **L. Meda**. High Performance Tin-coated Vertically Aligned Carbon Nanofiber Array Anode for Lithium-ion Batteries. *MRS Advances*, **2018**, 3 (60), 3519-3524.
7. Y Yang, K. Strong, GP Pandey, L. Meda. Nanostructured V_2O_5 /Nitrogen-doped Graphene Hybrids for High Rate Lithium Storage. *MRS Advances*, **2018**, 3 (60), 3495-3500.
8. Lacey Douglas, Anantharamulu Navulla and **Lamartine Meda**. Evidence of Extra Capacity in Conversion Reaction of Ruthenium Oxide: A Cyclic Voltammetry Study. *Materials Research Society Proceedings*. **2015**, 1775, 740.
9. Ayorinde S. Hassan, Anantharamulu Navulla, **Lamartine Meda**, B. Ramu Ramachandran, and Collin D. Wick. Molecular Mechanisms for the Lithiation of Ruthenium Oxide Nanoplates as Lithium-Ion Battery Anode Materials: An Experimentally Motivated Computational Study. *J. Phys. Chem. C*. **2015**, 119, 9705 – 9713.
10. A. Navulla and **L. Meda**. Direct Growth of RuO_2 Nano-Architectures on Current Collectors and Their Improved Performance in Lithium-Ion Batteries. *ECS Trans.* **2014**, 61(27), 131-135.

11. Anantharamulu Navulla, Geoffrey Stevens, Igor Kovalenko, **Lamartine Meda**. Reversible High Capacity in Hierarchical Columnar RuO₂ Nanoplates and Their Improved Performance in Lithium-Ion Batteries," *J. Phys. Chem. C*. **2014**, 118, 13382–13386.
12. **Lamartine Meda**, Aaron M. Dangerfield, Mila'na C. Jones, Christian M. White, Anantharamulu Navulla. Electrochemical Properties of Tungsten Oxide Nanowires Compared to Bulk Particles. *Jnp. J. Appl. Phys.* **2012**, 51 (11PEO6).
13. **Lamartine Meda** and Eleston E. Maxie. Lipon thin films grown by plasma-enhanced metalorganic chemical vapor deposition in a N₂-H₂-Ar gas mixture, *Thin Solid Films* **2012**, 520, 1799.
14. Ji-Guang Zhang, **Lamartine Meda**, Eleston Maxie. Apparatus for producing thin-film electrolyte. **2005**, Patent number: 6886240.
15. Ji-Guang Zhang, **Lamartine Meda**, Eleston Maxie. System and method of producing thin-film electrolyte. **2005**, Patent number: 6852139.
16. **Lamartine Meda**, Saleh Hayek, Klaus H-Dahmen, Hamid Garmestani. X-ray Diffraction Residual Stress Calculation on Textured La_{2/3}Sr_{1/3}MnO₃ thin films. *Journal of Crystal Growth*, **2004**, 263, 185.
17. **Lamartine Meda**, Richard C. Breitkopf, Terry E. Haas, and Rein U. Kirss. Investigation of Electrochromic Properties of Nanocrystalline Tungsten Oxide Thin-Film," *Thin Solid Films*, **2002**, 402, 126.
18. **Lamartine Meda**, LaQuita Kennon, Christiane Bacaltchuck, Klaus H-Dahmen, Hamid Garmestani. The Effects of Thermal Annealing on the Texture of La_{0.67}Sr_{0.33}MnO₃ Thin Films. *Journal Materials Research*, **2001**, 16, 1887.
19. **Lamartine Meda**, C. Bacaltchuck, K.H-Dahmen, H. Garmestani. Residual Strain and Texture in La_{2/3}Sr_{1/3}MnO₃. *Journal of Materials Science Materials – Materials in Electronics*, **2001**, 12, 143.
20. Rein U. Kirss and **Lamartine Meda**. Chemical Vapor Deposition of Tungsten Trioxide. *Applied Organometallic Chemistry*, **1998**, 12, 155.
21. William M. Reiff, Jozef Kreis, and **Lamartine Meda**, R. U. Kirss. On the Mixed Valence Behavior and Cooperative 3D Ordering of a Series of Tris-Oxalato Ferrates: Bu₄N{M FeIII(ox)₃} (M=MnII(A), FeII(B), CoII(C), NiII(D) and 4P{FeIIFeIII(ox)₃} (E): New Ferrimagnets. *Molecular Crystals and Liquid Crystal*, **1995**, 273, 181.

