

Paulo J Ferreira



Google Scholar

Citations: 13024

H-index: 42

Scopus Author ID: 55536479100

Citations: 9424

H-index: 35

Education

Postdoc, Materials Science and Engineering, Massachusetts Institute of Technology (MIT), 1996-2000
(Supervisor: Prof. John B. Vander Sande)

Ph.D. Materials Science and Engineering, University of Illinois-Urbana, 1997
(Supervisor: Prof. Howard Birnbaum)

Licenciatura, Materials Science and Engineering, Universidade do Porto, Portugal, 1988

Current and Previous Academic Positions

International Iberian Nanotechnology Laboratory, Portugal: 2017-

Head of Department of Advanced Electron Microscopy, Imaging and Spectroscopy

University of Lisbon, Portugal: 2017-

Professor, Department of Mechanical Engineering, IST

University of Texas at Austin: 2017-

Adjunct Professor, Robert & Jane Mitchell Endowed Faculty Fellowship in Engineering
Materials Science and Engineering Program

University of Texas at Austin: 2014- 2017

Professor, Robert & Jane Mitchell Endowed Faculty Fellowship in Engineering
Materials Science and Engineering Program

University of Texas at Austin: 2008- 2013

Associate Professor, Materials Science and Engineering Program

University of Texas at Austin: 2001- 2007

Assistant Professor, Materials Science and Engineering Program

Special Appointments

International Iberian Nanotechnology Laboratory, Braga, Portugal: 2015-2017

Visiting Professor, Department of Advanced Electron Microscopy, Imaging and Spectroscopy

KAUST, Saudi Arabia: June 2014

Visiting Scholar, Department of Materials Science and Engineering

Aalto University, Finland: June 2013

Visiting Professor, Department of Engineering Design and Production

Kyushu University, Japan: June 2012

Visiting Professor, Department of Materials Science and Engineering

MIT: 2003-2004

Visiting Scholar, Department of Materials Science and Engineering

Other Professional Appointments

1996-2000 PostDoctoral Associate, Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA

06/99-09/99 Visiting Scholar, Department of Materials Science and Engineering, Instituto Superior Tecnico, Lisbon, PORTUGAL

1991-1996 Graduate Research Assistant, Department of Materials Science and Engineering and Materials Research Laboratory, University of Illinois, Urbana, IL.

1989-1991 Graduate Research Assistant, Swedish Institute for Metals Research and Royal Institute of Technology, Stockholm, SWEDEN

1988-1989 Research Engineer, Development Department, Ferespe, Trofa, PORTUGAL

6/87-10/87 Internship, Outokumpu Oy, Research Laboratories, Tornio, FINLAND

Honors and Awards

Best Oral Presentation in Functional Ceramics, "Manuela A. C. Fernandes, Pedro L. Marques, Paula M. Vilarinho, Ana M. O. R. Senos, Paulo J. Ferreira", "Microstructural evolution of $K_{0.5}Na_{0.5}NbO_3$ thin films by in-situ TEM sintering", 13th FEMS Junior Euromat Conference, Lausanne, Switzerland, 10-14 July 2016

Best Poster Award, "Somaye Rasouli, Tsuyohiko Fujigaya, Naotoshi Nakashima, Paulo Ferreira", "On the Degradation of PtNi Nanocatalysts for PEM Fuel Cells: An Identical Location ac-STEM Study", Microscopy and Microanalysis, Microscopy Society of America, Columbus, OH, July 16, 2016

Best Oral Presentation, “Ricardo O. Sousa, Pedro Lacerda, Paulo J. Ferreira, Laura M. M. Ribeiro”, “Identification of Sigma and Chi Phases in Cast Super Duplex Stainless Steels”, “50th Meeting of SPMicros - Microscopy and Microanalysis in Materials and Life Science; Porto, Portugal, June 29, 2016.

Best Poster Award, “Somaye Rasouli, Mohamed R Berber, Tsuyohiko Fujigaya, Naotoshi Nakashima, Paulo Ferreira”, “Identical Location acTEM on the Degradation of Pt Nanocatalysts in PEM Fuel Cells 5th Frontiers of Electron Microscopy in Materials Science (FEMMS), Lake Tahoe, CA, September, 2015

Best Poster Award, “K.A. Jarvis, Z.Q. Deng, L. F. Allard, A. Manthiram, P.J. Ferreira”, “Structural Characterization of Li-excess Cathode Materials for Lithium-Ion Batteries”, International Union of Microbeam Societies, South Korea, (2011)

Special Research Grant Award, “Development of Pt-based Catalysts for Proton Exchange Membrane Fuel Cells”, University of Texas at Austin, (2007)

Summer Research Assignment Award, “A Multi-Channel Structure for Processing High-Tc BSCCO Superconductor Oxides”, University of Texas at Austin, (2001)

Best Oral Presentation, “Paulo J. Ferreira, Ian Robertson, Howard Birnbaum”, “Hydrogen Effects on Crystal Dislocations”, Award from the Microscopy and Microbeam Analysis Society, New Orleans, August (1994)

TEACHING

Teaching Experience

Graduate Courses

Practical Electron Microscopy	IST, University of Lisbon (Fall 2018)
Characterization of Nanomaterials	University of Texas at Austin (Spring 2010)
Practical Electron Microscopy	University of Texas at Austin (Fall 2009, Spring 2011, Spring 2012, Spring 2013, Fall 2013, Spring 2014)
Nanomaterials	University of Texas at Austin (Fall 2003, Fall 2004, Fall 2006, Fall 2007)
Mechanical Behavior of Interfaces	Instituto Superior Tecnico, Lisbon (06/99-08/99) (in collaboration with Prof. A.M. Fortes)

Undergraduate Courses

Materials Engineering	IST, University of Lisbon (Spring 2018)
Materials Engineering	University of Texas at Austin (Spring 2001-Fall 2014)
Materials Processing Lab	University of Texas at Austin (Spring 2009-Fall 2009)
Nanoscale Materials	Massachusetts Institute of Technology (Spring 2004)

(in collaboration with Prof. Stellaci)

Materials Structure Laboratory

Massachusetts Institute of Technology, Spring 1998

(in collaboration with Prof. Hobbs)

Additional Teaching Activities

Workshop, "IGERT's 3rd annual Summer Nanoscience Academy", University of Texas at Austin, July 16-18, 2009

Seminar, "Food for Thought Program", Old Quarry Library, Austin, TX, March, 2010

Electron Microscopy Course, University of Coimbra, Coimbra, Portugal, July 11-15, 2011

Seminar, "Seeing Small", International High School, Fukuoka, Japan, July, 2012

Tutorial, "In Situ Transmission Electron Microscopy", XXII International Materials Congress, Cancun, Mexico, August 11-15, 2013

Electron Microscopy Course, Aalto University, Helsinki, Finland Natal, Brazil, June 24-28, 2013

Electron Microscopy Course, Universidade Federal do Rio Grande do Norte, Natal, Brazil, May 26-30, 2014

Tutorial, "Texture Analysis In Thin Films using Precession Electron Diffraction", 13th FEMS Junior Euromat Conference, Lausanne, Switzerland, 10-14 July 2016

Electron Microscopy Course, INL, Braga, Portugal, March 20-24, 2017

Tutorial, "In Situ Transmission Electron Microscopy", School in Advanced Electron Microscopy (Satellite Event of Materials 2017), University of Aveiro, April 9, 2017.

Student Research Supervision

PhD in Progress (8)

1. Rafael Ferreira, Ph.D Thesis
2. Fátima Zorro, Ph.D Thesis
3. Szu-Tung Hu, Ph.D Thesis
4. Daniel Groom, Ph.D Thesis
5. Ricardo Sousa, Ph.D Thesis, (co-supervised with Prof. Laura Ribeiro, FEUP, Portugal)
6. Cinthya Blois, Ph.D Thesis, (co-supervised with Prof. Paula Jardim, UFRJ, Brazil)
7. Bruno Oliveira, Ph.D Thesis (co-supervised with Prof. Manuel Vieira, FEUP, Portugal)
8. Francisco Figueiredo, Ph.D Thesis (co-supervised with Prof. Sandra Ribeiro, IBMC, UP, Portugal)

PhD Supervisions Completed (9)

1. Kang Yu, Ph.D Thesis, "Understanding PEMFCs by 3D-Identical Location TEM and EELS", December 4, 2018
2. Charles Amos, Ph.D Thesis, "Effect of Chemical Treatment and Trivalent Doping on the Surface Structure and Surface Chemistry of $\text{Li}_{1-x}\text{Ni}_{0.5-y}\text{Mn}_{1.5+y}\text{O}_4$ ", December 2017
3. Somaye Rasouli, Ph.D Thesis, "Degradation Mechanisms of Pt and Pt Alloy Nanocatalysts in Proton Exchange Membrane Fuel Cells", February 2017
4. Joseph Graham, Ph.D Thesis, "A Study of the Ferroelectric Properties of Neutron Irradiated Lead Zirconate Titanate", August 2013, (co-supervised with Prof. Sheldon Landsberger).
5. Michael Asoro, Ph.D Thesis, "Coalescence and Sintering in Metallic Nanoparticles: *In-situ* Transmission Electron Microscopy (TEM) Study", May 2012, (co-supervised with Prof. Desi Kovar).
6. Jai Ganesh, Ph.D Thesis, "Effect of Downscaling Copper Interconnects on the Microstructure Revealed by High Resolution TEM Orientation Mapping", December 2011.
7. Chris Carlton, Ph.D Thesis, "Defects and Deformation In Nanostructured Metals", August 2009.
8. Shreyas Rakasekhara, Ph.D Thesis, "Development of Nano/Submicron Grains in Metastable Austenitic Stainless Steels", August 2007.
9. Jin Ho An, Ph.D Thesis, "Void Formation in Nano Copper Interconnects", August 2007.

