



# Paulo J Ferreira

**Google Scholar**  
Citations: 15429  
H-index: 47

**Scopus Author ID:** 55536479100  
Citations: 10764  
H-index: 36

## 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, Fall 2019)
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, 2019)
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. Ricardo Sousa, Ph.D Thesis, (co-supervised with Prof. Laura Ribeiro, FEUP, Portugal)
5. Cinthya Blois, Ph.D Thesis, (co-supervised with Prof. Paula Jardim, UFRJ, Brazil)
6. Bruno Oliveira, Ph.D Thesis (co-supervised with Prof. Manuel Vieira, FEUP, Portugal)
7. Francisco Figueiredo, Ph.D Thesis (co-supervised with Prof. Sandra Ribeiro, IBMC, UP, Portugal)
8. Beatriz Canabarro, Ph.D Thesis, (co-supervised with Prof. Paula Jardim, UFRJ, Brazil)

### ***PhD Supervisions Completed (10)***

1. Daniel Groom, Ph.D Thesis, "On The Segmentation Of Inorganic Nanoparticles In TEM Micrographs", April 25, 2019
2. Kang Yu, Ph.D Thesis, "Understanding PEMFCs by 3D-Identical Location TEM and EELS", December 4, 2018
3. 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 4, 2017 (co-supervised with Prof. John Goodenough).
4. Somaye Rasouli, Ph.D Thesis, "Degradation Mechanisms of Pt and Pt Alloy Nanocatalysts in Proton Exchange Membrane Fuel Cells", February 2017
5. 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).
6. 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).
7. Jai Ganesh, Ph.D Thesis, "Effect of Downscaling Copper Interconnects on the Microstructure Revealed by High Resolution TEM Orientation Mapping", December 2011.
8. Chris Carlton, Ph.D Thesis, "Defects and Deformation In Nanostructured Metals", August 2009.
9. Shreyas Rakasekhara, Ph.D Thesis, "Development of Nano/Submicron Grains in Metastable Austenitic Stainless Steels", August 2007.
10. Jin Ho An, Ph.D Thesis, "Void Formation in Nano Copper Interconnects", August 2007.

#### **MS Supervisions Completed (9)**

1. Luís Castelo-Branco, Master's Thesis, "Mechanical behaviour under thermal loading of metallic thin films used as catalysts for graphene growth under CVD", December 2019 (co-supervised with Prof. Augusto Moita de Deus, IST)
2. Monica Fidalgo, Master's Thesis, "Mechanical behavior of nano-copper interconnects subjected to thermal loading", May 2019 (co-supervised with Prof. Augusto Moita de Deus, IST)
3. Rohit Bezewada, Master's Thesis, "Effect of Crystal Size on the Diffraction Contrast of a Screw Dislocation", June 2013.
4. 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.
5. Jai Ganesh, Master's Thesis, "D-STEM: A Parallel Electron Diffraction Technique Applied to Nanomaterials", August 2009.

6. Michael Asoro, Master's Thesis, "Size Effects on Melting of Ag Nanoparticles: In-situ TEM Observations", August 2009.
7. Rosa Calinas, Master's Thesis (co-supervised with Prof. Teresa Vieira), "Influence of Nitrogen on the Nanocrystalline Copper Films", December 2007.
8. 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).
9. 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. Mohamed Ben Hassine, International Iberian Nanotechnology Laboratory, (July 2019-
2. Dr. Charles Amos, International Iberian Nanotechnology Laboratory, (August 2018-
3. Dr. Justyna Grzonka, International Iberian Nanotechnology Laboratory, (August 2018-
4. Dr. Cristiana Alves, International Iberian Nanotechnology Laboratory, (August 2018-
5. Dr. Sebastian Calderon, International Iberian Nanotechnology Laboratory, (April 2017-
6. Dr. Karalee Jarvis, University of Texas at Austin (March 2009-August 2014)
7. Dr. Shreyas Rajasekhara, University of Texas at Austin (May 2009 -August 2011)