Proceedings

1. "Synthesis, Characterization and Electrochemical Studies of Bulk and Nano-Sized LiNi₄(PO₄)₃," Anantharamulu Navulla and **Lamartine Meda**, *Prepr. Pap.-Am. Chem. Soc., Div. Energy and Fuels* **2013**, 58(1), 873.
2. "High Capacity Nickel Oxide Nanomaterials as Anode for Lithium-ion Batteries, Corey Arnold, Anantharamulu Navulla, **Lamartine Meda**, *Prepr. Pap.-Am. Chem. Soc., Div. Energy and Fuels*, **2014**.

Invited Presentations

- University of Notre Dame, South Bend, **April 30, 2020 (Postponed dues to Covid 19)**
- Tulane University, New Orleans, LA, **November 21, 2019**.
- Kansas State University, Manhattan, KS, **November 14, 2019**.
- Xavier University of Louisiana, 2015 Spring Faculty Colloquium, **April 7, 2015**, "Challenges in the Development of Rechargeable High Energy Density Lithium Batteries"

- *Louisiana Tech University, Rushton, LA, 2013*, "High Capacity and Coulombic Efficiency in Ruthenium Oxide"
- *American Chemical Society, Southwest Regional Meeting, November 5, 2012*, "High Capacity and Coulombic Efficiency in RuO₂ Nanomaterials."
- *NSF Ceramic Materials Principal Investigator Workshop, National Science Foundation, Washington, DC, June 19, 2013*, "Direct Growth of Ruthenium Oxide on Stainless Steel Current Collector for Application in Lithium-ion Batteries"

Current Grant (Total \$1.6 Million)

- **Agency:** NSF CBET; **Title:** Excellence in Research: Investigation of Interfacial Chemical and Ion Transport in Solid Inorganic-Polymer Electrolytes; **Duration:** 2021 -2024; **Amount:** \$513,443; **Role:** PI
- **Agency:** NASA MIRO (renewal); **Title:** Materials and Interfaces Center for High Energy Storage and Sensing; **Duration:** 2020 -2022; **Amount:** \$1.6,000,000; **Role:** PI

Post External Grants (Total \$8.5 Million)

- **Agency:** NASA; **Title:** Solid High Energy Lithium Battery; **Duration:** 2015 -2020; **Amount:** \$5,000,000; **Role:** PI
- **Agency:** The National Science Foundation - Division Of Materials Research; **Title:** NSF-MRI: Acquisition of Integrated Glovebox Vapor Deposition and Spin Coating Systems for Research and Education; **Duration:** 2016 -2019; **Amount:** \$198,832; **Role:** PI
- **Agency:** Henry Luce Foundation; **Title:** Clare Boothe Luce Scholarships for Undergraduate Women in Science at Xavier University of Louisiana"; **Duration:** August 2014 – May 2016; **Amount:** \$108,000 (direct costs); **Role:** Co-PI
- **Agency:** The National Science Foundation – Experimental Program to Stimulate Competitive Research (NSF – EPSCoR) program; **Title:** Louisiana Alliance for Simulation Guided Materials Applications (LA-SiGMA); **Duration:** September 2010 – December 2015; **Amount:** \$250,000 (direct costs); **Role:** Senior Research Personnel
- **Agency:** The National Science Foundation - Partnerships for Research and Education in Materials (NSF-PREM) program; **Title:** Nanoscale Imaging Systems; **Duration:** September 1st, 2009 – August 31st, 2015; **Amount:** \$3,000,000; **Role:** PI

Post Internal Grants (Total: \$101 K)

- **Agency:** The National Science Foundation – Experimental Program to Stimulate Competitive Research (NSF- EPSCoR) program; **Title:** Computational and Experimental Investigations of the Reversible Reactions of Lithium with Nanostructured RuO₂ as Potential Lithium-Ion Battery Anode; **Duration:** July 1st 2011 – June 30, 2013; **Amount:** \$34,000; **Role:** Subaward PI
- **Agency:** The National Science Foundation– Model Institution of Excellence (MIE); **Title:** Synthesis and Characterization of Ruthenium and Ruthenium Oxide Nanomaterials, National Science Foundation Model Institution of Excellence; **Duration:** August 18, 2008- July 31, 2009, **Amount:** \$59,999; **Role:** Subaward PI
- **Agency:** Xavier University of Louisiana - Center for Undergraduate Research (CUR); **Title:** Chemical Vapor Deposition (CVD) of Lithium Ruthenate; **Duration:** Summer 2009; **Amount:** \$7,000; **Role:** Subaward PI