MS Supervisions Completed (7)

1. Rohit Bezewada, Master's Thesis, "Effect of Crystal Size on the Diffraction Contrast of a Screw Dislocation", June 2013.
2. Daniel Groom, Master's Thesis, "The Effect of Nanocatalyst Size on Performance and Degradation in the Cathode of Proton Exchange Membrane Fuel Cells, December 2011.
3. Jai Ganesh, Master's Thesis, "D-STEM: A Parallel Electron Diffraction Technique Applied to Nanomaterials", August 2009.
4. Michael Asoro, Master's Thesis, "Size Effects on Melting of Ag Nanoparticles: *In-situ* TEM Observations", August 2009.
5. Rosa Calinas, Master's Thesis (co-supervised with Prof. Teresa Vieira), "Influence of Nitrogen on the Nanocrystalline Copper Films", December 2007.
6. Justin Cheng, Master's Thesis, "Synthesis, Processing and Characterization of Polycyanate Esther/Small Diameter Carbon Nanotube Nanocomposites", November 2006 (co-supervised by Dr. Joseph Koo).

7. Dana Johannsen, Master's Thesis, "Development of Nano/Submicron Grain Sizes in an AISI 301 Austenitic Stainless Steel", August 2004

Undergraduate Senior Thesis Supervision (5)

1. Joshua Sahoo, Plan II Honors Program, Senior Thesis, "In-situ HRTEM Simulations of Catalyst Nanoparticles for Proton Exchange Membrane Fuel Cells", August 2008.
2. Sonia Simoes, Senior Thesis, University of Porto, Portugal, "In-situ TEM study of Grain Growth in Nanocrystalline Copper", August 2006 (co-supervised by Prof. Manuel Vieira).
3. Jacob Ward, Plan II Honors Program, Senior Thesis, "Applied Superconductivity in the City of God: The Manufacture of Silver-Sheated Superconducting Wires and Potential Effects on the Power Structures of Rio de Janeiro as a Case Study", April 2006.
4. Manuela Ferreira, Senior Thesis, University of Porto, Portugal, "Grain Growth in Nanocrystalline Copper", December 2005 (co-supervised by Prof. Manuel Vieira)
5. Tia Ghose, Plan II Honors Program, Senior Thesis, "On the Brittle to Ductile Transition in Single Crystals", May 2003.

Undergraduate Research Supervision (27)

1. Fatima Zorro, Undergraduate Research Assistant (Summer 2017)
2. John Robert Polarinakis, Undergraduate Research Assistant (Fall 2015-Spring 2016)
3. Lauren Morganti, Undergraduate Research Assistant (Fall 2014-2015)
4. Lining Wang, Undergraduate Research Assistant (Summer 2014-2015)
5. Brian Gawlik, Undergraduate Research Assistant (Fall 2011- Summer 2013)
6. Ryann Rupp, Undergraduate Research Assistant (Summer 2012- Summer 2013)
7. Oscar Maldonado, Undergraduate Research Assistant (Fall 2011 – Spring 2013)
8. Emily Anderson, Undergraduate Research Assistant (Fall 2011 – Summer 2012)
9. Samantha Chen, Semiconductor Research Corporation Fellowship (Summer 2011)
10. Stefanie Matyas, Undergraduate Research Assistant (Fall 2009, Fall 2010-Spring 2011)
11. Jacob Warnake, Semiconductor Research Corporation Fellowship (Summer 2010)
12. Brian Patrick, Undergraduate Research Assistant (Fall 2008 – Fall 2010)
13. Joanna Tsenn , Undergraduate Research Assistant (Fall 2008 – Spring 2009)
14. Madison Berger, K project (Spring 2008)
15. Nicole Jabsen, K project (Spring 2008)
16. Sean Swearingen, Undergraduate Research Assistant (Fall 2007 – Spring 2008)
17. Joshua Hallman, Undergraduate Research Assistant, (Jan 2007 – Fall 2008)
18. Jeff Pickering, Undergraduate Research Assistant (Fall 2006 – Summer 2007)
19. Gregory Power, Undergraduate Research Assistant (Fall 2006 – Spring 2007)
20. Patti Hightower, Undergraduate Research Assistant (Fall 2005 – Summer 2006)
21. Chris Lin, Undergraduate Research Assistant (Fall 2004- Summer 2005)
22. Victor Tsai, Undergraduate Research Assistant (Fall 2004 - Summer 2005)
23. Tom Chang, Undergraduate Research Assistant (Spring 2003 – Fall 2004)
24. James Thomas, Undergraduate Research Assistant (Summer 2002-Fall 2002)
25. Eric Rollfing, Undergraduate Research Assistant (Spring 2002-Summer 2003)
26. John Martin, Undergraduate Research Assistant (Fall 2001-Spring 2002)
27. Ovelio Fernandez, Undergraduate Research Assistant (Fall 2001-Spring 2002)

Post-Doctoral Supervision

1. Dr. Charles Amos, International Iberian Nanotechnology Laboratory, (August 2018-
2. Dr. Justyna Grzonka, International Iberian Nanotechnology Laboratory, (August 2018-
3. Dr. Cristiana Alves, International Iberian Nanotechnology Laboratory, (August 2018-

4. Dr. Sebastian Calderon, International Iberian Nanotechnology Laboratory, (April 2017-
5. Dr. Karalee Jarvis, University of Texas at Austin (March 2009-August 2014)
6. Dr. Shreyas Rajasekhara, University of Texas at Austin (May 2009 -August 2011)

Visiting Scholars Supervision

1. Ms. Manuela Fernandes, University of Aveiro, Portugal (August 2015- January 2016)
2. Ms. Noora Manninen, University of Coimbra, Portugal (August 2014-January 2015)
3. Mrs. Rosa Calinas, Innovnano, Portugal (Aug 2011-Aug 2013)
4. Prof. Aleksandr Krystal, Krakov University, Ukraine (Jan 2012-April 2012)
5. Mr. Ruben Santos, University of Porto, Portugal (Jan 2012-July 2012)
6. Ms. Li Zhuoxuan, Tsinghua University, China (July 2012 –Oct 2012)
7. Dr. Yaobo Hu, Chongqing University, China (July 2011 – Sept 2012)
8. Mr. Yoann Dolidon, Ecole Centrale de Lille, France (June 2011 – Aug 2011)
9. Ms. Sofia Soares, University of Aveiro, Portugal (Aug 2011 – Dec 2011)
10. Mr. Nilson Ferreira, Universidade Federal do Amapá, Brasil (June 2011-Aug 2011)
11. Prof. Carla Costa, IST/ISEL, Portugal, (September 2008- February 2009)
12. Dr. Shuo Chen, Postdoctoral Researcher from MIT, (April 2007)
13. Mr. Emiliano Cechetti, Tenfold Corporation, USA, (March-August 2002)
14. Prof. Paula Braga, University of Tras-os-Montes, Portugal, (February-June 2006)
15. Mr. Pasi Juntunen, University of Oulu, Finland, (December 2006 – February 2007)
16. Mr. Luis Marques, University of Tras-os-Montes, Summer Training, (July 2005-September 2005)

Ph.D Dissertation Committees

1. Mary-Anne Kulas, Ph.D Thesis, "The Optimization of 5083 Aluminum Alloy Ductilities in Superplastic Forming", August 2003. (Supervisor: Prof. Eric Taleff, Mechanical Engineering, University of Texas at Austin).

2. Chen He, Ph.D Thesis "A Reconfiguration-Based Defect-Tolerant Design Paradigm for Nanotechnologies, April 2006. (Supervisor: Prof. Margarida Jacome, Electrical Engineering, University of Texas at Austin).

3. Yu, Hsing, Ph.D Thesis "Synthesis and Characterization of Silicon and Germanium Nanowires, Silica Nanotubes and Germanium Telluride/Tellurium Nanostructures", April 2007. (Supervisor: Prof. Brian Korgel, Chemical Engineering, University of Texas at Austin).