### **Visiting Scholars Supervision**

1. Mr. Andres Godoy, University of Connecticut, USA (May 2019-August 2019)
2. Ms. Manuela Fernandes, University of Aveiro, Portugal (August 2015- January 2016)
3. Ms. Noora Manninen, University of Coimbra, Portugal (August 2014-January 2015)
4. Mrs. Rosa Calinas, Innovnano, Portugal (Aug 2011-Aug 2013)
5. Prof. Aleksandr Krystal, Krakov University, Ukraine (Jan 2012-April 2012)
6. Mr. Ruben Santos, University of Porto, Portugal (Jan 2012-July 2012)
7. Ms. Li Zhuoxuan, Tsinghua University, China (July 2012 –Oct 2012)
8. Dr. Yaobo Hu, Chongqing University, China (July 2011 – Sept 2012)
9. Mr. Yoann Dolidon, Ecole Centrale de Lille, France (June 2011 – Aug 2011)
10. Ms. Sofia Soares, University of Aveiro, Portugal (Aug 2011 – Dec 2011)
11. Mr. Nilson Ferreira, Universidade Federal do Amapá, Brasil (June 2011-Aug 2011)
12. Prof. Carla Costa, IST/ISEL, Portugal, (September 2008- February 2009)
13. Dr. Shuo Chen, Postdoctoral Researcher from MIT, (April 2007)
14. Mr. Emiliano Cechetti, Tenfold Corporation, USA, (March-August 2002)
15. Prof. Paula Braga, University of Tras-os-Montes, Portugal, (February-June 2006)
16. Mr. Pasi Juntunen, University of Oulu, Finland, (December 2006 – February 2007)
17. 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  $\alpha'$ -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 RBaCo<sub>4</sub>O<sub>7</sub> 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. Aravindhha 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).

51. Nitin M. Batra, Ph.D Thesis, "Development and Application of Membraneless Electron Microscopy Chips", November 2019, (Supervisor: Prof. Pedro Costa, Materials Science and Engineering, King Abdullah University of Science and Technology, Thuwal, Kingdom of Saudi Arabia)
52. Ana Rovisco, Ph.D Thesis, "Solution based Zinc-Tin Oxide nanostructures: from synthesis to applications", December 2019, (Supervisor: Prof. Pedro Barquinha, Materials Science and Engineering, Universidade Nova de Lisboa, Portugal)

## **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).
5. Sharath Kumar, Master Thesis, "Electron Microscopy and Spectroscopy Study of Modified Titanate Nanowires and Nanotubes", July 2018, (Supervisors: Prof. Anabela Rolo and Dr. Leonard Francis, University of Minho and INL)
6. João Santos, Master Thesis, "Optimization of the chemical vapour deposition conditions for the growth of atomically thin MoSe<sub>2</sub> as photoresponsive material", October 2019, (Supervisors: Dr. Andreas Capasso and Prof. Susana Freitas, INL and IST)

## **RESEARCH**

### **Publications (199)**

#### **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 (102)**

1. C. F. Almeida Alves, S. Calderon V., P. J. Ferreira, L. Marques and S. Carvalho; "Passivation and dissolution mechanisms in ordered anodic tantalum oxide nanostructures"; Applied Surface Science, Vol. 513, pp. 145575 (2020)
2. Tânia Ribeiro, Ana Sofia Rodrigues, Sebastian Calderon, Alexandra Fidalgo, José L.M. Gonçalves, Vânia André, M. Teresa Duarte, Paulo J. Ferreira, José Paulo S. Farinha, Carlos Baleizão, "Silica nanocarriers with user-defined precise diameters by controlled template self-assembly", Journal of Colloid and Interface Science, Vol. 561, pp. 609-619, (2020)
3. J Pan, K Yu, H Mao, L Li, Y Zhang, Y Li, PJ Ferreira, J Yang, "Crystalline Sb or Bi in amorphous Ti-based oxides as anode materials for sodium storage", Chemical Engineering Journal, Vol. 380, pp. 122624, (2020)
4. Fang, Zhiwei; Wu, Ping; Yu, Kang; Li, Yifan; Zhu, Yue; Ferreira, Paulo; Liu, Yuanyue; Yu, Guihua, "A Hybrid Organic-Inorganic Gel Electrocatalyst for Stable Acidic Water Oxidation", ACS Nano, Vol. 12, pp. 14368-14376, (2019)
5. Yue Zhu, Yujin Ji, Zhengyu Ju, Kang Yu, Paulo Ferreira, Yuanyue Liu, and Guihua Y, "Ultrafast Intercalation Enabled by Strong Solvent-Host Interactions: Understanding Solvent Effect at Atomic Level", Angew. Chem. Int. Ed. Vol. 131, pp.17365-17369, (2019)

