MICHAEL T. LANAGAN

Professor of Engineering Science and Mechanics

**The Pennsylvania State University, University Park, PA 16802**

Phone: 814-865-6992 e-mail: mlanagan@psu.edu

# EDUCATION

Ph.D. Ceramic Science, Pennsylvania State University, 1987

B.S. Ceramic Engineering, University of Illinois at Urbana-Champaign,

Highest Honors, 1982

PROFESSIONAL EXPERIENCE

2009- Professor, Departments of Engineering Science and Mechanics, Material Science and Engineering, The Pennsylvania State University

2019-2021 Assistant Director, Strategic Interdisciplinary Research Office

2018-2019 Gordon Fulcher Sabbatical Program for Scientists, Corning Inc.

2015-2018 Head of Graduate Program, Engineering Science and Mechanics Graduate Program, The Pennsylvania State University

2004-2009 Associate Professor, Department of Engineering Science and Mechanics, Materials Science and Engineering, The Pennsylvania State University

2001-2012 Associate Director, Materials Research Institute, The Pennsylvania State

University

1998-2013 Associate Director, Penn State Center for Dielectric Studies, The Pennsylvania State University

1987-1998 Staff Ceramist, Argonne National Laboratory

1994 Visiting Scientist, Alfred University

1987 Research Associate, The Pennsylvania State University

1985 Graduate Student Co-op, IBM, Hopewell Jct., NY

1982 Student Co-op, IBM, Almaden Research Center San Jose, CA

1981 Student Co-op, Corning Glass Works, Corning, NY

# HONORS AND AWARDS

2021 International Ferroelectric Materials and Applications Award

2019 Fulcher Fellow, Corning

2017 Penn State College of Engineering Dean’s Faculty

2017 Fellow of the American Ceramic Society

2014 Summer Faculty Fellowship - Air Force Office of Scientific Research

2008 PSES Outstanding Research Award

2007 Top 25 articles from the past 25 years - Elsevier publication “Materials

Letters”

2003 MRI Faculty Achievement Award, The Pennsylvania State University

1996 National Academy of Engineering invited participant to Frontiers of

Engineering Symposium

1997 Argonne National Laboratory Director's Award

1994 Federal Laboratory Consortium for Technology Transfer Merit Award

1993 Argonne National Laboratory Pacesetter Award

1987 IBM Fellowship in the Materials Research Laboratory, The Pennsylvania

State University

1982 University of Illinois at Urbana-Champaign Bronze Tablet Award

1982 Society for the Advancement of Materials and Process Engineering Scholar

**PROFESSIONAL SOCIETY MEMBERSHIP**

American Ceramic Society (ACerS) – Elected Fellow in 2017

Institute for Electronic and Electrical Engineers (IEEE)

The American Society of Metals (ASM)

International Society of Magnetic Resonance in Medicine (ISMRM)

**EDITORIAL BOARDS**

2021-2022 **Guest Editor**: Macromolecules, Special Issue on Recent Advances in Dielectric Polyme

2020-2021 **Guest Editor**: Applied Physics Letters, Special Issue on 5G Telecommunications

2018-present **Advisory Board Member:** Saint-Gobain Corporation

2012-2018 **Editorial Board Member**: New Journal of Glass and Ceramics

2010-2015 **Guest Editor**: Journal of the American Ceramic Society

2006-present **Associate Editor**: Materials Letters

2008-2018 **Key Reader:** Metallurgical and Materials Transactions A

2015 **Guest Editor**: Journal of Materials Science: Materials in Electronics, Special Issue on High Temperature Polar Materials

2007 **Guest Editor:** Journal of Advanced Ceramic Technology Special Issue on Co-fire Ceramics

**JOURNAL REVIEWER**

Applied Physics Letters, Materials Letters, IEEE Transactions on Dielectrics and Insulation, Carbon, Journal of Applied Physics, Nature Communications, Journal of the American Ceramic Society, International Journal of Applied Ceramic Technology, ACS Applied Materials and Interfaces, Journal of Vacuum Science and Technology B, Journal of Chemistry and Physics of Solids, Journal of the Electrochemical Society, IET Microwaves, Antennas and Propagation, IEEE Transactions on Instrumentation and Measurement

**PROPOSAL REVIEWER**

AFOSR Extreme Materials, National Science Foundation DMR and Electrochemistry programs, Department of Energy Office of Vehicle Technologies and SBIR programs, ONR Pulsed Power Dielectrics Program

**NATIONAL AND INTERNATIONAL ACADEMIC AND TECHNICAL COMMITTEES**

2021-2022 Co-Chair of the symposium on Broadband Dielectric Spectroscopy, Annual Meeting, American Chemical Society

2020-2021 Co-Chair of the symposium on Microwave Materials and Their Applications, PacRim Meeting, American Ceramic Society

2016-2017 Co-Chair of the symposium on Advances in Polar, Magnetic and Semiconducting Materials: Extending Temperature Limits, PacRim Meeting, American Ceramic Society

2014-2015 Co-Chair of the symposium on Dielectric, Magnetic, and Semiconductor Materials for Harsh Environments, MS&T Annual Meeting

2012-2015 Co-organizer of Advanced Materials for Power Electronics, Power Conditioning, and Power Conversion, TMS Annual Meeting

2011 Co-Chair of the Reliability and Energy Storage in Capacitors Workshop –

National Science Foundation Center for Dielectric Studies

2008-2009 General Chair of the Ceramic Interconnect and Ceramic Microsystems

Conference, IMAPS and the American Ceramic Society

2006-2007 Technical Chair of the Ceramic Interconnect and Ceramic Microsystems Conference, IMAPS and the American Ceramic Society

2003-2005 Organizer of the Low Temperature Co-fired Ceramics Workshop, IMAPS and the American Ceramic Society

2003 Organizer for the Workshop on Dielectric Materials for Pulsed Power – National Science Foundation Center for Dielectric Studies

2000 Organizer of the Passive Components for Power Electronics Workshop –

National Science Foundation Center for Dielectric Studies

1995-1997 Co-organizer of Student Poster Session - Chicago-Milwaukee Section of the

American Ceramic Society

1992 Local committee for the Applied Superconductivity Conference (ASC) - The ASC is an independent organization devoted to superconductor science and technology. This conference had 2,000 attendees.

1990 Co-chair of the session on High Temperature Superconductors Microelectronic Applications, International Symposium on Microelectronics, International Society for Hybrid Microelectronics, Chicago, IL

# COURSES TAUGHT

E SC 314 Engineering Applications of Materials (3 credit): Electronic and photonic processes in solid state semiconducting materials and devices.

E SC 414M Materials Properties (3 credit): Crystal structure, thermodynamics and kinetics of phase formation in metals and ceramics, mechanical properties of solids.

E SC 419 Electronic Materials (3 credit): Electromagnetic properties of materials including permittivity, piezoelectricity and magnetics.

E SC 433H Experimental and Statistical Methods (1 credit): Probability distributions, error propagation and experimental error.

MATSE 417 Electronic Properties of Metals and Ceramics (3 credit): Defect chemistry, electronic and ionic transport in ceramics.

E SC 597B Microwave Materials Interactions (3 credit co-teaching): A survey course of microwave transmission structures, materials and processes.

E SC/ME 551 High-Power Energy Storage (3 credit co-teaching): A survey course of the major electric energy storage devices including fly-wheels, batteries and ultracapacitors.

**New course development:** E SC/ME 551 High-Power Energy Storage was offered in Spring 2016 for the first time as a permanently listed course (taught for multiple years as E SC 597K). This is one of three courses in the Penn State Graduate Automotive Technology Education (GATE) curriculum leading to a GATE certificate. It is an introduction to high-power in-vehicle energy storage technologies used in pluggable and grid independent hybrid electric and fuel cell vehicles including advanced battery chemistries, ultracapacitors, and flywheels. The course also provides an overview of hybrid electric vehicle design, control, and simulation to determine the effect of energy storage components on performance and fuel efficiency.

| **Year** | **Semester** | **Course** | **Course Rating** | **Instructor Rating** | **% Enrollment** | **Enrollment** |
| --- | --- | --- | --- | --- | --- | --- |
| 2004 | Spring | MATSE 417 | 6 | 6.36 | 78.6% | 14 |
| 2004 | Fall | E SC 597I | 6.17 | 5.83 | 85.7% | 7 |
| 2005 | Spring | MATSE 417 | 5.69 | 6.31 | 53.3% | 30 |
| 2005 | Fall | E SC 433H | 5.42 | 5.5 | 100% | 12 |
| 2006 | Spring | MATSE 417 | 6 | 6.31 | 94.1% | 17 |
| 2006 | Fall | E SC 433H | 6.19 | 6.43 | 95.5% | 22 |
| 2006 | Fall | E SC 597I | 6.2 | 6.8 | 100% | 9 |
| 2007 | Spring | MATSE 417 | 5.84 | 6.05 | 100% | 17 |
| 2007 | Fall | E SC 314 | 5 | 5.67 | 70.6% | 17 |
| 2008 | Fall | E SC 433H | 6 | 6.42 | 61.3% | 31 |
| 2009 | Spring | E SC 419 | 5.58 | 6 | 68.6% | 35 |
| 2009 | Fall | E SC 414M | 5.55 | 6.05 | 51.3% | 39 |
| 2009 | Fall | E SC 433H | 5.93 | 6.27 | 53.6% | 28 |
| 2010 | Fall | E SC 433H | 5.85 | 6.23 | 44.8% | 29 |
| 2010 | Fall | E SC 433H | 6.5 | 6.75 | 36.4% | 11 |
| 2010 | Fall | E SC 597A | 6.33 | 6.67 | 75% | 4 |
| 2011 | Spring | Sabbatical |  |  |  |  |
| 2011 | Fall | E SC 433H | 6.25 | 6.63 | 38.1% | 21 |
| 2011 | Fall | E SC 433H | 5.07 | 5.93 | 58.3% | 24 |
| 2011 | Spring | E SC 314 | 5.53 | 6.1 | 45.5% | 88 |
| 2012 | Fall | E SC 433H | 6.17 | 6.5 | 54.5% | 11 |
| 2012 | Fall | E SC 433H | 6.18 | 6.73 | 75.9% | 29 |
| 2013 | Spring | E SC 314 | 6 | 6.33 | 30% | 10 |
| 2013 | Spring | M E 597K | 7 | 7 | 16.7% | 6 |
| 2013 | Fall | E SC 414M | 6.5 | 6.5 | 42.1% | 19 |
| 2013 | Fall | E SC 433H | 6.55 | 6.42 | 40% | 30 |
| 2014 | Spring | E SC 597K | 7 | 7 | 33.3% | 3 |
| 2014 | Fall | E SC 433H | 5.93 | 6.29 | 43.8% | 32 |
| 2015 | Spring | E SC 597B | 7 | 7 | 20% | 5 |
| 2015 | Spring | E SC 597K | 6.2 | 6.8 | 71.4% | 7 |
| 2015 | Fall | E SC 433H | 5.8 | 6.27 | 35.6% | 45 |
| 2016 | Spring | E SC/ME 551 | 6.3 | 6.5 | 23% | 18 |
| 2016 | Fall | E SC 433-1 | 5.9 | 6 | 56% | 16 |
| 2016 | Fall | E SC 433-2 | 6.4 | 6.7 | 54% | 24 |
| 2017 | Spring | ESC 551 | 5.33 | 6.33 | 30% | 10 |
| 2017 | Fall | E SC 414M | 6 | 6.25 | 21% | 38 |
| 2018 | Spring | ESC 551 | 6.6 | 7 | 45% | 11 |
| 2018  | Fall | Sabbatical |  |  |  |  |
| 2019 | Spring | Sabbatical |  |  |  |  |