4. Andre Albert, Ph.D Thesis "Nanostructured Ag Produced by LAMA", May 2007. (Supervisor: Prof. Desi Kovar, Materials Science and Engineering, University of Texas at Austin).

5. Arun K. Tiruvannamalai, Ph.D Thesis, "Chemical, Structural and Electrochemical

Characterization of 5 V Spinel and Complex Layered Oxide Cathodes of Lithium Ion Batteries", August 2007, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).

6. Juho Talonen, Ph.D Thesis "Effect of Strain-Induced α' -Martensite Transformation on the Mechanical Properties of Metastable Austenitic Stainless Steels", May 2007. (Supervisor: Prof. Hannu Hanninen, Mechanical Engineering, Helsinki University of Technology, Finland)
7. Wu, Yan, Ph.D Thesis, "Structural and Electrochemical Characterization and Surface Modification of Layered Solid Solution Oxide Cathodes of Lithium Ion Batteries", May 2008, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin)
8. Jung-Kuei Chang, Ph. D thesis, "The Effect of Microstructure on Cavitation during Hot Deformation in Fine-grained AA5083 Aluminum Alloy Sheet Material, December 2008, (Supervisor: Prof. Eric Taleff, Mechanical Engineering, University of Texas at Austin).
9. Wen Li, Ph. D thesis, "Development and Understanding of New Membranes Based on Aromatic Polymers and Heterocycles for Fuel Cells", August 2009, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
10. Jung-Hyun Kim, Ph. D thesis, "Development of Alternative Cathodes for Intermediate Temperature Solid Oxide Fuel Cells", August 2009, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
11. Arindam Sarkar, Ph.D Thesis, "Synthesis and Characterization of Nanostructured Palladium-Based Alloy Electrocatalysts", August 2009, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
12. Damon Smith, Ph.D Thesis "Mechanical, Electrochemical and Optical Properties of Germanium Nanowires", Nov. 2009. (Supervisor: Prof. Brian Korgel, Chemical Engineering, University of Texas at Austin).
13. Zhen Wei, Ph.D Thesis "Spin Transfer Torque Effect in Ferromagnets and Antiferromagnets", Spring 2010. (Supervisor: Prof. Maxim Tsoi, Physics, University of Texas at Austin).
14. Ardon Lot Moore, Ph.D Thesis, "Experimental and Theoretical Investigation of Thermal and Thermoelectric Transport in Nanostructures", May 2010, (Supervisor: Prof. Li Shi, Mechanical Engineering, University of Texas at Austin).
15. Muraliganth Theivanayagam, Ph.D Thesis, "Nanostructured Cathode Materials for Lithium Ion Batteries," May 2010, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
16. Eungje Lee, Ph.D Thesis, "Electrocatalysts for Methanol Oxidation Reaction," August 2010, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
17. Juan Zhao, Ph.D Thesis "Development and Understanding of Pd-Based Nanoalloys as Cathode Electrocatalysts for PEMFC", Aug. 2010. (Supervisor: Prof. Manthiram, Mechanical Engineering,

University of Texas at Austin).

18. Lijuan Zhang, Ph.D Thesis, "Effects of Scaling and Grain Structure on Electromigration Reliability of Cu Interconnects", October 2010, (Supervisor: Prof. Paul Ho, Mechanical Engineering, University of Texas at Austin)
19. Kuan Hsun Lu, Ph.D Thesis, "Thermo-Mechanical Reliability of 3-D Interconnects Containing Through-Silicon-Vias (TSVs)", October 2010, (Supervisor: Prof. Paul Ho, Mechanical Engineering, University of Texas at Austin)
20. Wei Wang, Ph.D Thesis, "Plasmonic Properties of Subwavelength Structures and Their Applications in Optical Devices", December 2010, (Supervisor: Prof. Shaochen, Mechanical Engineering, University of Texas at Austin).
21. Hyung Ham, Ph.D Thesis, "First-Principle Investigation of the Surface Reactivity of Pd-based Alloys for Fuel Cell Catalyst Applications", December 2011, (Supervisor: Prof. G. Hwang, Chemical Engineering, University of Texas at Austin)
22. Young Kim, Ph.D Thesis, "Perovskite-Related and Trigonal RBaCo₄O₇ Based Oxide Cathodes for Intermediate Temperature Solid Oxide Fuel Cells, December 2011, (Supervisor: John Goodenough, Mechanical Engineering, University of Texas at Austin)
23. Carlos Oliveira, Ph.D Thesis, "The Teaching of Astrobiology to Develop Competent Thinking Skills in Non-Science Major College Students", August 2012, (Supervisor: Prof. James Barufaldi, Dept. of Education, University of Texas at Austin).
24. Daniel Slanac, Ph.D Thesis, "Design of Nanocomposites for Electrocatalysis and Energy Storage: Metal/Metal Oxide Nanoparticles on Carbon Supports", August 2012, (Supervisor: Prof. Keith Johnston, Chemical Engineering, University of Texas at Austin).
25. Katherine Harrison, Ph.D Thesis, "Microwave-Assisted Synthesis and Characterization of Inorganic Materials for Energy Applications", August 2012, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
26. Manuj Nahar, Ph.D Thesis, "Highly Conductive, Nanoparticulate Thick Films Processed at Low Processing Temperatures, June 2012, (Supervisor: Prof. Desi Kovar, Mechanical Engineering, University of Texas at Austin).
27. Yan Li, Ph.D Thesis, "Investigations of Cobalt-Based Oxides as Cathode Materials for Intermediate Temperature Solid Oxide Fuel Cells, August 2012, (Supervisor: Prof. John Goodenough, Mechanical Engineering, University of Texas at Austin).
28. Eun Sung Lee, Ph.D Thesis, "Structural and Electrochemical Characterization of High-Energy Oxide Cathodes for Li-Ion Batteries", December 2012, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
29. Yu-Sheng Su, Ph.D Thesis, "Rechargeable Li-Sulfur Batteries with Novel Electrodes, Cell Configurations and Recharge Strategies", July 2013, (Supervisor: Prof. Manthiram, Mechanical

Engineering, University of Texas at Austin).

30. Aravindha Raja Antoniswamy, Ph.D Thesis, "The Construction and Use of Physics-Based Plasticity Models and Forming-Limit Diagrams to Predict Elevated Temperature Forming of Three Magnesium Alloy Sheet Materials", August 2013, (Supervisor: Prof. Eric Taleff, Mechanical Engineering, University of Texas at Austin).
31. Si Chon Lao, Ph.D Thesis, "Multifunctional cyanate ester/MWNT nanocomposites: processing and characterization", December 2013, (Supervisor: Prof. Tess Moon, Mechanical Engineering, University of Texas at Austin).
32. Arturo Gutierrez, Ph.D Thesis, "Low-temperature synthesis and electrochemical properties of aliovalently-doped phosphates and spinel oxides", May 2014, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
33. Li Longjun, Ph.D Thesis, "High-performance hybrid lithium-air batteries: from battery design to catalysts", May 2014, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
34. Xiaobin Xu, Ph.D Thesis, "Ultrasensitive Surface Enhanced Raman Scattering Nanomotors", August 2014, (Supervisor: Prof. Donglei Fan, Mechanical Engineering, University of Texas at Austin).
35. Chih-Liang Wang, Ph.D Thesis, "Development of earth-abundant materials and low-cost processes for solar cells", December 2014, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
36. Daeil Yoon, Ph.D Thesis, "Novel heterogeneous catalyst anodes for high-performance natural gas-fueled solid oxide fuel cells", December 2014, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
37. Linjun Cao, Ph.D Thesis, "Effects of Scaling on Microstructure Evolution and Electromigration Reliability of Ultrafine Cu Interconnects", December 2014, (Supervisor: Prof. Paul Ho, Mechanical Engineering, University of Texas at Austin).
38. James Courtney Knight, Ph.D Thesis, "Electrochemical Properties and Ion-extraction Mechanisms of Li-rich Layered Oxides and Spinel Oxides", August 2015, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
39. Eric Koederitz Allcorn, Ph.D Thesis, "Development of Antimony-based Anode Systems for Lithium-Ion Batteries", June 2015, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
40. Chenxi Zu, Ph.D Thesis, "Building High-Energy Density Lithium-Sulfur Batteries" May 2015, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
41. Sheng-Heng Chung, Ph.D Thesis, "Custom-Cell-Component Design and Development for Rechargeable Lithium-Sulfur Batteries", May 2015, (Supervisor: Prof. Manthiram, Mechanical

Engineering, University of Texas at Austin).