6. R.O. Sousa, P. Lacerda, P.J. Ferreira, L.M.M. Ribeiro, "On the Precipitation of Sigma and Chi Phases in a Cast Super Duplex Stainless Steel", *Metallurgical and Materials Transactions A*, Vol. 50(10), pp. 4758-4778, (2019).
7. H.S. Vanegas P, S. Calderon V, J.E. Alfonso O, J.J. Olaya F, P.J. Ferreira, S. Carvalho, "Influence of silicon on the microstructure and the chemical properties of nanostructured ZrN-Si coatings deposited by means of pulsed-DC reactive magnetron sputtering", *Applied Surface Science*, Vol. 481, pp. 1249-1259, (2019)
8. Pablo Tancredi, Luelc Souza da Costa, S. Calderon, Oscar Moscoso-Londoño, Leandro M.Socolovsky, Paulo J. Ferreira, Diego Muraca, Daniela Zanchet, Marcelo Knobel, "Exploring the synthesis conditions to control the morphology of gold – iron oxide heterostructures", *Nano Research*, (2019)
9. CF Almeida Alves, L Marques, PJ Ferreira, D Schneider, A Cavaleiro, S Carvalho, "An experimental and theoretical study on the crystal structure and elastic properties of Ta1– xOx coatings", *Surfaces and Coating Technology*, Vol. 364, pp. 289-297, (2019).
10. M. Gonçalves, R. F. P. Pereira, P. Ferreira, E. Carbo-Argibay, J. Calita, G. Toquer, S. C. Nunes, V. DE Zea Bermudez "Structuring of Di-Alkyl-Urethanesils", *Journal of Sol-Gel Science and Technology*, Vol. 89, Issue 1, pp 205–215, (2019)
11. 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)
12. A Al-Rjoub, L Rebuta, P Costa, NP Barradas, E Alves, PJ Ferreira, K Abderrafi, A Matilainen, K Pischow, "A design of selective solar absorber for high temperature applications", *Solar Energy*, Vol. 172, Part 2, pp177-183, (2018)
13. 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)
14. 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)
15. D. Groom, A. Bovik, P.J. Ferreira, "Automatic Segmentation of Inorganic Nanoparticles in BF TEM Micrographs", *Ultramicroscopy*, Vol. 194, pp. 25-34, (2018)
16. Sitaramanjaneva Mouli Thalluri, Jerome Borme, Kang Yu, Junyuan Xu, Isilda Amorim, Joao Gaspar, Liang Qiao, Paulo Ferreira, Pedro Alpuim, and Lifeng Liu, "Conformal and continuous deposition of bifunctional cobalt phosphide layers on p-silicon nanowire arrays for improved solar hydrogen evolution", *Nano Research*, , Vol. 11, pp. 4823-4835, (2018)

17. P. Paradiso, R.L. Santos, R.B. Horta, J.N.C. Lopes, P.J. Ferreira, R. Colaco, "Formation of nanocrystalline tobermorite in calcium silicate binders with low C/S ratio", *Acta Materialia*, Vol. 152, pp. 7-15, 2018
18. Rajesh Ahluwalia, Xiaohua Wang, Jui-Kun Peng, Nancy Kariuki, Deborah Myers, Somaye Rasouli, Paulo Ferreira, Zhiwei Yang, Alex Bonastre, Dash Fongalland Jonathan Sharman, "Durability of De-Alloyed Platinum-Nickel Cathode Catalyst in Low Platinum Loading Membrane-Electrode Assemblies Subjected to Accelerated Stress Tests", *Journal of the Electrochemical Society*, Vol. 165, pp. F3316-F3327, (2018)
19. C Fernandes, Lina F Ballesteros, Miguel A Cerqueira, LM Pastrana, José A Teixeira, PJ Ferreira, S Carvalho, "Carbon-Based Sputtered Coatings for Enhanced Chitosan-Based Films Properties", *Applied Surface Science*, Vol. 433, pp. 689-695, (2018)
20. Jarvis, Karalee; Wang, Chih-Chieh; Varela, María; Unocic, Raymond; Manthiram, Arumugam; Ferreira, Paulo, "Surface Reconstruction in Li-rich Layered Oxides of Li-ion Batteries", *Chemistry of Materials*, Vol. 29, pp 7668–7674 (2017)
21. Minori Uchimiya, Joseph J. Pignatello, Jason C. White, Szu-Lung Hu, Paulo J. Ferreira, "Structural Transformation of Biochar Black Carbon by C60 Superstructure: Environmental Implications", *Scientific Reports*, Vol. 7, pp. 11787 (2017)
22. Cankur Firat Cetinbas, Rajesh K Ahluwalia, Nancy Kariuki, Vincent De Andrade, Dash Fongalland, Linda Smith, Jonathan Sharman, Paulo Ferreira, Somaye Rasouli, Deborah J Myers, "Hybrid Approach Combining Multiple Characterization Techniques and Simulations for Microstructural Analysis of Proton Exchange Membrane Fuel Cell Electrodes", *Journal of Power Sources*, Vol. 344, pp. 62-73 (2017)
23. Minori Uchimiya, Joseph J. Pignatello, Jason C. White, Szu-Lung Hu, Paulo J. Ferreira, "Surface Interactions between Gold Nanoparticles and Biochar", *Scientific Reports* 7, Nr. 5027, pp. 41598-41617, (2017)
24. S. Calderon, B. Gomes, P.J. Ferreira, S. Carvalho, "Zinc Nanostructures for Oxygen Scavenging", *Nanoscale*, Vol. 9, pp. 5254-5262, (2017)
25. Le Xin, Fan Yang, Jian Xie, Zhiwei Yang, Michael Perry, Nancy N. Kariuki, Deborah J. Myers, Kang Yu, Paulo J. Ferreira, Alex Martinez Bonastre, and Jonathan Sharman, "Enhanced MEA Performance for PEMFCs Under Low Relative Humidity and Low Oxygen Content Conditions via Catalyst Functionalization", *Journal of the Electrochemical Society*, Vol. 164, pp. F674-F684, (2017)
26. Aleksandr P. Kryshtal, Alexey A. Minenkov, Paulo J. Ferreira, "Interfacial Kinetics in Nanosized Au/Ge Films: an *in situ* TEM Study", *Applied Surface Science*, Vol. 409, pp. 343-349, (2017)
27. Somaye Rasouli, Richard A Ortiz Godoy, Zhiwei Yang, Mallika Gummalla, Sarah Ball, Deborah Myers, Paulo J. Ferreira, "Surface area loss mechanisms of Pt<sub>3</sub>Co nanocatalysts in proton exchange membrane fuel cells", *Journal of Power Sources*, Vol. 343, pp. 571–579, (2017)