Scale for SRTE Course Rating is 1-7

**GRADUATE STUDENTS ADVISED or COADVISED at Penn State**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Name**  | **Type of****Degree** | **Degree****Granted (projected)**  | **Title of Thesis/Subject Area** |
|  |  |  |  |
|  |  |  |  |
| Ziheng Fu | PhD | 2023 | AI of 5G mm-wave propagation |
| Tucker Brown | MS—In progress | 2022 | Coplanar Waveguide Devices |
| Thane Bonnett | MS | 5/2020 | Fabrication of Needle Arrays |
|  |  |  |  |
| Cesar Nieves | PhD—In Progress | 2022 | Graphene Polymer InterfacesPassed Candidacy Exam NSF Fellow |
|  |  |  |  |
| Jess Kopatz | PhD | 5/2021 | 3D printable polymer Networks |
| Hossein Hamedi | PhD | 12/2020 | Electromigration of Crosslinking Byproducts in Polyethylene |
| Roger Walker | PhD  | 8/2020 | Thermally Stimulated Depolarization Current in Polyethylene – Sloan Scholar |
|  |  |  |  |
| Wuttichai Reainthippayasakul | PhD | 12/2019 | Particle Polymer Composites |
| Sam Taylor | MS |  5/2022 | Single Crystal Piezoelectrics |
| Mengxue Yuan | PhD  | 5/2020 | Dielectric Polymer Coatings on glass  |
| Betul Akkopru | PhD | 12/2019 | Reliability of PZT thin Films |
| Zane Cohick | PhD  | 8/2019 | Plasma Metamaterials |
| Michael Vecchio | PhD  | 8/2019 | High Dielectric Breakdown Multilayer Polymer Laminates: Exploiting the Interface as Barrier to Charge Transport |
|  |  |  |  |
| Sarah Antonsson | MS  | 5/2019 | DC to Daylight: a review of dielectric mechanisms, relaxation modeling, and broadband experimental analysis. |
|  |  |  |  |
| Seth Berbano | PhD | 12/2016 | Low Temperature Processing of Sulfide and Oxide Solid Lithium Electrolytes - NSF Fellow |
| Jing Zhao | MS | 8/2016 | The Reliability of Split Ring Based Metamaterials in Plasma Environment |
|  |  |  |  |
| Matthew Pyrz | MS | 8/2015 | Development of Predictive Tools and the Role of Electrode Area for Self-Clearing Behavior in Coated Glass Systems |
| Matthew Ketterman | MS | 5/2014 | MR Image Enhancement with High Permittivity Materials |
|  |  |  |  |
| Doo Hyun Choi  | PhD  | 12/2013  | Numerical Modeling of Space Charge Dynamics and Electrical Breakdown in Solid Dielectrics |
|  |  |  |  |
| Priyanka Dash  | PhD  | 8/2013  | Dynamics of Space Charge Polarization and Electrical Conduction in Low Alkali Boroaluminosilicate Glasses |
|  |  |  |  |
| Haolun Zhang  | MS  | 5/2013  | Effects of Homogenous and Heterogeneous Interfaces on Electrical Breakdown in Metal Oxides Thin Films and their Nanostructures  |
| Benjamin Koch  | MS  | 12/2010  | Monte Carlo Simulation of Laminar Composite Breakdown in DC Field |
|  |  |  |  |
| Brian Bontempo  | MS  | 5/2010  | Conduction Mechanisms in Amorphous Crystalline Tantalum Oxide Thin Films |
|  |  |  |  |
| Joe Scholz | MS  | 12/2009  | Investigation of Mechanisms that Control Aging Rates in Capacitor and Piezoelectric Ferroelectrics |
|  |  |  |  |
| Badri Rangarajan | PhD  | 12/2009  | Nanophase Glass Ceramics for Capacitive Energy Storage |
|  |  |  |  |
| Francelys Medina  | PhD  | 12/2009  | Impedance Spectroscopy Studies of Silica-Titania Glasses and Glass Ceramics |
|  |  |  |  |
| Guneet Sethi  | PhD  | 12/2009  | Effects of Homogenous and Heterogeneous Interfaces on Electrical Breakdown in Metal Oxides Thin Films and their Nanostructures  |
|  |  |  |  |
| Pratyush Tewari  | PhD  | 8/2009  | Interfacial Effects in Oxide-Polymer Laminar Composite Thin Film Dielectrics for Capacitor Applications |
|  |  |  |  |
| Kevin Deily | MS  | 8/2008  | Polar Polymeric Materials for Advanced High Frequency and Low Operation Field Modulator Applications  |
|  |  |  |  |
| Cheolhong Min  | MS  | 8/2008  | Temperature Dependence of Breakdown Voltage |
| Henry Kwan | MS  | 8/2008  | Photo-switching of Patch Antenna Arrays  |
|  |  |  |  |
| Khalid Rajab | PhD | 5/2008 | Microwave Metamaterials |
| Do-Kyun Kwon | PhD  | 5/2006  | Barium Tellurate Microwave Dielectric Ceramics with Low Processing Temperature  |
| Lance Haney | MS  | 5/2006  | Microwave Characterization of Oxide Thin Films |
| William E. Janosik | MS  | 12/2005  | Glass Synthesis and Selection for Sintering High Performance Dielectrics  |
| Takaki Murata | MS  | 5/2004  | Fundamental Aspects of Microstrip Resonators   |
| Richard Stroman | MS  | 8/2002  | A Study of Capacitors for Damping Inverter Generated Ripple Currents on the Direct Current Bus  |
| Juan Nino  | PhD  | 5/2002  | Fundamental Structure-Property Relationships towards Engineering of an Integrated NPO Capacitor for Bismuth Pyrochlore Systems  |
|  |  |  |  |

**GRADUATE STUDENTS COADVISED at Argonne National Lab**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Name**  | **Type of****Degree** | **Degree****Granted**  | **Title of Thesis/Subject Area** |
| James Giumarra,U. Ill Chicago | MS  | 5/2000  | Effects of Annealing on the Dielectric Response of Barium Titanate Thin Films  |
|  |  |  |  |
| Michael Chudzik,Northwestern University | MS | 5/1998 | Inclined Substrate Deposition of YBCO on MgO |
|  |  |  |  |
| Yue Fang, GA Tech.  | PhD  | 5/1995  | Interfacial Studies of High Temperature Superconducting BiSrCaCuO and Ag  |
| Michael Hagen, IIT  | MS  | 5/1995  | Effects of Thermal and Atmospheric Variations on the Microstructure of the Tl-1223 Superconductor  |
|  |  |  |  |
| Weite Wu,U. Ill Chicago  | PhD  | 5/1992  | Residual Stress Measurement of YBCO Sol-Gel Films on Polycrystalline MgO  |

**HONORS UNDERGRADUATE THESES ADVISED or COADVISED**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Name**  | **Type of****Degree** | **Degree****Granted (projected)**  | **Title of Thesis/Subject Area** |
|  |  |  |  |
|  |  |  |  |
| Derek Ung | BS | 5/2022 | Microstrip Characterization |
| Eddie Brighthaupt | BS | 5/2022 | MRI Coil Design |
| Xuande Wang | BS | 12/2021 | MRI Dielectric Materials |
| Eric Schwartz | BS | 5/2021 | MRI Simulations |
| Colin Scalea | BS | 5/2021 | MRI Coil Design |
| Tucker Brown | BS | 5/2020 | EM Simulation of transmission lines |
| Krista Ross | BS | 12/2019 | Microwave Ring Resonators |
| Samantha Soliman | BS | 5/2018 | Magnetic Resonance Imaging |
| Michael Jadwin | BS | 5/2018 | Electric Vehicle Dynamics |
| Robert Wang | BS | 5/2018 | Van der Pauw measurements of Si |
| Junyu Zhu | BS | 5/2018 | Power Dense Energy Storage Devices |
| Rutvi Shaw | BS | 5/2018 | Glass Polymer Laminates |
| Muhammad Hasyim | BS | 5/2017 | Ionic conduction in Li-borates |
| Rui Liu | BS | 5/2016 | MRI dielectric resonators |
| Tyler Anderson | BS | 12/2015 | Ultracapacitors |
| James Zellhart | BS | 5/2015 | Nuclear activation analysis of clay |
| Collin FerrellAlejandra Piedrahita | BSBS | 5/20155/2014 | Ultracapacitor CharacterizationCrystal Structure of lactose and Sucrose |
| Malick Fofana  | BS  | 5/2014  | Conductivity of Dense Li-P-S Electrolytes  |
| Meredith Routson | BS | 12/2013 | MRI imaging of mouse brain |
|  |  |  |  |
| Rohit Ananth  | BS  | 5/2013  | Elastography with MRI  |
| Joe Merola  | BS  | 5/2012  | Temperature dependent AC breakdown in glass  |
|  |  |  |  |
| Grant Meyer  | BS  | 5/2012  | Microwave humidity control system  |
|  |  |  |  |
| Michael Hemmerle  | BS  | 5/2011  | Electrical Characterization of Tantalum Oxide Thin Films  |
| Mark Pavletich  | BS  | 5/2011  | Design and Characterization of Double layer Capacitor |
| Frank Haupt  | BS  | 5/2011  | Electrical Properties of Graphene  |
| Scott Kozlowski  | BS  | 5/2009  | Oxide thin films  |
| Jessica Portuese | BS | 5/2007  | Tunable Filters for Microwave Wireless Communications  |
| Shaun Campbell | BS  | 5/2007  | Design, Analysis and Testing of Resonator Structures  |