42. Jason Christopher Mantey, Ph.D Thesis, "Epitaxial Germanium via Ge:C and its use in Non-classical Semiconductor Devices", December 2015, (Supervisor: Prof. Banerjee, Electrical and Computer Engineering, University of Texas at Austin).
43. Guillaume J Noiseau, Ph.D Thesis, "Study of Atomic-scale Mechanisms for Deposition of Nanostructured Films from Nanoparticles", December 2015, (Supervisor: Prof. Kovar, Mechanical Engineering, University of Texas at Austin).
44. Phillip James Noell, Ph.D Thesis, "The Influence of High-Temperature Tensile Deformation on Microstructure Evolution in Select BCC Metals"; December 2015, (Supervisor: Prof. E. Taleff, Mechanical Engineering, University of Texas at Austin).
45. Wen Liao, Ph.D Thesis, "Controlling Nucleation and Growth of Ultra-Thin Ruthenium Films in Chemical Vapor Deposition", May 2016, (Supervisor: Prof. John Ekerdt, Chemical Engineering, University of Texas at Austin)
46. Chao Liu, Ph.D Thesis, "Precision Manipulation of Organic and Inorganic Nanoentities for Optical Biosensing at Deterministic positions", May 2016, (Supervisor: Prof. Donglei Fan, Materials Science and Engineering, University of Texas at Austin).
47. Anna Kisko, Ph.D Thesis "Microstructure and Properties of Reversion Treated Low-Ni High-Mn Austenitic Stainless Steels, June 2016 (Supervisor: Prof. David Porter, University of Oulu, Finland
48. Laura Spinella, Ph.D Thesis, "The Scaling and Microstructure Effects on the Thermal Stress and Reliability of Through-Silicon Vias in 3D Integrated Circuits", May 2017, (Supervisor: Prof. Paul Ho, Mechanical Engineering, University of Texas at Austin).
49. Michael Klein, Ph.D Thesis, "Understanding the Electrochemistry and Reaction Mechanisms of Solid-State Sulfides with Application to the Lithium-Sulfur Battery System", May 2017, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
50. Yu-Hao Tsai, Ph.D Thesis, "First Principle Study of Transition Metal Oxide (Catalytic) Electrodes for Electrochemical Energy Technologies", August 2017, (Supervisor: Prof. Gyeong Hwang, Chemical Engineering, University of Texas at Austin).

M.S Thesis Committees

1. Arden Lot Moore, Master Thesis, "Synthesis and Thermoelectric Characterization of Individual Nanowires", August 2007, (Supervisor: Prof. Li Shi, Mechanical Engineering, University of Texas at Austin).
2. Srivaramangai Rajagopalan, Master Thesis, "Effect of Imaging Conditions for Reliable Measurement of Local Strain from Synthetic High Resolution Transmission Electron Microscopy (HRTEM) by Geometrical Phase Analysis", May 2009, (Supervisor: Prof. Rabenberg,

Mechanical Engineering, University of Texas at Austin)

3. Garrett Salpeter, Master Thesis, "Optimization of Material Composition and Processing Parameters for Hybrid Organic-Inorganic Solar Cells", August 2010, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).
4. Brent Wise, Master Thesis, "Addition of Platinum to Palladium-Cobalt Nanoalloy Catalyst by Direct Alloying and Galvanic Displacement", December 2010, (Supervisor: Prof. Manthiram, Mechanical Engineering, University of Texas at Austin).

RESEARCH

Publications (188)

A. Review Publications (3)

1. P.J. Ferreira, E. Stach, K. Mitsuishi, Guest Editors, MRS Bulletin, "In-situ Transmission Electron Microscopy", February 2008, Volume 33, No.2.

MRS Bulletin is one of the most widely recognized and highly respected publications in advanced materials research. Published monthly, it features technical theme topics that capture a snapshot of the state-of-the-art of material research. Written by leading experts, the overview articles are useful references for specialists but are also presented at a level understandable to a broad scientific audience.

2. I.M. Robertson, P.J. Ferreira, B. Clark, Guest Editors, "In-situ Transmission Electron Microscopy Methods", Microscopy Research and Technique, Special Issue, March 2009, Volume 72, Issue 3, pp.121-292.

Microscopy Research and Technique (MRT) publishes articles on all aspects of advanced microscopy in the biological, clinical, chemical, and materials sciences.

3. C.E. Carlton, P.J.Ferreira, "In-situ TEM Nanoindentation of Nanoparticles", Micron, Special Issue, Vol. 43, pp. 1134-1139, (2012).

Micron is an interdisciplinary forum for all work that involves new applications of microscopy or where advanced microscopy plays a central role. The journal will publish on the design, methods, application, practice or theory of microscopy and microanalysis.

B. Refereed Archival Journals (92)

1. Somaye Rasouli, Deborah Myers, Nancy Kariuki, Kenji Higashida, Naotoshi Nakashima, Paulo Ferreira, "On the Electrochemical Degradation of Pt-Ni Nanocatalysts: An Identical Location Aberration-Corrected STEM Study", Nano Letters, 19 (1), pp. 46-53, (2018)

2. M. Gonçalves, R. F. P. Pereira, P. Ferreira, E. Carbo-Argibay, J. Catita, G. Toquer, S. C. Nunes, V. DE Zea Bermudez "Structuring of Di-Alkyl-Urethanesils", *Journal of Sol-Gel Science and Technology*, (2018).
3. I.Carvalho, S.Ferdov, C.Mansilla, S.M.Marques- M.A.Cerqueira- L.M.Pastrana, M.Henriques, C.Gaidau, P.Ferreira, S.Carvalho, "Development of antimicrobial leather modified with Ag-TiO₂ nanoparticles for footwear industry", *Science and Technology of Materials*, 30, pp. 60-68, (2018)
4. S. Calderon, Tânia Ribeiro, José Paulo S. Farinha, Carlos Baleizão, P. J. Ferreira, "On the Structure of Amorphous Mesoporous Silica Nanoparticles by Aberration-Corrected STEM", *Small*, Vol. 14, pp. 1802180, (2018)
5. D. Groom, A. Bovik, P.J. Ferreira, "Automatic Segmentation of Inorganic Nanoparticles in BF TEM Micrographs", *Ultramicroscopy*, Vol. 194, pp. 25-34, (2018)
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E. Books, Book Chapters Authored/Co-Authored, Editor/Co-Editor of Books

Books Authored

Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers and Architects, D. Schodek (Harvard University) P.J. Ferreira (University of Texas at Austin) and Michael Ashby (University of Cambridge, UK), Publisher: Butterworth-Heinemann (Elsevier), (2009)

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3. *Investing In The Future: University-Industry Collaborations in Portugal and USA*, edited by P.J. Ferreira (University of Texas at Austin), J. Tavares (Universidade Nova de Lisboa, Portugal), N. Vasconcelos (University of California at San Diego) and F. Veloso (Carnegie Mellon University), PAPS/ FLAD, Cambridge, MA, 1st edition, 161 pages, Maio 2003, published by Gradiva Publicacoes Limitada, Portuguese.

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6. P.J. Ferreira, "High Tc Superconductor Materials", *Materials: Years 2000*, pp. 269-275, edited by M.A. Fortes and P.J. Ferreira, Instituto Superior Tecnico/Univ. Of Texas, 1st edition, 1 volumes, 546 pages, March 2003, published by IST Press, Portuguese.
7. P.J. Ferreira, J. Tavares, N. Vasconcelos, F. Veloso and Pedro Conceicao, "Investir No Futuro: Relacoes Universidade Industria", *Investing In The Future: University-Industry Collaborations In Portugal And USA*, pp. 11-33, PAPS/ FLAD, Cambridge, MA, 1st edition, 161 pages, Maio 2003, published by Gradiva Publicacoes Limitada, Portuguese.

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Plenary, Keynote, Invited Lectures (138)

Plenary Lectures (2)

1. "The Science of the Small: Understanding the Thermal Behavior of Nanoparticles", Brazilian Congress of Microscopy, Buzios, Brazil, June 4-7, 2017
2. "The Science of the Small: Understanding the World of Nanoparticles", Nano Monterrey 2015, International Forum, Monterrey, Mexico, October 2015

Keynote Lectures (10)

1. "Understanding the Surface Structure of $\text{Li}_{1-x}[\text{Mn}_2]\text{O}_4$ by Aberration-Corrected STEM and EELS", NanoPT, Lisbon, Portugal, February 7-9, 2018
2. "Understanding the Surface of LiMn_2O_4 Spinel Cathodes with Aberration-Corrected HAADF STEM and EELS", Hyceltec 2017, Porto, Portugal, June 19-23, 2017
3. "Seeing is Believing: The Beauty of *In Situ* Transmission Electron Microscopy" 50th Anniversary of the Portuguese Society of Microscopy, Porto, Portugal, June 29-30 2016
4. "The Science of the Small: Understanding Coalescence of Nanoparticles by Advanced Transmission Electron Microscopy", International Conference "NanoSpain 2016", Logrono, Spain, March 2016.
5. "Understanding the Atomic Structure of Li-Mn Based Spinel Cathodes with Aberration-Corrected HAADF STEM", International Conference "TNT2015, Trends in Nanotechnology", Toulouse, France, September 2015
6. "Nanotechnology: Science or Fiction?", International Conference on "Sustainable Intelligent Manufacturing", Lisbon, Portugal, June 26-29, 2013
7. "Nano/Submicron Grained Stainless Steels"; 7th International Conference on Physical and Numerical Simulation of Materials Processing, Oulu, Finland, June 16-19, 2013

8. "Nano/Submicron Austenitic Stainless Steels with Superior Mechanical Properties"; Conference "International Conference on Advanced Steels 2010", Guilin, China, November 2010.
9. "Nano/Submicron Grained Stainless Steels", International Symposium on "Advances in Stainless Steels 2007", Chennai, India, April 9-11, 2007.
10. In-situ and High-Resolution Transmission Electron Microscopy Applied to Nanomaterials", International Conference "Global Materials for the XXI Century: Challenges to Academia and Industry, ", Porto, Portugal, April 1-4, 2007.