TEACHING ACCOMPLISHMENTS

Lecture

- CHEM 4153 - Special Topics -Materials Science and Engineering
- CHEM 4010 - Advanced Inorganic Chemistry II
- CHEM 3010 – Inorganic Chemistry I
- CHEM 1010 and 1020 - General Chemistry I and II Lectures
- CHEM 1110 and 1120 – General Chemistry I and II Lectures for Chemists and Engineers

Laboratory

- CHEM 1111L (New laboratory course) – General Chemistry Laboratory Lab I
- CHEM 1121L (new laboratory course) - General Chemistry Laboratory II
- CHEM 1011L - General Chemistry Laboratory I
- CHEM 1021L - General Chemistry Laboratory II

STUDENT AND POSTDOCS SUPERVISION

Current and former Postdocs and Technician:

1. Dr. Yanmei Jiang (current)
2. Dr. Gaiind Pandey (former)
3. Dr. Yuqun Yang (former)
4. Dr. Anantharamula Navulla (former)

Current Undergraduate Research Students

- 1) Ms. Jere Williams, (Senior, Dual Degree Engineering), December 2020
- 2) Abiade, Asha (Junior, Chemistry/ACS), *Thesis*: High Capacity MnO as Anode in Lithium-ion Batteries
- 3) Adams, Jada, (Junior, Chemistry/ACS), *Thesis*: Synthesis of ceramics-polymer Composite electrolyte
- 4) Asa Green, Freshman, Chemistry ACS Major,

Former Undergraduate Research Students

- Dr. Aaron Dangerfield, **Ph.D.** in Materials Science and Engineering, UT Dallas, 2018
- Dr. Milana Thomas, **Ph.D.** in Materials Science and Engineering, UT Dallas, 2018
- Dr. Jamal Alexander, **Ph.D.** in Physics, Mississippi State University, 2016
- Dr. Cherise Steib, **Dr. of Pharmacy**, College of Pharmacy, Xavier University of New Orleans, 2014
- Dr. Keishondra Sampson, **MD**, St. Louis University School of Medicine, 2017
- Dr. Uchena Onwuegbusi, **M.D. and Ph.D.** Howard University School of Medicine, 2016
- Mr. Christian White, **BS** (Chemistry ACS); DuPont, 2013
- Ms. Lydia Mensah, **Ph.D. candidate**, Materials Science, and Engineering, U. Michigan, Expected 2020
- Lacey Douglas, **Ph.D. Candidate**, Inorganic Chemistry, Texas A &M University, Expected 2021
- Mr. Geoffrey Stevens, **Master's Degree**, Mechanical Engineering, University of New Orleans

- Levon Leban, **Graduate student**, Department of Chemistry, Kansas State University, Expected 2022
- Joshua Adkins, **Graduate Student**, Materials Science and Engineering, Univ. of IL at Chicago, Expected 2023
- Corey Arnold, **Graduate student**, Materials Science and Engineering, Univ. of North Texas
- Edelmy Marin Bernadez, **Graduated May 2019**, (Stony Brook, Graduate Student Fall 2020)
- Kobi Jones, Senior Dual Degree, Chemical Engineering, at Tulane University, May 2020
- Kayla Strong, Senior Dual Degree, Chemical Engineering at Tulane University, May 2020
- Jere Williams, Senior Dual Degree, Chemical Engineering at Tulane University, December 2020
- Nam Tran, Junior Dual Degree, Chemical Engineering at Tulane University, May 2021
- Alexis Day, Senior, Chemistry ACS Major, May 2020, (University of California San Diego, Graduate Student Fall 2020)
- Ms. Edelmy Marin Bernadez, Graduated May 2019, (Stony Brook, Graduate Student Fall 2020)
- Arielle Lebean, Sophomore, Biomedical Engineering

MEMBERSHIP

- Member of the American Chemical Society (ACS), 1990-present
- Member of the Electrochemical Society (ECS), 2004-present
- Member of the Materials Research Society (MRS), 2000-present
- Member of the American Ceramic Society (Acers), 2013-present