**POST-DOCTORAL SCHOLARS AND RESEARCH ASSOCIATES SPONSORED AND/OR MENTORED**

**Name Year Position**

Shivani Gupta 2021-2022 Visiting Student

Zichen He 2019-2020 Visiting Student

Jaishung Ru 2018-2019 Visiting Student

Zhonghua Yao 2017 Visiting Professor

Lin Zhang 2017 Visiting Student

Qi Xu 2016 Visiting Student

Zhe Song 2015 Visiting Student

Do-Kyun Kwon 2015 Visiting Scientist

Maryam Sarkarat 2015-present Post-Doctoral Scholar

Ray Luo 2014-2016 Post-Doctoral Scholar

Hubertus Braun 2014 Visiting International Student

Amira Medeb 2013-present Research Associate

Jun Gao 2014-2015 Post-Doctoral Scholar

Derek Wilke 2012-2014 Research Associate

Mohan Manoharan 2012-2013 Post-Doctoral Scholar

Yong Zheng 2011-2012 Visiting Scientist

Ram Rajagopalan 2010-2011 Research Associate

Takashi Murata 2010-2011 Visiting Scientist

Hoikwan Lee 2009-2010 Post-Doctoral Scholar

Mehdi Mirsaneh 2008-2009 Post-Doctoral Scholar, Visiting Scientist

Teppie Akiyoshi 2007-2008 Visiting Scientist

Jun Du 2004 Visiting Scientist

Richard Eitel 2004-2005 Post-Doctoral Scholar

Masato Iwasaki 2004-2005 Visiting Scientist

Elena Semouchkina 2005-2008 Post-Doctoral Scholar, Research Associate

George Semouchkini 2005-2008 Visiting Scientist

Sang Young Yoon 2003-2004 Post-Doctoral Scholar

Ching-Tai Cheng 2003 Visiting Scientist

H.T. Kim 2001-2001 Post-Doctoral Scholar

Alexander Hennings 2003 Visiting International Student

Rupendra Anklekar 2000-2002 Post-Doctoral Scholar

Eugene Furman 2000-present Research Associate/wage payroll

Hyun-Joon Youn 1998-1999 Visiting Scientist

**GRADUATE COMMITTEE MEMBERSHIPS (PAST 5 YEARS LISTED)**

|  |  |
| --- | --- |
| **Student Name**  | **Type of Degree**  |
|  |  |
|  |  |
|  |  |
|  |  |
| Alireza Sepehrinezhad, ESM | PhD- In Progress |
| Joshua Fox MatSEMohamed Alkhatib, EE | MS - 2022PhD – In Progress |
| Jianan Song, EE | PhD – In Progress |
| Katy Gerace, MatSE | PhD – In Progress |
| Brittany Hauk, MatSE | PhD – In Progress |
| Marc Navagato, EE | PhD - 2022 |
| Shruti Gupta, MatSE | MS - 2021 |
| Xinyi Li, ESM | PhD – In Progress |
| Rahul Pendurthi, ESM | MS - 2021 |
| Dipika Nanda NIT Rourkela, Physics | PhD - 2020 |
| William Barker, MS | MS - 2020 |
| Xiayue Zhao, ME` | PhD – In Progress |
| Maximilliano Burgess, MatSE | MS - 2020 |
| Abdullah Taher, EE | PhD – 2021 |
| Max Tellmer, CMU MatSE | PhD – 2021 |
| Brian Manning, ESM | PhD – 2021 |
| Thomas Schranghamer, ESM | PhD – In Progress |
| Jia Zhu, ESM | PhD – 2020 |
| John Binion, EE | PhD – 2021 |
| Alex Molina, MatSE | PhD – 2021 |
| Behzad Damirchi, ME | PhD – 2021 |
| Xin Chen, MatSEDooman Akbarian, ME | PhD – 2021PhD – 2021 |
| Michael Brova, MatSE | PhD – 2020 |
| Rui Wang, MatSE | PhD – In Progress |
| Faiz Ahmad, ESM | PhD – 2020 |
| Rebecca Watson, MatSE | PhD – 2020 |
| Sun Hwi Bang, MatSC | PhD – In Progress |
| Joseph O’Donnell, EE | PhD—2021 |
| Xiaoxing Cheng, MatSE | PhD--2020 |
| Tian Zhang, EE | PhD 2019 |
| Josh Harper, ESM | PhD--2020 |
| Russel Vela, ESM | PhD 2019 |
| Albert Foster, MatSE | PhD 2019 |
| Duane McCrory, ESM | PhD 2019 |
| Lyndsey Denis, MatSE | PhD 2019 |
| Omar Alzaabi, EE | PhD 2019 |
| Lisheng Gao, MatSe | PhD 2019 |
| Gang Chea Lee, BioE | PhD 2018 |
| Hyunjun Kim, EE | PhD 2018 |
| Huiyuan Zhou, EE | PhD 2018 |
| Omar Alzaabi, EE | PhD 2018 |
| Gregory Talali, EE | PhD 2018 |
| Danny Zhu, EE | PhD 2018 |
| Tiannan Yang, MatSE | PhD 2018 |
| Zijian Hong, MatSE | PhD 2018 |
| Yash Thakur, EE | PhD 2018 |
| Saad Ahmed MEKapil Sharma EE | PhD 2017PhD 2017 |
| Johnes Obonguloch BME | PhD 2017 |
| Sareecha Nasira, External Reader UBahawalpur | PhD 2017 |
| Mark Anders ESM | PhD 2017 |
| S.V. Pandey, EE | PhD 2017 |
| Ravi Kumar Arya- EE | PhD 2017 |
| Chandraprokash Chindam – ESM  | PhD 2017 |
| Meng-Chien Lu EE | PhD 2016 |
| Raghu Abhilash ME | PhD 2016 |
| Bo Li MatSE | PhD 2016 |
| Brian Phelan EE | PhD 2016 |
| Steven Swiontek ESM | PhD 2016 |
| Lei Mei- EE | PhD 2016 |
| Aaron Welsh MatSE | PhD 2016 |
| Elizabeth Michael MatSE | PhD 2015 |
| Kiaming Li – EE | PhD 2015 |
| Yifeng Qin – EE | PhD 2015 |
| Muhammed K Hassan- EE | PhD 2015 |
|  |  |
|  |  |

**Publications: >300 Refereed Journal Articles, Refereed Letters**

**H-index Google Scholar 53 >10000 Citations**

**Peer Reviewed Journal Articles**

261. Hamedi, Hossein, Roger C. Walker, WH Hunter Woodward, Ramakrishnan Rajagopalan, Eugene Furman, and Michael T. Lanagan. "Transient behavior of electrical conductivity in low‐density polyethylene in the presence of acetophenone." Journal of Applied Polymer Science (2021): 51881.

260. Akkopru‐Akgun, Betul, Daniel M. Marincel, Kosuke Tsuji, Thorsten Bayer, Clive A. Randall, Michael T. Lanagan, and Susan Trolier‐McKinstry. "Thermally stimulated depolarization current measurements on degraded lead zirconate titanate films." Journal of the American Ceramic Society (2021).

259. Lanagan, Michael, Tucker Brown, Steve Perini, and Qing X. Yang. "High frequency dielectric materials for medicine and telecommunications." Japanese Journal of Applied Physics 60, no. SF (2021): SF0801.

258. Gandji, Navid P., Christopher T. Sica, Michael T. Lanagan, Myung‐Kyun Woo, Lance DelaBarre, Jerahmie Radder, Bei Zhang et al. "Displacement current distribution on a high dielectric constant helmet and its effect on RF field at 10.5 T (447 MHz)." Magnetic resonance in medicine 86, no. 6 (2021): 3292-3303.

257. Alireza Sadeghi-Tarakameh, Steve Jungst, Mike Lanagan, Lance DelaBarre, Xiaoping Wu, Gregor Adriany, Gregory J. Metzger, Pierre-Francois Van de Moortele, Kamil Ugurbil, Ergin Atalar, Yigitcan Eryaman, "A nine‐channel transmit/receive array for spine imaging at 10.5 T: Introduction to a nonuniform dielectric substrate antenna." Magnetic resonance in medicine (2021).

256. Lakshmanan, Karthik, Giuseppe Carluccio, Jerzy Walczyk, Ryan Brown, Sebastian Rupprecht, Qing X. Yang, Michael T. Lanagan, and Christopher M. Collins. "Improved whole‐brain SNR with an integrated high‐permittivity material in a head array at 7T." Magnetic Resonance in Medicine 86, no. 2 (2021): 1167-1174.

255. Akkopru-Akgun, Betul, Thorsten JM, Kosuke Tsuji, Ke Wang, Clive A. Randall, Michael T. Lanagan, and Susan Trolier-McKinstry. "Leakage current characteristics and DC resistance degradation mechanisms in Nb doped PZT films." Journal of Applied Physics 129, no. 17 (2021): 174102.

254. Akkopru-Akgun, Betul, Thorsten JM Bayer, Kosuke Tsuji, Clive A. Randall, Michael T. Lanagan, and Susan Trolier-McKinstry. "The influence of Mn doping on the leakage current mechanisms and resistance degradation behavior in lead zirconate titanate films." Acta Materialia 208 (2021): 116680.

253. Alzaabi, Omar, Mohammad M. Al-Khaldi, Kenneth Ayotte, Diego Peñaloza, Julio Urbina, James K. Breakall, Michael Lanagan, Harland M. Patch, and Christina M. Grozinger. "Numerical modeling and measurement of Apis mellifera radar scattering properties." IEEE Geoscience and Remote Sensing Letters 19 (2021): 1-5.

252. Walker, Roger Craig, Hossein Hamedi, William H. Hunter Woodward, Ramakrishnan Rajagopalan, and Michael Lanagan. "Impacts of Crosslinking and Degassing on the Conductivity, Dielectric Loss, and Morphology of Low-Density Polyethylene and Crosslinked Polyethylene." In Broadband Dielectric Spectroscopy: A Modern Analytical Technique, pp. 239-260. American Chemical Society, 2021.

251. Perini, Steven, Maryam Sarkarat, Danny Zhu, Brian Foley, and Michael Lanagan. "Broadband Dielectric Characterization from 10 mHz to 100 GHz of a 3D Printable Material." In Broadband Dielectric Spectroscopy: A Modern Analytical Technique, pp. 77-89. American Chemical Society, 2021.

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**PRESENTATIONS (Past 15 Years)**