Invited Lectures (126)

1. Seminar, "On the Degradation of Pt-Ni Nanocatalysts for PEM Fuel Cells: An Identical Location Aberration-Corrected TEM Study", Materials Science and Engineering Department, University of Connecticut, January 25, 2019
2. "A Novel Approach to Identify the Ionomer Phase in PEM Fuel Cells by EELS", Brazil MRS Meeting, September 16-20, 2018, Natal, Brazil
3. "On the Degradation of Pt-Ni Nanocatalysts for PEM Fuel Cells: An Identical Location Aberration-Corrected TEM Study", Electron Microscopy of Nanostructures ELMINA2018 Conference, August 27–29, 2018, Belgrade, SERBIA
4. "Understanding Amorphous Mesoporous Silica Superstructures by Aberration-Corrected STEM", XXVII International Materials Research Congress, August 19-24, 2018, Cancun, Mexico
5. "On the Degradation of Pt-Ni Nanocatalysts for PEM Fuel Cells: An Identical Location Aberration-Corrected TEM Study", XXVII International Materials Research Congress, August 19-24, 2018, Cancun, Mexico
6. "Understanding the Surface Structure of $\text{Li}_{1-x}[\text{Mn}_2]\text{O}_4$ by Aberration Corrected STEM and EELS", MRS Spring Meeting, Phoenix, Arizona, April 2-6, 2018.
7. "Seeing Small: There is Plenty Our Eyes Can't See", FCCN Meeting, INL, Braga, Portugal, April 12, 2018
8. Seminar, "Understanding Nanomaterials by TEM", Paul Sherrer Institute, Zurich, Switzerland, February 23, 2018.
9. Seminar, "Nanotechnology and the 4th Industrial Revolution", PAPS XXI Forum, Harvard University, Cambridge, MA, USA, June 9
10. "Imaging Single Atoms by Differential Phase Contrast", Portuguese Society of Microscopy, Annual Conference, Coimbra, Portugal, October 12, 2018
11. "Nanotechnology, Science or Fiction", TED Braga, Braga, Portugal, October 20, 2018
12. "Nanotechnology, Science or Fiction", ENEM, FEUP, Porto, Portugal,

13. Seminar, "Nanotechnology and the 4th Industrial Revolution", Congress of the National Association of Engineers, Coimbra, Portugal, November 23, 2017
14. Seminar, "Seeing Small: Enabling New Discoveries in Nanomaterials Through Advanced Transmission Electron Microscopy", Workshop on Advanced Electron Microscopy of Materials, Santiago de Compostela, Spain, October 30, 2017
15. "Seeing Small: There is Plenty Our Eyes Can't See", INL Summit, Braga, Portugal, October 19, 2017
16. Seminar, "Seeing Small: Enabling New Discoveries in Nanomaterials Through Advanced Transmission Electron Microscopy", Beijing University, Beijing, China, August 28, 2017
17. Seminar, "Seeing Small: Enabling New Discoveries in Nanomaterials Through Advanced Transmission Electron Microscopy", National University of Singapore, Singapore, July 24, 2017
18. Seminar, "Thermal Behavior of Nanoparticles", University of Trás-os-Montes, Vila Real, Portugal, May 24, 2017
19. Seminar, "Thermal Behavior of Nanoparticles", University of Vigo, Vigo, Spain, May 11, 2017
20. Seminar, "The Odyssey of Materials and The Age of Nanotechnology", Air Force Base, Lisbon, Portugal, May 10, 2017
21. "Understanding Metallic Nanoparticles by Advanced Transmission Electron Microscopy", Conference, "Energy, Materials, Nanotechnology – Catalysis", Dubrovnik, Croatia, May 3-7, 2017
22. Seminar, "Seeing small: Enabling New Discoveries in Nanomaterials through Advanced Transmission Electron Microscopy", University of Oslo, Oslo, Norway, March 27, 2017
23. Seminar, "The Odyssey of Materials", Workshop, "The Future of Ideas", Universidade Nova de Lisboa, Lisboa, Portugal, May 9, 2017
24. "Understanding the Surface of LiMn_2O_4 Spinel Cathodes with Aberration-Corrected HAADF STEM and EELS", Conference, "Electronic Materials and Applications 2017", American Ceramic Society, Orlando, Florida, January 18-20, 2017.
25. "A Study of Texture and Phase Evolution during Grain Growth of Nanocrystalline Ni Thin Films by In-situ and Precession Electron Diffraction Microscopy", Conference, "MS&T16 – Materials Science and Technology", Symposium - Advancements in In-situ Electron Microscopy Characterization, Salt Lake City, Utah, October 23-27, 2016
26. "Texture and phase analysis in nanocrystalline Ni thin films by precession electron diffraction microscopy", Conference, "SPB Mat2016, Symposium F – Advanced and Analytical Microscopy and Spectroscopy of Nanostructures and Engineering Materials, Campinas, Brazil, 25-29 September, 2016.
27. "On the Study of PEM Fuel Cells by Transmission Electron Microscopy", Conference,

"Microscopy and Microanalysis, Columbus, Ohio, July 24-28, 2016

28. "A Study of Texture during Grain Growth of Nanocrystalline Ni Thin Films", 13th FEMS Junior Euromat Conference - Tutorial - Functional Coatings, Lausanne, Switzerland, July 14, 2016.
29. Seminar, "Seeing Small: Understanding the Behavior of Nanoparticles by Advanced Transmission Electron Microscopy", Instituto Superior Tecnico, Lisbon, Portugal, May 9, 2016.
30. Seeing Small: Enabling New Discoveries in Nanomaterials Through Transmission Electron Microscopy", Instituto Nacional Ricardo Jorge, Lisbon, Portugal, April 5, 2016
31. Seminar, "Seeing small: Enabling new discoveries in energy materials through advanced transmission electron microscopy", AGH University of Science and Technology, Krakow, Poland, December 2015
32. Colloquium, "Living with Complexity: The Value of Interdisciplinarity", University of Porto, October 15-16, 2015.
33. Seminar, "Seeing small: Enabling new discoveries in nanomaterials through advanced transmission electron microscopy", National Center for Electron Microscopy, Berkeley, October 2015
34. "Understanding the Atomic Structure of Li-Mn Based Spinel Cathodes with Aberration-Corrected HAADF STEM", XXII International Materials Congress, Cancun, Mexico, August 12-16, 2015
35. "Precession Electron Diffraction Microscopy: A Study of Texture and Phase Evolution during Grain Growth of Nanocrystalline Ni Thin Films"Conference "Microscopy and Microanalysis", 2015", Portland, OR, August 2015
36. "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Universidad de Complutense, Madrid, Spain, April 13, 2015.
37. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", University of Houston, Houston, Texas, November 18, 2014.
38. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Iberian Institute of Nanotechnology, Braga, Portugal, Sept. 19, 2014.
39. "Thermal Behavior of Nanoparticles", AVS Pacific Northwest Chapter Annual Symposium, Pacific Northwest National Laboratory, Richland, WA, Sept 16-19. 2014
40. "Understanding the Atomic Structure of Li-Mn Based Spinel Cathodes with Aberration-Corrected HAADF STEM", 16th Annual Conference, Yucomat 2014, Herceg Novi, Montenegro, Sept 1-5, 2014
41. "Are Dislocations Possible in Nanoparticles?", 3rd Congress of International Union of Crystallography, Montreal, Canada, 5-11th August, 2014.