28. Marta S. Laranjeira, Ana A. Moço, Jorge Ferreira, Sílvia Coimbra, Elísio Costa, Alice Santos-Silva, Paulo J. Ferreira, Fernando J. Monteiro, "Different hydroxyapatite magnetic nanoparticles for medical imaging: Its effects on hemostatic, hemolytic activity and cellular cytotoxicity", *Colloids and Surfaces B: Biointerfaces*, Vol. 146, pp. 363–374 (2016)
29. Charles Amos, Manuel Roldan, Maria Varela, John Goodenough, Paulo Ferreira, "Revealing the Reconstructed Surface of  $\text{Li}[\text{Mn}_2]\text{O}_4$ ", *Nanoletters*, Vol. 16, pp 2899–2906 (2016).
30. Karalee A. Jarvis, Chih-Chieh Wang, James C. Knight, Lew Rabenberg, Arumugam Manthiram, Paulo J. Ferreira, "Formation and effect of orientation domains in layered oxide cathodes of lithium-ion batteries", *Acta Materialia*, Vol. 108, pp. 264-270, (2016)
31. Le Xin, Fan Yang, Somaye Rasouli, Yang Qiu, Zhe-Fei Li, Cheng-Jun Sun, Yuzi Liu, Paulo Ferreira, Wenzhen Li, Yang Ren, and Jian Xie, "Understanding Pt nanoparticle anchoring on graphene supports through surface functionalization", *ACS Catal.*, Volume 6, pp 2642–2653, (2016)
32. James A Gilbert, A Jeremy Kropf, Nancy N Kariuki, Stacy DeCrane, Xiaoping Wang, Somaye Rasouli, Kang Yu, Paulo J Ferreira, Dane Morgan, Deborah J Myers, "In-Operando Anomalous Small-Angle X-Ray Scattering Investigation of Pt<sub>3</sub>Co Catalyst Degradation in Aqueous and Fuel Cell Environments", *Journal of The Electrochemical Society*, Volume 162, pp. F1487-F1497 (2015).
33. Mallika Gummalla, Sarah C. Ball, David A. Condit, Somaye Rasouli, Kang Yu, Paulo J. Ferreira, Deborah J. Myers, Zhiwei Yang, "Effect of Particle Size and Operating Conditions on Pt<sub>3</sub>Co PEMFC Cathode Catalyst Durability", *Catalysts*, Volume 5, pp. 926-948, 2015.
34. James A. Gilbert, Nancy N. Kariuki, Xiaoping Wang, A. Jeremy Kropf, Kang Yu, Daniel J. Groom, Paulo J. Ferreira, Dane Morgan, Deborah J. Myers, "Pt Catalyst Degradation in Aqueous and Fuel Cell Environments studied via In-Operando Anomalous Small-Angle X-ray Scattering", *Electrochimica Acta*, Volume 173, pp. 223–234 (2015)
35. Kang Yu, Daniel J. Groom, Xiaoping Wang, Zhiwei Yang, Mallika Gummalla, Sarah C. Ball, Deborah J. Myers, and Paulo J. Ferreira, "Degradation Mechanisms of Platinum Nanoparticle Catalysts in Proton Exchange Membrane Fuel Cells: The Role of Particle Size", *Chemistry of Materials*, Volume 26, pp 5540–5548 (2014).
36. Katayun Barmak, Amith Darbal, Kameswaran J. Ganesh, Paulo J. Ferreira, Jeffrey M. Rickman, Tik Sun, Bo Yao, Andrew P. Warren, Kevin R. Coffey, "Surface and grain boundary scattering in nanometric Cu thin films: A quantitative analysis including twin boundaries", *Journal of Vacuum Science and Technology*, 32, 061503 (2014).
37. M.A. Asoro, P.J. Ferreira, D. Kovar, "In Situ TEM and STEM Studies of Sintering of Ag and Pt Nanoparticles", *Acta Materialia*, Volume 81, pp. 173–183 (2014).
38. Thandavarayan Maiyalagan, Karalee A. Jarvis, Soosairaj Therese, Paulo J. Ferreira, Arumugam Manthiram, "Spinel-type lithium cobalt oxide as a bifunctional electrocatalyst for the oxygen evolution and oxygen reduction reactions", *Nature Communications* 5, 3949, pp.