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* Omar Alzaabi1,2, Mohammad M. Al-Khaldi3, Diego Peñaloza2, Julio Urbina 2, James K. Breakall2, and Michael Lanagan4 1Department of Electrical Engineering and Computer Science, Khalifa University, Abu Dhabi, UAE, 2Department of Electrical Engineering, Penn State, 3Constellation Observing System for Meteorology, Ionosphere, and Climate Program, University Corporation for Atmospheric Research, CO 80301 USA, 4Department of Engineering Science and Mechanics, Penn State, “Entomological Target Radar Cross Section: Numerical Modelling and Estimation,” URSI 2021.
* A. Sadeghi-Tarakameh1,3, S. Jungst1, X. Wu1, M. Lanagan2, G. Adriany1, G. J. Metzger1, P. Van de Moortele1, K. Ugurbil1, E.Atalar1,3, F. Nelson1, Y. Eryaman1, 1University of Minnesota, Minneapolis, MN, 2Pennsylvania State University, University Park, PA, 3Bilkent University, Ankara, Turkey, “Imaging the Spine at 10.5T,” Americas Committee for Treatment and Research in Multiple Sclerosis Forum, West Palm Beach FL, February 27-29, 2020.
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* Gandji\*, N. (Michigan Technological University), Seifi, B. (Michigan Technological University), Semouchkina, E. (Michigan Technological University), Lanagan, M. T., Neuberger, T., Lee, G. (Penn State), Jung, S. (Penn State), National Radio Science Meeting, National Acadamies of Science, Engineering, and Medicine, Boulder Colarado, "Unconventional Designs of RF Probes for High-Field MRI to Enhance Magnetic. January 4, 2017.
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* Amir Aref Lelah\*, M. Lanagan and R. Rajagopalan, “Carbon Electrodes for Ultracapacitors,” Material Research Society Annual Meeting, Boston, MA, Nov 27-Dec 2, 2016.
* M. Vecchio\*, A. Meddeb, M. Lanagan, and Z. Ounaies, “Polymer Laminates for High Energy Density and Low Loss,” Conference on Electrical Insulation and Dielectric Phenomena (CEIDP) is sponsored by the IEEE Dielectrics and Electrical Insulation Society, Toronto, Canada, October 16-19, 2016.
* M. Yuan\*, S. Zhang, R. Rajagopalan, and M. Lanagan, “High Energy Dielectric Polymer-Glass Laminates,” Conference on Electrical Insulation and Dielectric Phenomena (CEIDP) is sponsored by the IEEE Dielectrics and Electrical Insulation Society, Toronto, Canada, October 16-19, 2016.
* Z. Cohick\*, W. Luo\*, D. Wolfe, M. Lanagan, and J. Hopwood, “Split-Post Dielectric Resonator Plasma Generators,” IEEE International Conference on Plasma Science (ICOPS), Banff, Canada, June 19-23, 2016.
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* J. Zhao\*, W. Luo\*, J. Guo\*\*, T. Matlock, R. Wirz, C. Randall, and M. Lanagan, “Microwave Generated Plasmas in Ring Resonators," Microwave Materials and Applications Conference, Seoul, Korea, July 3-6, 2016.
* M. Lanagan, “Metamaterial Arrays," Microwave Materials and Applications Conference, Seoul, Korea, July 3-6, 2016. (Invited)
* M. Lanagan, “High Frequency Permittivity Measurement,” National Science Foundation Center for Dielectrics Meeting, Kyoto, Japan, June 17, 2016.
* M. Vecchio\*, A. Meddeb, M. Lanagan and Z. Ounaies, “Multilayer Dielectrics for High Breakdown Strength and Low Loss,” National Science Foundation Center for Dielectrics Meeting, Kyoto, Japan, June 17, 2016
* Betul Akkopru-Akgun\*, M. Lanagan, and S. Trolier-McKinstry “Links Between Reliability, Imprint and Aging in Piezoelectric Films,” National Science Foundation Center for Dielectrics Meeting, Kyoto, Japan, June 17, 2016
* RW. Luo\*, R. Liu\*, T. Neuberger, M. T. Lanagan “Numerical evaluation of the optimal coupling scheme of a cylindrical dielectric resonator operating at 600 MHz (14T) ", ISMRM-24rd Meeting, Singapore May 7 – May 13, 2016.
* J. Gao\*, D. K. Kwon, E. Furman, M. Lanagan, B. Akkopru-Akhun\*, B. Balachandran, and S. Garner, “Dielectric Performance of Glass at High Temperature and Electric Field,” Electronic Materials and Applications Conference, Orlando, FL, January 20-22, 2016.
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* J. Gao, M. Lanagan and S. Zhang (PolyK), “High Temperature Dielectrics for Film Capacitors,” National Science Foundation Center for Dielectrics Meeting, Raleigh, NC, October 26, 2015.
* M. Vecchio\*, M. Lanagan and Z. Ounaies, “Novel Multilayer Polymer Laminates for High Energy Density and Low Loss Dielectrics,” National Science Foundation Center for Dielectrics Meeting, Raleigh, NC, October 26, 2015.
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* M.T. Lanagan, “Millimeter-wave Characterization of Dielectrics and Semiconductors,” National Science Foundation Center for Dielectrics Meeting, Raleigh, NC, October 26, 2015.
* J. Zhao\*, Z. Cohick\*, W. Luo\*, A, Baker, S. Perini, M. Lanagan and C. Randall, "Dielectric Substrate Development for Plasma Metamaterial," MS&T Materials Science and Technology Conference, Columbus, OH, October 4-18, 2015.
* S. Zhe\*, S. Zhang, H. Liu, H. Hao, M. Cao, W. Luo\*, M. Lanagan, "Effect of Thermal Annealing on the Energy Storage Properties and Interfacial Polarization Behavior in Microwave-sintered BST Ceramics," MS&T Materials Science and Technology Conference, Columbus, OH, October 4-18, 2015.
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* S. Berbano\*, M. Lanagan and C. Randall, “Impedance Spectroscopy Modeling of Glass-Ceramic Lithium Solid," MS&T Materials Science and Technology Conference, Columbus, OH, October 4-18, 2015.
* C. Randall and M. Lanagan, “Piezoelectric and Dielectric Multilayer Components,” MS&T Materials Science and Technology Conference, Columbus, OH, October 4-18, 2015. (Keynote Presentation)
* T. Neuberger, Rui Liu\*, W. Luo\* and M. Lanagan, “Coupling strategies for ultra-high field dielectric resonators,” International Conference on Magnetic Resonance Microscopy, Munich, Germany, August 2-6, 2015
* M. Lanagan, “High Energy Dielectrics for Pulse Power and Power Electronic Applications,” Pacific Rim Conference of the Ceramic Societies, Jeju Island, Korea, September 30 – August 4, 2015. (Invited)
* M. Lanagan, “Dielectric Resonators for Electric and Magnetic Field Enhancement,” Pacific Rim Conference of the Ceramic Societies, Jeju Island, Korea, September 30 – August 4, 2015. (Invited)
* B. Seifi\*, M. Lanagan, G.C. Lee\*, T. Neuberger, E. Semouchkina, “Modified Design of Coil Probe for High Field MRI,” IEEE Antenna and Propagation Society, Vancouver, Canada, July 19-25. 2015.
* S. Amma, M. Lanagan, S. Kim, C. Pantano, “Composition Effects on Ionic Transport in Alkali-Alkaline Earth-Aluminosilicate Glass,” American Ceramic Society Glass & Optical Materials Annual Meeting, Miami, FL, May 17-21, 2015.
* U. Balachandran, B. Ma, M, Pyrz\*, M. Lanagan, S. Garner, P. Cimo, “Development of Flexible Glass Capacitors for Power Inverters in Electric Drive Vehicles,” American Ceramic Society Glass & Optical Materials Annual Meeting, Miami, FL, May 17-21, 2015.
* M. Lanagan, “Energy and Power Densities of Dielectrics and Capacitors,” IEEE International Workshop on Integrated Power Packaging, Chicago, IL, May 3-6, 2015.
* R. Liu\*, W. Luo\*, T. Neuberger, M. T. Lanagan “Evaluation on Coupling Strategies for Ultra-High Field MRI Probe Made of Cylindrical Dielectric Resonator ", ISMRM-23rd Meeting, Toronto Canada, May 30 – June 5, 2015.
* M. Pyrz\* and M. Lanagan, “Development of Predictive Tools for Self-Healing Behavior in Coated Glass Systems,” TMS Annual Meeting and Exposition, Orlando, FL, March 15-19, 2014.
* M. Lanagan, "Glass Capacitors for Power Electronics," TMS Annual Meeting and Exposition, Orlando, FL, March 15-19, 2014. (Invited)
* E. Furman and M. Lanagan, “High Temperature Dielectric Materials and Capacitors for Power Electronics,” Applied Power Electronic Conference APEC, Charlotte, NC, March 15-19, 2015. (Invited)
* M. Lanagan, "Dielectric Breakdown: Theory, Characterization and Its Relationship to Energy and Power Density," MS&T Materials Science and Technology Conference, Pittsburgh, PA, October 12-16, 2014.
* S. Berbano\*, M. Lanagan and C. Randall, "Glass and Glass Ceramic Lithium Thiophosphate Solid Electrolytes for Solid State Batteries and Electrochemical Capacitors," MS&T Materials Science and Technology Conference, Pittsburgh, PA, October 12-16, 2014.
* M. Pyrz\*, B. Akkopru-Akgun\*\*, S. Trolier-McKinstry M. Lanagan "Thin Film Deposition and Characterization of High Energy Glass," 23rd International Symposium on Applications of Ferroelectrics, State College, PA, May 12-16, 2014.
* C. Sica, W. Luo\*, S. Rupprecht, M. Lanagan, C. Collins, R. Sahul, S. Kwon, and Q. Yang, "Ultra High Dielectric Constant (UHDC) Head Insert at 3T for Dramatic Reduction of SAR and B1 Inhomogeneity", Joint annual Meeting ISMRM-ESMRMB, Milan, Italy, May 10-16, 2014.
* Z. Cao, W. Luo\*, S. Rupprecht, C. Sica, M. Lanagan, C. M. Collins and Q. Yang, "Improvement of Parallel Imaging Using High Permittivity Material (HPM) - Demonstration with Liver Imaging at 3T", Joint annual Meeting ISMRM-ESMRMB, Milan, Italy, May 10-16, 2014.
* C. Sica, W. Luo, S. Rupprecht, M. Lanagan, C. Collins, R. Sahul, S. Kwon and Q. Yang, "RF Field Enhancement at 0.5T to 1.5T with Ultra High Dielectric Constant Material (UHDC)", Joint annual Meeting ISMRM-ESMRMB, Milan, Italy, May 10-16, 2014.
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* B. Akkopru-Akgun\*, M. Lanagan, S. Trolier-McKinstry, "Self-Healing MnO2 Electrodes for Enhanced Reliability of Dielectric Films," TMS Annual Meeting and Exposition, San Diego, CA, February 16-20, 2014.
* M. Lanagan, "Dielectric Breakdown: Theory, Characterization and Its Relationship to Energy and Power," (Invited) TMS Annual Meeting and Exposition, San Diego, CA, February 16-20, 2014.
* U. Balachandran, B. Ma, M. Lanagan, S. Garner, P. Cimo, "Development of Flexible Glass Capacitors for Power Inverters in Electric Drive Vehicles," Flexible and Printed Electronic Conference & Exhibition, Phoenix AZ, February 3-6, 2014.
* S. S. Berbano\*, M. Mirsaneh\*, M. T. Lanagan, C. A. Randall, "Enhanced Ionic Transport in High Density, Pressure Formed 0.70Li2S + 0.30P2S5 Lithium Thiophosphate Solid Electrolytes," Electronic Materials and Applications 2013. Orlando, Florida, January 22-25, 2014.
* Seth S. Berbano\*\*, Mehdi Mirsaneh, Michael T. Lanagan, Clive A. Randall, "Bulk ionic conductivity and crystallization of lithium thiophosphate solid electrolytes," 224th ECS Meeting. San Francisco: The Electrochemical Society; October 27-November 1, 2013.
* S. S. Berbano\*, M. Mirsaneh\*, M. T. Lanagan, C. A. Randall, "Nanocomposite and Glass Ceramics as Solid-State Electrolytes: Processing, Microstructure, and Properties," International Congress on Glass. Prague, Czech Republic, July 1-5, 2013.
* M. P. Manoharan\*, M. T. Lanagan, S. Zhang, D. Kushner, C. Zhou , T. Murata, "High Temperature High Energy Density Polymer-coated Glass Capacitors", 2013 IEEE Transportation Electrification Conference & Expo, Metro Detroit, Michigan, June 16-19, 2013.
* P. Dash\*, E. Furman, C. Pantano, M. T. Lanagan, "Space Charge Formation and High Field Properties of Low Alkali Glasses,” 2013 Material Research Society Spring Meeting & Exhibit, San Francisco, California, April 1-5, 2013.
* S. Oh, E. Semouchkina, T. Neuberger, M. T. Lanagan, B. Zhang, C. Murat-Deniz, C. Collins "Miniaturized Patch Antenna for Traveling-Wave Excitation: Pilot Study at 7T MRI", ISMRM-21st Meeting, Salt Lake City Utah, April 20-26, 2013.
* S. Rupprecht, C. Sica, R. Sahul, S. Kwon, M. T. Lanagan, Q. Yang "Drastic Enhancement and Manipulation of RF Field with Ultra High Dielectric Constant (UHDC) Materials at 3T”, ISMRM-21st Meeting, Salt Lake City Utah, April 20-26, 2013.
* C. Sica, S. Rupprecht, R. Luo, Z. Cao, R. Sahul, S. Kwon, M. T. Lanagan, C. Collings and Q. Yang "In-Vivo Evaluation of a New High Dielectric Constant Material for Local Enhancement of B1+ and SNR at 3T", ISMRM-21st Meeting, Salt Lake City Utah, April 20-26, 2013.
* S. Oh, W. Luo, B. Zhang, M. T. Lanagan, G. Wiggins, C. Collins "Maximized Local B1+ Using Optimized Dielectric Pad at 7T: Numerical Optimization and Experimental Validation", ISMRM-21st Meeting, Salt Lake City Utah, April 20-26, 2013.
* P. Dash\*, E. Furman, C. Pantano, M. T. Lanagan, "Alkali Free Boroaluminosilicate Glasses for High Energy Density Power Electronic Applications," Functional Glasses: Properties and Applications for Energy & Information, Siracusa, Sicily, Italy, January 6-11, 2013.
* E. Furman, B. A. Jones, S. E Perini, M. T Lanagan, S. Kwon, W. Hackenberger, R. Sahul, "Investigation of Tunable Bulk Microwave Dielectrics," Electronic Materials and Applications Orlando, Florida, January 22-25, 2013.
* P. Dash\*, E. Furman, C. Pantano, M. T. Lanagan, "Low Alkali Boroaluminosilicate Glasses as Dielectrics for Power Electronic Capacitors," Material Science &Technology 2012 Conference & Exhibition, Pittsburgh, Pennsylvania, October 7-11, 2012.
* S. S. Berbano\*, M. Mirsaneh\*, M. T. Lanagan, C. A. Randall, "REUs: Mentoring Relationships and Transitioning to Graduate School," National Science Foundation International Materials Institute for New Functionality in Glass Review. Bethlehem, PA, September 13, 2012 (Invited Oral).
* S. S. Berbano\*, M. Mirsaneh\*, M. T. Lanagan, C. A. Randall, “Ionic Conductivity of Lithium Thiophosphate Solid Electrolytes,” 3M Fellows Graduate Poster Session. Minneapolis, Minnesota, October 5, 2012.
* S. Marinel, D. H. Choi\*, D. Agrawal, M. Lanagan and T. Shrout, "Broadband Dielectric Characterization of Direct Microwave Sintered TiO2 Ceramics," 2nd Global Congress on Microwave Energy Applications, Long Beach, CA, USA, July, 23-27, 2012. (Poster)
* M. T. Lanagan, "High Energy Glass Composites for Pulse Power and Power Electronic Applications" 4th International Congress on Ceramics and Composites, Chicago IL, July 15-19, 2012. (Invited Presentation)
* M. P. Manoharan\*, M. T. Lanagan, C. Zhou, D. Kushner, S. Zhang, "Enhancement of Dielectric Breakdown Strength in Glass using Polymer Coatings", 2012 IEEE International Power Modulator and High Voltage Conference, San Diego, California, June 3-7, 2012.
* P. Dash\*, T. Murata, C. Pantano, E. Furman, M. T. Lanagan, "Space Charge Formation and High Field Properties of Low Alkali Glasses," The American Ceramic Society's 2012 Glass & Optical Materials Division Annual Meeting. St. Louis, Missouri, May 20-24, 2012.
* E. Furman, A. Baker, S. Perini , M. Monoharan, D. Kushner, N. Zhang, C. Zou, C. Mi, S. Zhang, T. Murata and M. Lanagan, High Temperature Performance of Coiled Glass Capacitors, Proceedings of the High Temperature Electronics Conference, Albuquerque, NM, May 8-12, 2012.
* E. Semouchkina, G. Semouchkin, M. Lanagan, "All Dielectric Meta-materials for New Areas of Applications," Proc. Ceramic Interconnect and Ceramic Microsystems Conf., Intern. Microelectronics and Packaging Soc.," Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT), Erfurt, Germany, April 16-19, 2012.
* H. Zhang\*, T. Neuberger, S. Perini, M. Lanagan, E. Semouchkina, and G. Semouchkin, "High Frequency Approaches for LTCC-Based Sensors", Proc. Ceramic Interconnect and Ceramic Microsystems Conf., Intern. Microelectronics and Packaging Soc.," Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT) Erfurt, Germany, April 16-19, 2012.
* M. T. Lanagan, "High Energy Glass Composites for Pulse Power and Power Electronic Applications" 36th International Conference and Exposition on Advanced Ceramics and Composites, January 22-27, Daytona Beach FL, January 24, 2012. (Invited Presentation)