42. "Thermal Behavior of Metallic Nanoparticles: An in Situ TEM Study", Zing Conference, Nanocrystals, Dominican Republic, 14-17th July, 2014.
43. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Department of Materials Science and Engineering, KAUST, Saudi Arabia, June 26, 2014
44. "Seeing Small: Enabling New Discoveries in Energy Materials Through Advanced Transmission Electron Microscopy", BIT's 3rd Annual Conference, Dalian, China, 25-28 April, 2014
45. Seminar, "Thermal Behavior of Ag Nanoparticles", Department of Materials Science and Engineering, Universidade Federal do Rio de Janeiro, Brazil, 20th February, 2014.
46. "Seeing Small: Enabling New Discoveries in Energy Materials Through Advanced Transmission Electron Microscopy", 2nd International Conference and Exhibition on Materials Science and Engineering, Las Vegas, NV, 7th-9th October, 2013
47. "Thermal Behavior of Nanoparticles", 12th Inter-American Congress of Microscopy, Cartagena, Columbia, 24th-28th September, 2013.
48. "Behavior of Pt and Pt₃Co Nanoparticles in PEM Fuel Cells Observed by High-Resolution TEM, Aberration-Corrected STEM and In-situ TEM", Microscopy at the Frontiers of Science, Terragona, Spain, 17th-20th September, 2013
49. "Thermal Behavior of Metallic Nanoparticles: An in Situ TEM Study", Frontiers of Electron Microscopy in Materials Science, Lorne, Australia, 8th-13th September, 2013.
50. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Aalto University, Helsinki, Finland, June, 2013.
51. "Seeing small: Enabling new discoveries in energy materials through advanced transmission electron microscopy", American Chemical Society 245th National Meeting, New Orleans, April, 2013.
52. "Behavior of Pt and Pt₃Co nanoparticles in PEM fuel cells observed by high-resolution TEM, aberration-corrected STEM, and in-situ", American Chemical Society 245th National Meeting, New Orleans, April, 2013.
53. "Understanding the role of excess Li on the atomic structure and capacity of lithium-rich layered oxides", American Chemical Society 245th National Meeting, New Orleans, April, 2013.
54. Seminar, "Seeing Small: Enabling New Discoveries In Li-Ion Batteries and Fuel Cells through Transmission Electron Microscopy", Argonne National Laboratory, Argonne, Illinois, October 23, 2012.
55. "Sintering of Nanoparticles: In Situ TEM Studies", Materials Science and Technology Conference, Pittsburgh, PA, October 8, 2012.

56. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy", Department of Physics, Kharkov University, Kharkov, Ukraine, Sept. 1, 2012.
57. "Dislocations in Individual Nanoparticles: An In Situ TEM Nanoindentation Study" XI Nanomaterials conference on Nanostructured Materials, Rhodes, Greece, August 2012.
58. Prochips Workshop, "In Situ TEM Observations of Solid to Vapor Phase Transitions in Silver Nanoparticles", Phoenix, AZ, August 2012
59. NanoMEGAS ASTAR Workshop, "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation and Phase Mapping, Phoenix, AZ, August 2012
60. Seminar, "Seeing Small: Enabling New Discoveries in Energy Materials through Transmission Electron Microscopy", High Voltage Electron Microscopy Laboratory, Kyushu University, Fukuoka, Japan, June 20, 2012
61. G-COE Special Lecture, " Seeing Small: Enabling New Discoveries in Li-ion Batteries and Fuel Cells through Transmission Electron Microscopy", Kyushu University, Fukuoka, Japan, June 12, 2012
62. Seminar, "Are Dislocations Possible In Nanoparticles", Kyoto University, Kyoto, Japan, May 31, 2012
63. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy", Department of Materials Science and Engineering, University of Pennsylvania, PA, February 2012.
64. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy, Department of Physics, University of Texas at San Antonio, November 11, 2011
65. "Structural Characterization of Li-Excess Cathode Materials for Batteries", 11th Interamerican Congress on Microscopy, Merida, Mexico, September 2011.
66. "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation", Conference "XX International Materials Congress", Cancun, Mexico, August 2011
67. "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation and Phase Mapping", Conference "Microscopy and Microanalysis", 2011", Nashville, TN, July 2011
68. "Dislocations and Surfaces Studied by In Situ Aberration-Corrected TEM/STEM", 3rd International Workshop on Remote Electron Microscopy and In Situ Studies, Carnegie-Mellon University, Pittsburgh, June 6-8, 2011.
69. "Temporal and Spatial Resolution of Mechanical Deformations Resolved by TEM", Workshop "ARO/AFOSR Multiscale Experiments, Washington DC, May 2, 2011
70. "Rapid and Automated Grain Orientation and Grain Boundary Analysis in Nanoscale Copper Interconnects", Conference "IEEE International Reliability Physics Symposium", Monterey, California, April 2011

71. "Are Dislocations Possible in Nanoparticles", Conference "TMS Annual Spring Meeting", San Diego, California, March 2011
72. Seminar, "Atomic Structure and Defect Behavior of Nanoparticles through Aberration-Corrected STEM, High-Resolution TEM and In-situ TEM", Materials Science and Engineering Program, Texas A&M University, College Station, TX, October 2010.
73. "Behavior of Pt and Pt₃Co Nanoparticles in PEM Fuel Cells Observed by High-Resolution TEM, Aberration-Corrected STEM and In-situ TEM", Conference, "17th International Microscopy Congress, Rio de Janeiro, Brazil, September 2010.
74. Seminar, "Are Dislocations Possible In Nanoparticles", Department of Materials Science and Engineering, Pontificia University Catholic, Rio de Janeiro, Brazil, September 2010.
75. "Are Dislocations Possible in Nanoparticles", 2010 APS/EMC Users Meeting, Argonne National Laboratory, IL, May 2010.
76. "Correlating Texture with Local Stresses in Cu Interconnects Using D-STEM and Precession Electron Diffraction", Workshop, "11th International Workshop on Stress-Induced Phenomena in Metallization", Dresden, Germany, April 2010
77. Seminar, "Seeing Small", University of Porto, Portugal, May 2010
78. "Development of Stainless Steels with Superior Mechanical Properties: A Correlation Between Structure and Properties in Nanoscale/ Sub-micron Grained Austenitic Stainless Steel "2nd International Conference on Steel Science", Kyoto, Japan, October 2009.
79. "Atomic Structure of Pt-based Nanoparticles for Fuel Cells through Aberration-Free STEM, High-Resolution TEM and In-situ TEM Conference.", "XVIII International Materials Research Congress 2009", Cancun, Mexico, August 2009.
80. Seminar, "Atomic Structure and Defect Behavior of Nanoparticles through Aberration-Free STEM, High-Resolution TEM and In-situ TEM", University of Puerto Rico, Puerto Rico, March 2009.
81. "Self Healing Nanoparticles: In-situ TEM Indentation of Nanoparticles Workshop", Advanced Electron Microscopy in Materials Science", Oak Ridge, TN, November 2008
82. "Thermal Stress Induced Voids in Nanoscale Cu Interconnects by *in-situ* TEM Heating", 10th International Workshop on Stress-Induced Phenomena In Metallization, Austin, TX, November 2008.
83. "Self-Healing Nanoparticles: In Situ TEM Nanoindentation", Workshop, "2008 European in Situ TEM probing", Goteborg, Sweden, October 2008.
84. Seminar, "In Situ Transmission Electron Microscopy", PASI School in Microscopy, Cancun, Mexico, August 2008.
85. "In situ Transmission Electron Microscopy", Conference, Texas Society of Microscopy, Spring 2008 Meeting, University of Texas at Austin, April 2008.

86. "Atomic Structure and Defect Behavior of Nanoparticles through Aberration-Free STEM, High-Resolution TEM and In-situ TEM" Conference, INCOMAM-07, International Conference on Microscopy and Microanalysis, Coimbra, Portugal, December 2007.
87. Seminar, "Nanomaterials and Nanostructures – Applications to Molecular Electronics and Biotechnology", University of Texas at Austin, October 2007.
88. Seminar, "Atomic Structure and Defect Behavior by Aberration-Free STEM, High-Resolution TEM and In-situ TEM", National University of Engineering, Lima, Peru, Sept. 2007.
89. "Aberration-Free STEM, High-Resolution TEM and In-situ TEM Applied to Catalyst Pt and Pt-based Nanoparticles for Fuel Cells", Conference, "9th Inter-American Congress of Electron Microscopy", Cusco, Peru, September 2007.
90. Seminar, "In-situ and High Resolution Transmission Electron Microscopy Applied to Nanomaterials", INETI, Porto, Portugal, April 2007
91. "In-situ Transmission Electron Microscopy on Cs-Corrected TEMs", Symposium on "Electron Microscopy at Sub- Angstrom Resolution", Austin, TX, March 7, 2007.
92. "In-situ Transmission Electron Microscopy: Mapquest for Materials Conference", CBECIMAT, Foz do Iguacu, Brazil, November 18, 2006.
93. "In-situ Transmission Electron Microscopy: Mapquest for Materials", Nano/Materials Science Seminar, University of Texas at Austin, April, 2006.
94. "Government-Industry-University Relationships in a Global Economy", Conference, "Engineers for a Sustainable World", Austin, TX, October 8, 2005.
95. Seminar, "Research & Development: Effects of Scale on The Economy", University of Minho, Portugal, by Video Conference, October 6, 2005.
96. Seminar, "In-situ TEM Studies of Nanoscale Cu Interconnects under Thermal Stress", Howard's Birnbaum Symposium, University of Illinois, June 2005.
97. Seminar, "Science and Technology in the World: A Comparison", Portuguese Ministry of Economics and Innovation, Lisbon, Portugal, August 2005.
98. Seminar, "Carbon Nanostructures Formed by Metal Dusting", Winstead Sechrest & Minick P.C, Austin, TX, April 2005.
99. Seminar, "In-situ Transmission Electron Microscopy", Brookhaven National Laboratory, Long Island, NY, April 2005.
100. Seminar, "Seeing Small: In-situ and High Resolution Transmission Electron Microscopy Applied to Nanomaterials", NASA Center for Applied Radiation Research, Prairie View, TX, April 2005.
101. Seminar, "Texture Development in High-Temperature Superconductors", CEPEL, Rio de Janeiro, Brazil, March 2005.
102. Seminar, "Transmission Electron Microscopy Applied to Crystalline Defects", PUC, Rio de

Janeiro, Brazil, March 2005.