* P. Dash\* and M. T. Lanagan, "Current and Voltage Studies for Improving Dielectric Breakdown in High Energy Density Glass Capacitors," 19th University Conference on Glass Science, Troy NY, August 5, 2011.
* D. Choi\*, M.T. Lanagan, E. Furman, C.A. Randall, "AC Dielectric Properties and Resistance Degradation in Barium Strontium Titanate," Electronic Materials and Applications Conference, Orlando FL, January 20, 2011.
* P. Dash\*\*, T. Murata, H. Lee, R. Rajagopalan, E. Furman, M. T. Lanagan, "Dielectric Breakdown of High Energy Density Alkali Free Glasses," Electronic Materials and Applications Conference, Orlando FL, January 20, 2011.
* Jessica Serra\*, Michael Lanagan and Carlo Pantano "Dielectric Breakdown of Alkali-Free Boroaluminosilicate Glass Thin Film," The American Ceramic Society's 2010 Glass & Optical Materials Division Annual Meeting. May 16-20, 2010 Corning, New York.
* Mike Lanagan, Clive Randall, Amanda Baker and Eugene Furman, "High Energy Glass Laminates for Pulse Power and Power Electronic Applications," 2010 CICMT Conference, Chiba, Japan April 18-21, 2010
* Brian Bontempo\*, Steve Perini, Mark Fanton, Tim Bogart\* and Mike Lanagan, "Current Voltage Characterization of Tantalum Oxide Thin Film Dielectrics," 2010 CICMT Conference, Chiba, Japan April 18-21, 2010
* Kristine Haines\*, Jose A. Muniz, Ihssan S. Masad,.Elena Semouchkina\*, Michael Lanagan, Andrew Webb, Samuel Grant, "MR Microimaging with a Cylindrical Ceramic Dielectric Resonator at 21.1 T," Experimental Nuclear Magnetic Resonance Conference, Daytona Beach Fl, April 18-23, 2009
* C. A. Randall , H. Ogihara, S. S. N. Bharadwaja, M. T. Lanagan, S. Trolier-McKinstry, C. Stringer, Potential High Temperature, High Energy Density Dielectrics for Multilayer Ceramic Capacitors for Power Applications, 17th Annual IEEE Pulsed Power Conference, Washington DC, June 28 -July 2, 2009.
* E. Furman, G. Sethi, B. Koch\*, M. T. Lanagan, Monte Carlo Modeling of Heterogeneities in Ceramic, Polymer, and Composite Capacitors , 17th Annual IEEE Pulsed Power Conference, Washington DC, June 28 -July 2, 2009.
* Mike Lanagan, Nick Smith\*, Hoikwan Lee\*, Badri Rangarajan\*, Ben Koch\*, Eugene Furman and Carlo Pantano, "High Energy Density Glass Dielectric for Pulsed Power and Power Electronics Applications," The 14th US-Japan Seminar on Dielectric and Piezoelectric Ceramics., Principal Author, October 2009. (Invited presentation)
* E.Furman, S. Zhang N. Kim, H. Hofmann, T. Shrout, M. Lanagan R. Stroman\* "High-Temperature, High-Power Capacitors: the Assessment of Capabilities," Society of Automotive Engineers, Seattle, Washington, November 11, 2008.
* B. Rangarajan\*, T. Shrout, and M. Lanagan, "Glass Ceramic Dielectrics: Energy Storage and Breakdown," 17th ISAF IEEE International Symposium, Santa Fe NM, February 25-27, 2008.
* M. Lanagan, K. Rajab\*, D. Kwon\*, G. Semouchkin, E. Semouchkina\*, and M. Iwasaki, "Ceramic Dielectric Materials for Microwave Resonator Arrays," 17th ISAF IEEE International Symposium, Santa Fe NM, February 25-27, 2008.
* C.H. Min\*, M. Lanagan, T. Shrout, Temperature Dependence of Electrical Breakdown in Polymer Dielectrics, Proc. High Temp. Elect. Conf., Intern. Microelectronics and Packaging Soc., Albuquerque, New Mexico, May 13 -15, 2008.
* M.T. Lanagan, T. Shrout, B. Rangarajan\*, C. Pantano, and S. Conzone, "Glass Based Dielectrics for High Temperature Capacitors," Proc. of the IMAPS High Temperature Electronics Conf., 6 pages, Albuquerque, New Mexico, May 13-15, 2008.
* M. Lanagan, E. Furman, R. Rajagopalan and P. Tewari\* Glass and Glass Ceramics as High Energy Materials, US-Japan Winter School on New Functionality in Glass, Kyoto Japan , January 4 - 17, 2008.
* M. Lanagan, "High Power Capacitors and Energy Storage," Materials Day, State College, PA, April 14, 2008.
* M. Lanagan, C. Pantano, S. Perini, B. Rangarajan, S. Conzone, "High Temperature Glass-based Dielectrics for Capacitors," presented at IMAPS HiTec Conference , May 13, 2008.
* M. Lanagan, "High Field Conduction and Space Charge Distribution, and Polarization in Composites," Sandia Pulsed Power Breakout Session, Sandia National Laboratory February 27, 2008, Albuquerque, NM
* J. Turpin\*, L. Haney\*, S. Perini, B. Booth\*, J. Robinson, M. Fanton and M. Lanagan, "A Microwave Characterization Technique for Dielectric Films using Interdigital Capacitors," 2008 CICMT Conference, Munich, Germany April 24-26, 2008
* M. Lanagan, "Dielectric Behavior for High Field and High Power over Broad Time Ranges," CDS fall meeting, State College, PA. October 13, 2008.
* C. Randall, D. Shay\*, R. Maier\*, D. Choi\*, and M. Lanagan, "Designing Dielectric Materials for High Power and Energy Density-a New Era for Capacitor Based Applications," 2013 IEEE International Ultrasonics Symposium (IUS) , Prague, Czech Republic, July 21-25, 2013.
* M. Lanagan, "An Update on High Energy Storage Capacitors," CDS spring meeting, State College, PA., April 9-10, 2007.
* M. Lanagan, "Novel Antenna Design Opportunities with LTCC," CDS spring meeting, State College, PA., April 9-10, 2007.
* J. Li\*, M. Olszta, G. Sethi, M.T. Lanagan, M. Horn and E. Dickey, "Fluctuation Electron Microscopy Investigation of Anodic Ta2O5 and Nb2O5 Dielectrics", Microscopy & Microanalysis 2007 Meeting, Ft. Lauderdale, FL, August 5-9, 2007
* G. Sethi\*, M. Lanagan and M. Horn, "Processing of High-k Oxide Thin Films for High Energy Density Capacitors", AVS 53rd Symposium, San Francisco, CA, November 12-17, 2006.
* G. Seth\*i, M.T. Lanagan, M. Horn, and N. Wonderling, "Crystal Structure Evolution in High-k Zirconia Thin Films for High Energy Density Capacitors," 55th Annual Conference on Applications of X-ray Analysis, International Center for Diffraction Data, Denver, CO, August 7-11, 2006.
* G. Sethi\*, M.Olszta, J.Li, J. Sloppy, M. Horn, E. Dickey and M.T. Lanagan "Structure and Dielectric Properties of Amorphous Tantalum Pentoxide Thin Film Capacitors," IEEE Conference on Electrical Insulation and Dielectric Phenomena, Vancouver, Canada, 2007.
* E. Semouchkina\*, V. Tyagi\*, M. Lanagan, and G. Semouchkin, "Electromagnetic Response of Bianisotropic Resonators Perspective for Terahertz and Optical Metamaterials," URSI North American Radio Science Meeting, Ottawa, ON, Canada, July 2007 (Invited).
* A. Hennings\*, E. Semouchkina, A. Baker, G. Semouchkin, R. Waser, and M. Lanagan, "Development of Miniature LTCC Filter for TV broadcasting Band by Using Substrates of Mixed Dielectrics," 37th European Microwave Conf., Munich, Germany, September 2007.
* E. Semouchkina\*, Y. Miyamoto, G. Semouchkin, S. Kirihara, S., and M. Lanagan, "FDTD Study of Resonance Phenomena at Electromagnetic Wave Localization in 3D Dielectric Fractal and Modified Structures," Metamaterials 2007, 1st International Congress, Rome, Italy, October 2007.
* E. Semouchkina\*, M. Lanagan, G. Semouchkin, and R. Mittra, "Field Simulation Based Analysis and Development of Metamaterial Structures," Metamaterials 2007, 1st International Congress, Rome, Italy, October 2007 (Invited Presentation).
* D. Kwon\*, T. Akiyoshi and M.T. Lanagan, "(ICACC-S10-049-2007) Synthesis of Manganese Oxice Thin Films for Capacitor Electrodes," 31st International Cocoa Beach Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, Florida. January, 2007.
* M.T. Lanagan, D. Kwon\* and E. Semouchkina\*, "(ICACC-S10-056-2007) Dielectric Materials Development for Low Temperature Co-Fired Ceramics ," 31st International Cocoa Beach Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, Florida. January, 2007. (Invited Presentation).
* K. Rajab\*, R. Mittra, M. Naftaly, E. Linfield and M.T. Lanagan, "Terahertz Transmission Through Periodic Arrays of Dielectric and Conducting Spheres," IEEE International Symposium, Antennas & Propagation Society, Honolulu, Hawaii, June 10-14, 2007.
* E. Semouchkina\*, G. Semouchkin and M.T. Lanagan,"Electromagnetic Simulation of Paired-Wire and U-Shaped Resonator Metamaterial Composites for Terahertz and Optical Frequencies," IEEE International Symposium, Antennas & Propagation Society, Honolulu, Hawaii, June 10-14, 2007.
* E. Semouchkina\*, A. Baker, G. Semouchkin, T. Kerr and M.T. Lanagan, "Wearable Patch Antenna for Voice Communications with Substrate Composed of High Contrast Dielectrics," IEEE International Symposium, Antennas & Propagation Society, Honolulu, Hawaii, June 10-14, 2007.
* V. Tyagi\*, E. Semouchkina and M.T. Lanagan, "Ceramic Dielectric Resonators for High-Field Magnetic Resonance Imaging," IEEE International Symposium, Antennas & Propagation Society, Honolulu, Hawaii, June 10-14, 2007.
* J. Bringuier\*, R. Mittra, K. Rajab, J. Gonzalez and M.T. Lanagan, "Size Reduction of Microstrip Patch Antennas via Artificial Dielectric Loading," IEEE International Symposium, Antennas & Propagation Society, Albuquerque, NM. July 9-14, 2006.
* E. Semouchkina\*, V. Tyagi\*, A. Baker, T. Neuberger, M.T. Lanagan and A. Webb, "Ceramic Dielectric Resonators for High-Field Magnetic Resonance Imaging," CrossOver 2006, State College, PA. October, 2006.
* B. Rangarajan\*, B. Jones, C. Wang, T. Shrout and M.T. Lanagan, "Barium/Lead Based Invert Glasses for High Energy Density Capacitor Applications," 8th International Symposium on Crystallization in Glasses and Liquids, Jackson Hole, Wyoming. September, 2006.
* L. Haney\* and M.T. Lanagan (Primary Presenter), "Tunable Material Concepts," 48th TMS 2006 Electronic Materials Conference, State College, PA. 2006.
* G. Sethi\*, M.T. Lanagan, E. Furman and M. Horn, "Development of Structure-Property Relationships in Disordered Zirconia Thin Films for High Energy Density MIM Capacitors," 2006 MRL Fall Meeting, Boston, MA. November 27-December 1, 2006.
* P. Tewari\*, G. Sethi\* and M.T. Lanagan, "Electrical Characterization of 2-2 Zirconia-P(VDF-TrFE) Composite Dielectric," College of Engineering Research Symposium, Pennsylvania State University, State College, PA. March, 2006.
* P. Tewar\*i, E. Furman and M.T. Lanagan, "Interfacial Characterization of Oxide Parylene-C Laminar Composites," American Vacuum Society November 2006 Meeting, San Francisco, CA. 2006.
* B. Rangarajan\*, B. Jones, T. Shrout and M. Lanagan, "Glass ceramics from invert glasses for high energy density capacitor applications," GOMD Meeting, Greenville, SC, May 15-19, 2006.
* B. Rangarajan\*, "High energy density glass ceramics as energy sources in hybrid vehicles," International Congress on Ceramics, Toronto, June 25-29, 2006
* B. Rangarajan\*, B. Jones, T. Shrout and M. Lanagan, "Barium/lead based high permittivity invert glasses for capacitor applications," International Conference on Crystallization in Glasses and Liquids, Wyoming, Sept. 25-29, 2006
* M.T. Lanagan (Primary Presenter), S. Perini, J. Dougherty, M. Iwasaki and K. Rajab\*, "Dielectric Characterization of Dielectric Ceramic Materials Using THz Time-Domain Spectroscopy," Ceramic Interconnect and Ceramic Microsystems Technology, Denver, Colorado, 2006.
* M. Lanagan, "High Frequency Dielectric Characterization Techniques," CDS spring meeting St. Louis, Missouri. May 15-17, 2006.
* M. Lanagan, "CDS Microwave and Low Temperature Co-fired Ceramics (LTCC) R&D Activities," CDS fall meeting, Annapolis, MD, November 10-11, 2005.
* A. Perrotta and M.T. Lanagan, "Carbon-Carbon from mesophase Carbon Nanotubes Aspire," AFRL Carbon Tech Exchange, State College, PA. November 8, 2005.
* M. Iwasaki, S. Perini, E. Semouchkina, G. Semouchkin, K. Rajab\*, E. Furman, M. Okuyama, C. Randall and M.T. Lanagan, "Microwave Propagation Through the Dielectric Resonator Arrays," The 12th US-Japan Seminar on Dielectric and Piezoelectric Ceramics, Annapolis, Maryland. November 6-9, 2005.
* K. Rajab\*, E. Semouchkina, G. Semouchkin, C. Randall, A. Baker, M. Iwasaki, R. Mittra, and M.T. Lanagan, "New Development in Ceramic Metamaterials," The 12th US-Japan Seminar on Dielectric and Piezoelectric Ceramics, Annapolis, Maryland. November 6-9, 2005.
* M.T. Lanagan (Primary Presenter), J. Du\*, C. Wang, B. Jones, B. Rangarajan\*, T. Perrotta and T. Shrout, "Glass Ceramic Dielectrics," The 12th US-Japan Seminar on Dielectric and Piezoelectric Ceramics, Annapolis, Maryland. November 6-9, 2005.
* M.T. Lanagan (Primary Presenter), "Oxide Materials for High-Frequency and High-Power Applications," CDS Spring Meeting, Ogle Bay, W.V. May 17, 2005.
* G. Yang,\* E. Dickey, M.T. Lanagan and C. Randall, "Reliability Issues for BT and PLZT Multilayer Ceramic Capacitors," Dielectric Phenomena and Insulating Materials Symposium. May 2005.
* C. Randall, G. Yang\*, E. Dickey, R. Eitel\*, E. Semouchkina\*, G. Semouchkina, A. Baker and M.T. Lanagan, "Present and Future Challenges in Multilayer Ceramic Devices," 2005 IMAPS/ACerS 1st International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT), Denver, CO. April, 2005.
* D.-K. Kwon\*, M.T. Lanagan and T.R. Shrout, "Microwave Dielectric Properties of Ultra-Low Fireable BaO-TeO2 Based Ceramics," 107th ACERS meeting, Baltimore, MD. April, 2005.
* M. Iwasaki, S. Perini, E. Semouchkina\*, G. Semouchkin, C. Randall and M.T. Lanagan, "Microwave Propagation Through the Dielectric Resonator Arrays," 107th American Ceramics Society Annual Meeting, Baltimore, MD. April, 2005.
* M.T. Lanagan (Primary Presenter), "Nanotechnology and MEMS Research at Penn State, presented at SAIC," SAIC, State College, PA. Mar 17, 2005.
* K. Rajab\*, G. Semouchkin, E. Semouchkina, C. Randall, M. T. Lanagan, R. Mittra, E. Furman, M. Iwasaki and A. Baker, "Transmission Line and Resonator Based Metamaterial Structures," 29th International Conference on Advanced Ceramics and Composites, Cocoa Beach, Florida. January, 2005.
* E. Semouchkina\*, A. Baker, G. Semouchkin, M. Lanagan and C. Randall, "Resonant Ceramic Metamaterials," 29th International Conference on Advanced Ceramics and Composites, Cocoa Beach, Florida. January, 2005. (Invited Presentation).
* D.-K. Kwon\*, M.T. Lanagan and T.R. Shrout, "Low Firing Dielectrics in the BaO-TiO2-TeO2 Ternary System," 29th International Conference on Advanced Ceramics and Composites, Cocoa Beach, Florida. January, 2005.
* K. Rajab\*, R. Mittra and M.T. Lanagan, "Size Reduction of Microstrip Antennas using Metamaterials," IEEE International Symposium, Antennas & Propagation Society, Washington, DC. July 3-8, 2005.
* E. Semouchkina\*, G. Semouchkin, R. Mittra and M.T. Lanagan, "Resonant Properties of Dielectric Metamaterials," IEEE International Symposium, Antennas & Propagation Society, Washington, DC. July 3-8, 2005.
* E. Semouchkina, G. Semouchkin, M.T. Lanagan, L. Ivanchenko, S. Koroljev and N. Popenko, "A New Approach for Enhancement Circular Polarization Output in Square Shaped Microstrip Patch Antennas," IEEE International Symposium, Antennas & Propagation Society, Monterey, CA. June 20-25, 2004.
* M.T. Lanagan (Primary Presenter) and T. Shrout, "Low Processing Temperature and Dielectric Properties of Te-Based Dielectric Compounds," CDS fall meeting, State College, PA. October, 2004.
* M.T. Lanagan (Primary Presenter), "MRI Overview and Microwave Processing of Electronic Components," Microwave Powder Processing Consortium, State College, PA. September, 2004.
* E. Semouchkina, G. Semouchkin and M.T. Lanagan, "FDTD Analysis of Dual-mode Microstrip Antennas," IEEE International Symposium, Antennas & Propagation Society, Columbus, OH. June 22-27, 2003.
* M. Lanagan (Primary Presenter), "Materials and Structures for the Microwave/mm-wave Frequency Spectrum," Materials Research Society Annual Meeting, Boston, December, 2003. (Invited Presentation).
* D.-K. Kwon\*, M.T. Lanagan, and T.R. Shrout, "Microwave Dielectric Properties of LaScO3-TiO2 Materials," Materials Research Society Annual Meeting, Boston, December, 2003.