103. Seminar, "High-Velocity Forming of Nano/Submicron Stainless Steels", University of Oulu, Oulu, Finland, August 2004.
104. Seminar, "Development of Nano/Submicron Stainless Steels", University of Oulu, Oulu, Finland, June 2004.
105. "The Role of Ph.Ds in Strengthening University-Industry Relationships", Conference, , Portuguese-American Foundation, Lisbon, Portugal, July 2003
106. Seminar, "Nanotechnology: Science or Fiction", Univ. of Coimbra, Coimbra, Portugal, July 2003.
107. Seminar, "Microstructure Development of Stainless Steels During High Velocity Deformation", Swedish Institute for Metals Research, Stockholm, Sweden, June 2003.
108. Seminar, "Microstructure Development of Stainless Steels During High Velocity Deformation", University of Texas, Aeronautic and Aerospace Eng. Dept., Austin, TX, April.2003.
109. Seminar, "Nanotechnology: Science or Fiction?" UT Quest "Physics Today and Tomorrow Series", Austin, TX, Jan.2003.
110. Seminar, "Nanotechnology: Science or Fiction?", University of Porto, Porto, Portugal, Jan. 2003.
111. Seminar, "Nanotechnology, Science or Fiction?", University of Minho, Braga, Portugal, Jan. 2003
112. Seminar, "In-situ Transmission Electron Microscopy Applied to the Study of Crystalline Defects", University of Tokyo, Tokyo, Japan, Nov. 2002.
113. "Applied Magnetic Field Effects on Materials Behavior" Conference on Innovative Materials Processing by Controlling Chemical Reaction Field, " Magnetic Field Effects on Materials Behavior" Miyagi, Japan, November 2002.
114. Seminar, "Applied Magnetic Field Effects on Materials Behavior", Swedish Institute for Metals Research, Stockholm, Sweden, March 2002.
115. Seminar, "A Multi-Channel Structure for Processing High-Tc BSCCO Superconductor Oxides", CNRS, Grenoble, France, January, 2002
116. Seminar, "Hydrogen Effects on Crystal Dislocations", Lawrence Livermore National Laboratory, Berkeley, California, June 2001
117. Seminar, "Microstructure Development During Plastic Deformation", Helsinki University of Technology, Finland, May 2001.
118. Seminar, "Relationship between Microstructure and Properties in Magnetically Driven Materials", Russian Academy of Sciences, Institute of Solid State Physics, Chernogolovka, Moscow, Russia, May 2001.

119. Seminar, "Texture Formation in High-Temperature Superconductors", Institute of Physics, Academy of Sciences, Czech Republic, May 2001
120. "A Mechanism for the Magnetically Driven Shape Memory Alloys", MRS 2000 Fall Meeting, Symposium on Applied Magnetic Fields on Materials Behavior, Boston, Massachusetts, USA, November 2000
121. Seminar, "Hydrogen Effects on Crystal Dislocations", Lawrence Livermore National Laboratory, Berkeley, California, June 2000
122. "Hydrogen Effects on Crystal Dislocations", MURI Conference on Multiscale Modeling of Materials, , Newport, Rhode Island, USA, May 2000
123. Seminar, "Magnetic Field Effects on Materials Behavior", University of California at Los Angeles, USA, April 2000
124. Seminar, "Magnetic Field Effects on Materials Behavior", University of Texas at Austin, USA, March. 2000
125. Seminar, "Hydrogen Effects on Crystal Dislocations", University of Virginia, USA, Dec. 1999
126. "Texture Development in High Temperature BSCCO Superconductors", Superconductor Materials Conference, Giens, France, Sept. 1999

Funded Grants and Contracts (Total: \$19.1M; Ferreira Share: \$2.7M)

Investigators	Title	Agency/Sponsor	Grant Total (My Share)	Grant Period
PI: Graphenest Co-PIs: 4 and Paulo Ferreira	GNESIS- Graphenest's New Engineered System and its Implementation Solutions	POCI-FEDER	€2,244,791 (€153,199)	07/01/2018- 12/31/2019
PIs: Albano Cavaleiro/ YuanYue Liu Co-PI: Paulo Ferreira	Self Lubricating Coatings for high temperature applications with controlled release of the lubricious agent	UT-Austin Portugal Program	€173,250 (€74,250)	11/01/2018- 10/31/2019
PI: INEGI and FEUP Co-PI: Paulo Ferreira	msCORE - Multiscale methodology with model order reduction for advanced materials and processes	FCT	€219,916 (€8,433)	02/07/2018- 01/07/2021
PI: Paulo Ferreira	Efficient catalysts for energy storage: tackling failure mechanisms from	BINA/INL	€68,750 (€34,375)	10/01/2018- 09/30/2020

	electron microscopy observation			
PI: FEUP Co-PI: Paulo Ferreira	UseCoin: Understanding the Structure Evolution of Seedless Copper Interconnects for Nanoelectronics	FCT	€183,855 (€25,859)	01/09/2018-31/08/2021
PI: U-Minho Co-PI: Paulo Ferreira	Design of new antimicrobial osseointegrated dental implants	FCT	€202,170 (8,750)	26/07/2018-25/07/2021
PI: Paulo Ferreira	Durable High-Power Membrane Electrode Assemblies with Low-Pt-Loading	DOE – General Motors	\$450,000 (\$450,00)	09/01/2017-09/01/2020
PI: Paulo Ferreira	Rationally Designed Catalyst Layers for PEMFC Performance Optimization	DOE – Argonne National Laboratory	\$391,608 (\$391,608)	09/01/2013-08/31/2016
PI: Paul Barbara, Co-PIs: 20 Faculty including Paulo Ferreira	Understanding Charge Separation and Transfer at Interfaces in Energy Materials and Devices	DOE	\$13,108,718 (\$500,000)	08/01/2009-07/31/2014
PI: Paulo Ferreira	Polymer Electrolyte Fuel Cell Lifetime Limitations: The Role of Electrocatalyst Degradation	DOE – Argonne National Laboratory	\$200,084 (\$200,084)	09/01/2009-09/30/2013
PI: Desi Kovar Co-PI: Paulo Ferreira	Measurements of Fundamental Sintering Parameters in Nanoparticles	NSF	\$450,000 (\$225,000)	07/15/2010-06/30/2013
PI: Paulo Ferreira	Grain Orientation in Nanocrystalline Ni Films	Sandia National Laboratories	\$32,494 (\$32,494)	06/01/2010-08/31/2013
PI: Paulo Ferreira	Structural Characterization of Li-oxide Materials for Batteries	Innovnano	\$120,129 (\$120,129)	08/22/2011-08/21/2013
PI: Sheldon	Radiation Effects in PZT Materials	Sandia National Laboratories	\$186,000 (\$93,000)	09/01/2010-08/31/2013

Landsberger, Co-PI: Paulo Ferreira				
PI: Keith Stevenson Co-PIs: Paulo Ferreira, Maria Juenger	Acquisition of a Scanning Electron Microscope	NSF – MRI	\$526,297 (\$175,432)	08/31/2008- 08/31/2011
PI: Paulo Ferreira	Void formation in Nano Cu Interconnects	Semiconductor Research Corporation	\$211,440 (\$211,440)	10/01/2008- 10/01/2011
PI: Desi Kovar Co-PI: Paulo Ferreira	Direct Writing of Silver Conductors and Seals	Sandia National Laboratories	\$64,684 (\$32,342)	10/01/2009- 09/30/2010
PI: Sheldon Landsberger Co-PI: Paulo Ferreira	Behavior of Dielectric Materials in Radiation Environments	Sandia National Laboratories	\$15,000 (\$7,500)	10/01/2009- 09/30/2010
PI: Paulo Ferreira	High-Velocity Forming of Nano/Submicron Grain Stainless Steels	NSF-DMR	\$240,000 (\$240,000)	06/01/2004- 06/01/2008
Career Total			\$19,089,186	
Career Total (my share)			\$2,679,029	

In-Kind Gifts (Total: \$216.4k; Ferreira Share: \$208.4k)

Institution/ Sponsor	Funding (in US Dollars)
FEI, USA	2,000
Protochips, USA	1,000
Hummingbird, USA	2,000
Hysitron, USA	5,000
Gatan, USA	2,000
Fischione, USA	1,000
Nanomegas, Belgium	2,000
UT Austin, USA	5,000
UC Berkeley, USA	3,000
Corticeira Amorim, Portugal	26,005 (my share 18,605)
University of Porto, Portugal	1,500
Kharkov University, Ukraine	3,000
Molecular Imprints, USA	2,500
Porocel, Canada	13,610
Texas Instruments, USA	3,560
USDA, USA	5,835
Ferespe, Portugal	80,804

Samsung, USA	64,000
Total	216,414

TRANSFER OF KNOWLEDGE

Conferences Organized

1. Conference Organizer, Symposium on "Materials for energy production, storage and catalysis", 19th International Microscopy Congress, September 9-14, Sydney, Australia
2. Organizer, Workshop on Electron Microscopy, INL, Braga, Portugal, May 4, 2018
3. Organizer, Workshop on Cryo-Electron Microscopy, INL, Braga, Portugal, April 20, 2018
4. Symposium Organizer, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 12-16, 2011
5. Symposium Organizer, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 11-15, 2011
6. Conference Organizer, 4th International Conference on Remote and In situ Microscopy, Lisbon, Portugal, May 22-24, 2013
7. Symposium Organizer, Symposium on "Energy Materials", Microscopy and Microanalysis, Phoenix, AZ, July 29-August 2, 2012
8. Symposium Organizer, Symposium on "Advanced Developments in Electron Microscopy", MS&T'11, Materials Science & Technology 2011 Conference, Columbus, Ohio, 2011.
9. Symposium Organizer, Symposium 19 on "Advanced Electron Microscopy and Nanospectroscopy", XX International Materials Congress, Cancun, Mexico, August 14-19, 2011
10. Symposium Organizer, Symposium D on "Synthesis, Characterization and Properties of Nanoparticles", 11th International Conference on Advanced Materials, Rio de Janeiro, Brazil, Sept. 20-25, 2009.
11. Organizer, Symposium on "Electron Microscopy at Sub-Angstrom Resolution", University of Texas at Austin, March 7, 2007.
12. Organizer, MRS Symposium MM on "In-situ Electron Microscopy", MRS Fall 2005 Meeting, Boston, December 2005
13. Organizer, Materials 2000, Portugal, April, 2003
14. Symposium Organizer, University-Industry Relationships, Portugal, June 26, 2003.

Sessions Chaired/Organized

1. Session Chairman, Symposium on "Materials for energy production, storage and catalysis", 19th International Microscopy Congress, September 9-14, Sydney, Australia
2. Session Chairman, Symposium "Batteries" on "Hyceltec 2017", Porto, Portugal, June 19-23, 2017
3. Session Chairman, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 12-16, 2015
4. Session Chairman, 16th Annual Conference, Yucomat 2014, Herceg Novi, Montenegro, Sept 1-5, 2014
5. Session Chairman, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 11-15, 2013
6. Session Chairman, 4th International Conference on Remote and In situ Microscopy, Lisbon, Portugal, May 22-24, 2013.
7. Session Symposium Organizer, Symposium on "Energy Materials", Microscopy and Microanalysis, Phoenix, AZ, July 29-August 2, 2012
8. Session Chairman, Symposium P on "Electron Microscopy/Spectroscopy of Energy Related Materials", Microscopy and Microanalysis, Phoenix, AZ, July 29-August 2, 2012
9. Session Chairman, Symposium 19 on "Advanced Electron Microscopy and Nanospectroscopy", XX International Materials Congress, Cancun, Mexico, August 14-19, 2011
10. Session Chairman, Symposium on "Advances in Mechanics of One-Dimensional Micro/Nano Materials: Nanomechanics: In-Situ Techniques", TMS Annual Spring Meeting, San Diego, California, March, 2011.
11. Session Chairman, 3rd International Workshop on Remote Electron Microscopy and In Situ Studies, Carnegie-Mellon University, Pittsburgh, June 6-8, 2011
12. Session Chairman, Symposium D on "Synthesis, Characterization and Properties of Nanoparticles", 11th International Conference on Advanced Materials, Rio de Janeiro, Brazil, Sept. 20-25, 2009
13. Session Chairman, Microscopy and Microanalysis 09, Richmond Virginia, August, 2009.
14. Session Chairman, Texas Society of Microscopy, Spring 2008 Meeting, University of Texas at Austin, April, 2008

Consulting

Porocel, Canada, (2015-2017)

Samsung, USA (2016-2017)

Fish & Richardson P.C, USA (2015-2016)

Texas Instruments, USA (2014)

National Network of Microscopy, Portugal (2010-2011)

National Network of Polymers, Portugal (2010)

Fluidinova, Portugal (2008)

Greatbatch Inc., USA (2007)

Texas A&M University and Boeing, USA (2007)

Ministry of Economics and Innovation, Portuguese Government, Portugal (2005)

Schell Mitchell & Cooley, USA (2005)

Nano-C, USA (2004)

A123, USA (2003)

James Avery, USA (2001)

Corticeira Amorim, Portugal (2000)

Cabelte, Portugal (2000)

AMCO, USA (1999)

JA-RO, Finland (1998)

Membership in Professional and Honorary Societies

Member, Materials and Research Society, 1995-present
Member, Microscopy Society of America, 2007-present
Member, Texas Society of Microscopy, 2007-present
Member, Portuguese Society of Microscopy, 2007-present

UNIVERSITY MANAGEMENT

International Committees

Editorial Board

Metallurgical and Materials Transactions, Board of Review, (March 2003-2017)

Journal Reviewer

Reviewer for "Science", "Nature Materials"; "Nanoletters"; "Acta Materialia"; "Microscopy and Microanalysis"; "Microscopy Research and Technique"; "Philosophical Magazine"; "Physica-C"; "Nanotechnology"; "Materials Science and Engineering A"; "Journal of Materials Research";

“Journal of Applied Physics”; “Applied Physics Letters”; “Journal of Physical Chemistry”; “Journal of Alloys and Compounds”; “Journal of Tribology”; “Electrochimica Acta”; “International Journal of Fracture”; “Journal of Physics and Chemistry of Solids”; “Journal of the Electrochemical Society”, “MRS Bulletin”, ACS Nano, Chemistry of Materials

US National Committees

Reviewer, US Department of Energy: Panel member and proposal reviewer of the Argonne National Center for Electron Microscopy and Berkeley National Center for Electron Microscopy, (2009, 2012)

Reviewer, US National Science Foundation: Panel member and proposal reviewer across several divisions within the program areas of engineering and physical sciences, (2002-present).

Reviewer, US Department of Energy, Office of Basic Energy Sciences (USA): Proposal reviewer across several areas within the office of basic energy sciences, (2007-present)

Reviewer, US Department of Energy, The Advanced Research Projects Agency-Energy (ARPA-E), Proposal reviewer, (2011-2016)

Portuguese National Committees

Area Director, Nanotechnologies, UT-Austin Portugal Program (2018-

Reviewer, Portuguese Government, National Center of Microscopy: Panel member and proposal reviewer of the network of microscopy centers in Portugal, (2010, 2011)

Special Advisor to the Minister of Economics and Innovation, Portugal “On Government Strategy for Science & Technology”, (June 2005 – December 2005).

University of Texas at Austin

Co-Chair, University of Texas at Austin-Portugal Program, Emerging Technologies, 2012-2018

Co-Chair, Nanoscience/Nanotechnology/Materials Science Colloquia, 2006-2014

Committee member, International Programs, 2009-2010

Committee member, Hamilton Book Award, 2009

Co-Organizer, Nano-Image Exhibit for the Opening of the Nanocenter, Fall 2006

IST, University of Lisbon

Ph.D coordinator, Materials Science and Engineering, 2019-

College of Engineering, UT-Austin

Assistant Graduate Advisor in Materials Science and Engineering Program: 2006-2016

Chair, Electron Microscopy Facility, Texas Materials Institute, 2008-2017

Committee Member, Graduate Student Admissions in Materials Science and Engineering Program
2006-2017

Committee Member, Electron Microscopy Facility, Texas Materials Institute, 2001-2008

Chair, Materials Science Colloquia, 2001-2005

Member, Materials Science and Engineering Program, Qualifying Committee in Thermodynamics
of Materials, 2001-2006

Member, Materials Science and Engineering Program, Qualifying Committee in Phase
Transformations, 2001-2006

Member, Research Grant Competition, Review Panel Committee: 2006-2017

Department of Mechanical Engineering, UT-Austin

Chair, Strategic Hiring Committee, 2016-2017

Committee Member, Materials Area Proceed Plan: 2001-2017

Committee Member, ME Materials Area Space, 2011-2017

Committee Member, ME ABET, 2011-2017

Member, Materials Science and Engineering Qualifying Committee in Thermodynamics of
Materials, 2001-2006

Member, Materials Science and Engineering Qualifying Committee in Phase Transformation, 2001-
2006

Organizer, Scientific Literature in Materials Area, 2006