**Invited Presentations at Workshops and Seminars (Past 9 Years)**

October 2021 "RF Electromagnetic Wave Interactions with Dielectric Materials and Structures," High Field and Ultra High Field Workshop, University of Minnesota CMRR On-Line

July 2021 “Dielectrics in Medicine and Communications” , International PACK Fellows, University of Kiel, On-Line

April 2021 “Broadband Dielectric Characterization of Polymers and Ceramics in the 5G Frequency Range,” International Electronics Manufacturing Initiative. On-Line

March 2021 “Materials for 5G,” The Penn State – National Taipei University of Technology Joint Symposium, On-Line

February 2021 “Broadband Dielectric Characterization for Microwave Processing, 5G, and Medical Applications,” Indo-US Virtual Workshop, Resource Efficient Processing using Microwave, IIT Roorke

July 2020 “Glass materials for Energy Storage and 5G,” Oxide Seminar, Zoom to 30 participants.

February 2019 “Microwave Dielectric Response of Insulators and Interfaces,” Lawrence Workshop on Solid-State Technology Arizona State University Campus, Tempe, AZ

January 2019 “Dielectric Response of Glass and Glass/Water Interfaces,” Materials Nucleus, Corning Inc, Corning NY.

November 2018 “Material Science and High Permittivity Ceramics Fabrication for MRI and MRS Application at UHF,” Center for Magnetic Resonance Research, University of Minnesota

August 2018 “Plasma Based Reconfigurable Photonic Crystals and Metamaterials, ONR Workshop on Counter High Power Microwaves, Washington DC.

July 2018 “Dielectric Materials for Energy and Medicine,” Penn State Millennium Science Complex.

November 2017 “Glass as an Energy Storage Material, “ Sandia National Lab, Albuquerque, NM

August 2017 “Overview of Dielectrics Research for Power Electronics," NASA Glenn, Cleveland, OH

June 2017 “Space Charge Development and Dielectric Reliability,” Dow Corporation, Collegeville, PA

August 2016 “Materials and Components for Sensing in Extreme Environments,” National Energy Technology Lab,” Pittsburgh, PA.

June 2016 “Glass Dielectrics for Extreme Temperature Environment,” NEG Corporation, Kyoto, Japan.

June 2016 “Fundamental Dielectric Properties of Materials Under Extreme Environment,” Wuhan University of Technology, Wuhan, China.

July 2016 “Overview of Research Activities within the Center for Dielectrics,” Samsung Corporation, Seoul, Korea.

Nov. 2015 "Transient Charge Transport and Implication on Breakdown to Failure," NSF Center for Dielectrics and Piezoelectrics, Raleigh NC.

Aug. 2015 “A novel, all-dielectric, microwave plasma generator towards development of plasma metaterials,” Stanford University

April 2015 "High Energy Dielectrics for Pulsed Power and Power Electronics Applications," Lock Haven University Physics Seminar, Lock Haven, PA.

March 2015 "High Temperature Dielectric Materials and Capacitors for Power Electronics," Applied Power Electronic Conference, IEEE, Charlotte, NC.

October 2014 "The Role or Simulation and Design for Novel Microwave Materials and Devices," Materials Day, University Park, PA.

October 2014 "High Energy Dielectrics for Pulsed Power and Power Electronics Applications." University of Houston Physics Seminar, Houston TX.

October 2014 “Supercapacitors,’ Kraton Corporation, Houston TX

April 2014 "High Energy Dielectrics for Pulsed Power and Power Electronics," Korean Institute of Ceramic Technology, Seoul, Korea.

April 2014 "High Energy Dielectrics for Pulsed Power and Power Electronics," Yonsei University, Seoul, Korea.

May 2014 “Dielectric Resonators for Enhanced Magnetic Resonance Imaging” Wakino Memorial Symposium, International Symposium on the Applications, IEEE. State College, PA.

May 2012 “Commercialization Path for High Temperature Capacitors,” American Ceramic Society, Chicago, IL.

January 2012 “High Energy Glass Composites for Pulsed Power and Power Electronic Applications,” American Ceramic Society, Daytona Beach, FL.

March 2011 “Beyond the World of Electrical Engineering,” Student Section of IEEE, Penn State.

March 2011 “Nanotechnology in Energy Storage Capacitors,” EPRI, Charlotte, NC.

**INVENTIONS AND PATENTS**

1. Chen, Wei, Byeong-Yeul Lee, Xiao-Hong Zhu, Hannes M. Wiesner, Michael T. Lanagan, Qing X. Yang, Sebastian Rupprecht, Navid P. Gandji, and Maryam Sarkarat. "Apparatus and method for tuning the permittivity of ultrahigh dielectric constant materials in an rf coil for mr imaging." U.S. Patent A11,275,132, March 15, 2022.
2. T. J. Marks, M. Lanagan, M. A. Ratner, M. Delferro, L. A. Fredin, Z.Li, "Aluminum metallic nanoparticle-polymer nanocomposites for energy storage," U.S. Patent 10586628: March 10, 2020
3. C. Randall, J. Guo, A. Baker, M. Lanagan and Hanzheng Guo. “Cold Sintering Ceramics and Composites,” Patent No. 10730803, issued 8/4/2020
4. T. J. Marks, M. T. Lanagan, M. A. Ratner, M. Deferro, L. A. Fredin, and Z. Li. "Aluminum Metallic Nanoparticle-Polymer Nanocomposites for Energy Storage." U.S. Patent 20,160,071,627, issued March 10, 2016.
5. M. Lanagan, C. Pantano, H. K. Lee, R. Ramakrishnan and N. Smith, “Self-Healing High Energy Glass Capacitors,” U.S. Patent 8,542,4757: 2014.
6. T. J. Marks, M. Lanagan, N. Guo, S. DiBenedetto "High Energy Density Nanocomposites and Related Methods of Preparation," U.S. Patent 8,163,347: 2014.
7. T. Sogabe, T. Shrout, M. Lanagan, C. Randall, and H.-J. Youn, "Bismuth Pyrochlore Microwave Dielectric Materials," U.S. Patent 6,680,269: 2004.
8. M. Lanagan, V. Valsko-Vlasov, B. Fisher, and U. Welp, "Magneto-optic Current Sensor," U.S. Patent 6,630,819: 2003.
9. K. Goretta, M. Lanagan, D. Miller, S. Sengupta, J. Parker, and J. Hu, U. Balachandran, and R. Siegel, "Engineered Flux-pinning Centers in BSCCO TBCCO and YBCO Superconductors," U.S. Patent 5,929,001:1999.
10. N. Chen, K. Goretta, and M. Lanagan, "(Bi, Pb).sub.2, Sr.sub.2 Ca.sub.2 Cu.sub.3 O.sub.x Superconductor and Method of Making same Utilizing Sinter-forging," U.S. Patent 5,821,201:1998.
11. M. Lanagan, D. Kupperman, and G. Yaconi, "Apparatus for Monitoring High Temperature Ultrasonic Characterization," U.S. Patent 5,731,521:1998.
12. M. Lanagan, J. Picciolo and S. Dorris, "Synthesis of Increased-density Bismuth-based Superconductors with Cold Isostatic Pressing and Heat Treating," U.S. Patent 5,674,814: 1997.
13. S. Danyluk, M. McNallan, R. Troendly, R. Poeppel, K. Goretta, and M. Lanagan, "Near Net Shape Processing of Continuous Lengths of Superconducting Wire," U.S. Patent 5,661,113: 1997.
14. S. Dorris, R. Poeppel, B. Prorok, M. Lanagan, and V. Maroni, "Synthesis of Highly Phase Pure BSCCO Superconductors," U.S. Patent 5,468,566: 1995.
15. S. Dorris R. Poeppel, B. Prorok, M. Lanagan and V. Maroni, "Synthesis of Highly Phase Pure (Bi, Pb)-Sr-Ca-Cu-O Superconductor," U.S. Patent 5,354,535: 1994.

**Service to the University**

**Department of Engineering Science and Mechanics:**

2015-2018 Chair, Graduate Admissions and Fellowships Committee

2007-present Member, Graduate Admissions and Fellowships Committee

2015, 2020 Member, Strategic Planning Committee

2015 Member, Rapid Manufacturing Faculty Search Committee

2014 Member, Scholarships Committee

2013-14 Chair, Department Promotion and Tenure Committee

2011-2014 Chair, Senior Thesis Committee

2008-present Judge for Presentations and Posters at ESM Today

2008-2010 Member, Department Promotion and Tenure Committee

2021-2022

2007-present Chair, Ph.D. Candidacy Exam Committee

2006-2010 Member, Senior Thesis Committee

**College of Engineering:**

2014-2016 Member, MatSE Ph.D. Candidacy Exam Committee

2013-present Member, Materials Characterization Leadership Committee

2013-2014 Member, COE Promotion and Tenure Committee

2005-2012 Member, NSF GREAT Graduate Program Committee

1989-present Member, DOE GATE Graduate Program Committee

**University:**

2018-2021 Assistant Director of Development, Strategic Interdisciplinary Research Office

2016 Member, Global Programs Travel Grant Committee

2011-2012 Chair, Vice President for Research Promotion Review Committee for Research Faculty

2010-2011 Member, Vice President for Research Promotion Review Committee for Research Faculty

2010- 2015 Member, NIH Clinical Translational Science Award (CTSA) Steering Committee:

2010-2011 Member, RA10 Committee on Research Protection

2006-2009 Member, Millennium Science Complex Building Committee

2004-2013 Member, Materials Day Organization Committee

2004-present Honors Advisor, University Honors Program

2004-2012 Chair, Materials Research Institute Promotion Committee for Research Faculty

Contracts, Grants and Sponsored Research (PAST 15 YEARS)

Lanagan, M. T. (Principal Investigator), "High Field Dielectric Research in Polymeric Compositions," DOW Chemical Company, $427,280, 7/1/2020-6/30/2022. This program will support one graduate student and one post doctor.

Yang, Q. (Principal Investigator) Lanagan, M. T. (Co-Principal Investigator), "Breaking Spatiotemporal Barriers of MR Imaging Technologies to Study Human Brain Function and Neuroenergetics "," NIH, $1,600,000, 9/1/2018-8/31/2023. This program supports student Wuttichai Reainthippayasakul and Post Doctor Maryam Sarkarat.

Yang, Q. (Principal Investigator) Lanagan, M. T. (Co-Principal Investigator), "Elementary Neuronal Ensembles to Whole Brain Networks: Ultrahigh Resolution Imaging of Function and Connectivity in Humans "," NIH, $1,416,524, 2/1/2017-1/31/2022. This program supported ESM Graduate Student Thane Bonnett.

Rajagopalan, R. (Principal Investigator) Lanagan, M. T. (Co-Principal Investigator), Grant, "High field conduction in Silicone rubber"," 3M, $270,00.00, 2/1/2017-1/31/2019. This program supports Post Doctor Maryam Sarkarat.

Lanagan, M. T. (Principal Investigator), Van Duin, A. (Co-Principal Investigator), "Trap-Related Localized Fields and Percolation Conduction within Dielectrics and Across Interfaces," DOW Chemical Company, $1,066,056, 3/1/2017-2/29/2020. This program supports four students in ME, Chem. E. and MatSE.

Wolfe, D. (Principal Investigator) Lanagan, M. T. (Co-Principal Investigator), " High Temperature Materials for Hypersonic Radomes and Antennas "," HAMR, Industries LLC, $61,000, 8/15/2018-5/9/2019.

Lanagan, M. T. (Principal Investigator), "Glass Capacitors for Energy Storage and Conversion," National Science Foundation, $356,850, July 15, 2014 – June 30, 2018. This program supported graduate student Menxue Yuan.

Lanagan, M. T. (Principal Investigator), "RF Characterization of laminate composites," Naval Underwater Warfare Center, $75,000.00, September 1, 2015 – February 15, 2016. This program supports technical staff, Steve Perini and Eugene Furman.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Sponsored Research, "Metamaterials for Terahertz Applications," AFOSR, $7,500,000.00, July 2014 - June 2019. This program has supported students Sarah Antonsson, Jing Zhao, Zane Cohick and two post doctors Jing Guo and Wei Luo.

Lanagan, M. T. (Principal Investigator), Neuberger, T. U. (Co-Principal Investigator),"Collaborative Research: IDBR: TYPE A: Unconventional Antenna Probes for Ultra-High-Resolution Magnetic Resonance Imaging," National Science Foundation, $234,330.00, August 1, 2014 - July 31, 2017. This program supported a bioengineering student, Gang Chea Lee, who is advised by Thomas Neuberger.

Lanagan, M. T. (Principal Investigator), Anstrom, J. R. (Co-Principal Investigator), Contract, "Penn State GATE Center of Excellence: In-Vehicle, High-Power Energy Storage Technologies," National Energy Technology Laboratory, Federal Laboratories, $944,753.00, October 1, 2011 - September 30, 2017. This program supported seven graduate students in ESM, ME and MatSE.

Yang, Q. (Principal Investigator) Lanagan, M. T. (Co-Principal Investigator), "RF Coils with High-Permittivity Material Improving Performance and Safety in MRI," NIH, $665,500.00, March 1, 2014 - May 31, 2016. This program supported technical staff, Amanda Baker and post doctor, Wei Luo.

Lanagan, M. T. (Principal Investigator), "Investigation of Dielectric Materials: Electrode Glass Interfacial Layer," University of Dayton Research Institute, Associations, Institutes, Societies and Voluntary Health Agencies, $90,000.00, June 15, 2012 - August 31, 2015. This program supported graduate student Matthew Pyrz.

Lanagan, M. T. (Principal Investigator), "Development of Capacitor Technologies on Behalf of DOE's Office of Vehicle Technologies Program," DOE, $670,000.00, July 1, 2010 - April 30, 2016. This program supported graduate students Mike Vecchio and Mengxue Yuan.

Lanagan, M. T. (Principal Investigator), "Development and Characterization of Anisotropic Dielectrics," Naval Underwater Warfare Center, $46,000.00, August 1, 2014 - March 31, 2015.

Agrawal D. (Principal Investigator), Lanagan M. T. (Co-Principal Investigator), Grant, "High Temperature Materials Interaction with W-Band Electromagnetic Radiation for Microsatellite Application," Air Force Research Laboratory, $100,000.00, December 1, 2013 - December 31, 2014.

Lanagan, M. T. (Principal Investigator), "Unconventional Wound Glass Capacitor Component for Power Modulator in RF Accelerator," Department of Energy., $40,000.00, February 1, 2014 - October 31, 2014.

Lanagan, M. T. (Principal Investigator), "Synthesis and Characterization of Polycarbonate-Alumina Laminates for High Temperature Capacitors," Sabic, $120,000.00, November 1, 2013 - October 31, 2014.

Lanagan, M. T. (Principal Investigator), "Spark Plug research," Autolite-Fram Group, $46,000.00, January 1, 2012 - January 31, 2014.

Lanagan, M. T. (Principal Investigator), "Characterization of Nonlinear and Dispersive Dielectrics," Naval Underwater Warfare Center, $46,000.00, August 1, 2013 - December 31, 2013.

Lanagan, M. T. (Co-Principal Investigator), "NSF Nanosystems Engineering Research Center (ERC) on Advanced Self-Powered Systems of Integrated Sensor Technologies (ASSIST)," North Carolina State University, Universities and Colleges, $699,870.00, September 1, 2012 - August 31, 2013.

Lanagan, M. T. (Principal Investigator), "Unconventional Compact Wound Glass Capacitors for Pulsed Power System in RF Accelerators (SBIR Phase II)," Strategic Polymer Sciences^, Corporations, $300,000.00, August 8, 2012 - August 7, 2013.

Lanagan, M. T. (Principal Investigator), "Design and Fabrication of Dielectric Meta-material Antennas," Naval Sea Systems Command, Federal Agencies, $93,260.00, August 31, 2012 - May 30, 2013.

Lanagan, M. T. (Principal Investigator), Contract, "Developing Dielectric Test Methodology for Benchmarking Sparkplug Insulators," FRAM Group Operations, LLC, Corporations, $40,000.00, August 31, 2012 - February 1, 2013.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Nanodielectrics for Pulsed Power Applications," Air Force Research Laboratory, $100,000.00. , November 28, 2008 - September 30, 2012.

Anstrom, J. R. (Principal Investigator), M. T. (Research Associate), "Penn State GATE Center of Excellence: In-Vehicle, High-Power Energy Storage Technologies," U.S. Department of Energy, Federal Agencies, $500,000, October 1, 2005 - August 31, 2010.

Lanagan, M. T. (Principal Investigator), Zhang, Q. (Co-Principal Investigator), Contract, "DOE SBIR III: Compact High Temperature DC Bus Capacitors for Electric Vehicles Using High Performance Electroactive Polymers," Strategic Polymer Sciences, Corporations, $100,000.00, October 1, 2010 - August 30, 2012.

Lanagan, M. T. (Principal Investigator), Rajagopalan, R. (Co-Principal Investigator), Contract, "Etching and Coating Glass Substrates for Prototype Multilayer Capacitors," Strategic Polymer Sciences, , $40,000.00, June 17, 2011 - March 16, 2012.

Furman, E. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "SBIR: Nanodielectrics with Nonlinear Response for High Power Microwave Generation," TRS Technologies, Inc., $125,000.00, December 16, 2009 - November 30, 2011.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Developing Dielectric Test Methodology for Benchmarking Spark Plug Insulators," Honeywell International, Inc., $60,000.00, April 1, 2011 - September 30, 2011.

Lanagan, M. T. (Principal Investigator), Zhang, Q. (Co-Principal Investigator), Randall, C. A. (Co-Principal Investigator), Shrout, T. R. (Co-Principal Investigator), Wang, Q. (Co-Principal Investigator), Grant, MURI "Unconventional Dielectric Materials and Structures for Ultra-High Performance Pulsed Power Capacitors," Office of Naval Research, $5,000,000, May 1, 2005 - April 30, 2011).

Randall, C. A. (Principal Investigator), Trolier-McKinstry, S. E. (Co-Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Nanodielectrics for Pulsed Power Applications," Air Force Research Laboratory, $400,000.00, November 28, 2008 - January 31, 2011.

Lanagan, M. T. (Principal Investigator), Contract, "Dielectric Property Measurement of Films," Cabot Corporation, $1,000.00, September 20, 2010 - December 31, 2010.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Grant, "Expansion and Maintenance of a Newly Formed I/UCRC Multi-University Center for Dielectric Studies," National Science Foundation, $83,000.00, August 15, 2006 - July 31, 2010.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Conductive Oxides," Recapping, Inc., $410,590.00, November 24, 2008 - May 30, 2010.

Lanagan, M. T. (Principal Investigator), Pantano, C. G. (Co-Principal Investigator), Contract, "Glass-Ceramic Capacitors for High Energy Density Power Conditioning Applications," TRS Technologies, Inc., $100,000.00, April 10, 2008 - April 10, 2010.

Semouchkin, G. B. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Theoretical Study and Characterization of Ion Tracks in Flow of Liquid in Strong Magnetic Field," Abell Foundation, $110,670.00. Total awarded: $110,670.00, December 1, 2008 - March 31, 2010).

Lanagan, M. T. (Principal Investigator), "High Voltage Breakdown Characterization of Nanocomposite Dielectrics," TPL, Incorporated, $26,000.00, March 1, 2009 - August 31, 2009.

Furman, E. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Nanoscale Tunable Microwave Barium Strontium Titanate," TRS Technologies, Inc., $50,000.00, October 8, 2008 - July 7, 2009).

Semouchkina, E. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Development of metamaterials for cherenkov radiation based particle detectors," Euclid Techlabs, LLC, $17,000.00, October 7, 2008 - March 29, 2009.

Lanagan, M. T. (Principal Investigator), "Glass Dielectric Measurements," Guardian Industries Corporation, $2,800.00, December 1, 2008 - February 28, 2009.

Lanagan, M. T. (Principal Investigator), , "Determination of Resistivity of SiC Samples," M Cubed Technologies, $2,400.00, September 1, 2008 - December 31, 2008.

Lanagan, M. T. (Principal Investigator), Srowthi, B. (Co-Principal Investigator), Wolfe, D. E. (Co-Principal Investigator), Contract, "High Energy Wound Capacitors based on Flexible Oxide Films," TRS Technologies, Inc., $22,000, May 12, 2008 - November 12, 2008.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Grant, "Formation of an I/UCRC Multi-University Center for Dielectric Studies Supplement""," National Science Foundation, $150,000.00, August 1, 2005 - July 31, 2008.

Lanagan, M. T. (Principal Investigator), Contract, "Broad Band Characterization of Particle Filled Composites from DC to Microwave Frequency," Cabot Corporation, $10,000.00, July 1, 2007 - June 30, 2008.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Comparative Cardiac Capacitor Component Study for Resistance Against Degradation," Guidant/Cardiac Pacemakers, $100,000.00, February 5, 2007 - February 28, 2008.

Lanagan, M. T. (Principal Investigator), "High Energy Thin Film Capacitors for Pulse Power Systems," TRS Technologies, Inc., $33,000.00, March 28, 2007 - December 28, 2007).

Lanagan, M. T. (Principal Investigator), "Materials and Capacitor Development of Power Electronics," Murata Manufacturing Co., Ltd. (Japan), $25,000.00, September 1, 2006 - August 31, 2007.

Lanagan, M. T. (Principal Investigator), Dickey, E. C. (Co-Principal Investigator), Grant, "Dielectrics in the Commonwealth," Ben Franklin Technology Center of Central & Northern Pennsylvania, Inc., $55,000.00, July 1, 2006 - June 30, 2007.

Lanagan, M. T. (Principal Investigator), Shrout, T. R. (Co-Principal Investigator), Grant, "Nanocrystalline Glass Ceramics for High Energy Density Capacitors," U.S. Department of the Navy, $305,000.00, March 11, 2004 - March 30, 2007).

Lanagan, M. T. (Principal Investigator), "Capacitor Materials," Intel Corp., $40,000.00, July 1, 2005 - December 31, 2006).

Lanagan, M. T. (Principal Investigator), Shrout, T. R. (Co-Principal Investigator), Randall, C. A. (Co-Principal Investigator), Contract, "High Temperature Materials and Capacitor Development for SiC Power Electronics," Battelle - Oak Ridge National Laboratory, $75,000.00, January 9, 2006 - December 30, 2006.

Lanagan, M. T. (Principal Investigator), Randall, C. A. (Co-Principal Investigator), Contract, "Co-Sintered Lead Zirconate Titanate Ceramics," Sandia National Laboratories, $30,000.00, June 1, 2006 - September 11, 2006).

Lanagan, M. T. (Principal Investigator), "Composites of Phase Change Dielectrics and Glass-Ceramics for High Power Density Capacitors," TRS Technologies, Inc., $41,250.00, May 11, 2005 - September 11, 2006.

Lanagan, M. T. (Principal Investigator), "Glass Ceramic Antiferroelectric Capacitors," TRS Technologies, Inc., $33,750.00, May 11, 2005 - September 11, 2006.

Lanagan, M. T. (Principal Investigator), "Materials and Capacitor Development of Power Electronics," Murata Manufacturing Co., Ltd. (Japan), $25,000.00, September 1, 2005 - August 31, 2006.

Semouchkina, E. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Contract, "Miniaturized Wearable Transceiver for WLAN Communications," Vocollect, Inc., $75,000.00, March 1, 2005 - August 31, 2006.

Randall, C. A. (Principal Investigator), Lanagan, M. T. (Co-Principal Investigator), Grant, "Formation of an I/UCRC Multi-University Center for Dielectric Studies Supplement""," National Science Foundation, $130,000.0, August 1, 2005 - July 31, 2006.

Lanagan, M. T. (Principal Investigator), Dickey, E. C. (Co-Principal Investigator), Contract, "Dielectrics in the Commonwealth," Ben Franklin Technology Center of Central & Northern Pennsylvania, $65,000.00, July 1, 2005 - June 30, 2006.

Lanagan, M. T. (Principal Investigator), Furman, E. (Co-Principal Investigator), Grant, "Frequency Agile Microwave Dielectric Components with High-Speed Piezoelectric Actuator," U.S. Civilian Research and Development Foundation (CRDF), $9,500.00, May 27, 2004 - May 26, 2006.

Lanagan, M. T. (Principal Investigator), "Glass-Ceramic Capacitor Development," Argonne National Laboratory, $150,000.00, June 27, 2003 - March 31, 2006.

Lanagan, M. T. (Principal Investigator), "Multifunctional Oxide Films for Integrated High Frequency Devices," U.S. Department of the Navy, $34,821.00, February 1, 2005 - December 31, 2005.