1-8, (2014)

39. M.A. Asoro, D. Kovar, P.J. Ferreira, "Effect of surface carbon coating on sintering of silver nanoparticles: in situ TEM observations", *Chemical Communications*, Vol. 50, pp. 4835-4838, (2014).
40. Karalee A. Jarvis, Chih-Chieh Wang, Arumugam Manthiram and Paulo J. Ferreira, "The role of composition in the atomic structure, oxygen loss, and capacity of layered Li-Mn-Ni oxide cathodes", *Journal of Materials Chemistry A*, Vol. 2, pp. 1353 – 1362, (2014).
41. Michael Asoro, Desiderio Kovar, Paulo Ferreira, "In-situ Transmission Electron Microscopy Observations of Sublimation in Silver Nanoparticles", *ACS Nano*, Vol. 7, pp. 7844-7852, (2013).
42. Chih-Chieh Wang, Karalee A. Jarvis, P.J. Ferreira and A. Manthiram, "Effect of synthesis conditions on the first charge and reversible capacities of lithium-rich layered Oxides", *Chemistry of Materials*, Vol. 25 (15), pp. 3267–3275, (2013).
43. Linjun Cao, K. J. Ganesh, Lijuan Zhang, Oliver Aubel, Christian Hennesthal, Meike Hauschildt, Paulo J. Ferreira, and Paul S. Ho, "Grain structure analysis and effect on electromigration reliability in nanoscale Cu interconnects". *Applied Physics Letters*, Vol. 102, pp. 131907-1:131907-4, (2013).
44. J. T. Graham, G.L. Brennecke, P.J. Ferreira, L. Small, D. Duquette, C. Ablett, S. Landsberger and J.F. Ihlefeld, "Neutron irradiation effects on domain wall mobility and reversibility in lead zirconate titanate thin films", *Journal of Applied Physics*, Vol. 11, pp. 124104-124109, (2013).
45. B. Patrick, H. Ham, Y. Shao-Horn, L. Allard, G. Hwang, P.J. Ferreira, "Atomic Structure and Composition of "Pt<sub>3</sub>Co" Nanocatalysts in Fuel Cells: An Aberration-Corrected STEM HAADF Study", *Chemistry of Materials*, Vol. 25, pp 530–535, (2013).
46. A. Darbal, K. J. Ganesh, X. Liu, S.-B. Lee, J. Ledonne, T. Sun, B. Yao, A. P. Warren, G. S. Rohrer, A. D. Rollett, P. J. Ferreira, K. R. Coffey, and K. Barmak, "Grain Boundary Character Distribution of Nanocrystalline Cu Thin Films Using Stereological Analysis of Transmission Electron Microscope Orientation Maps", *Microscopy and Microanalysis*, Vol. 19, pp. 111-119, (2013).
47. Xiaobin Xu, Min Wu, Michael Asoro, P. J. Ferreira and D. L. Fan, "One-Step Hydrothermal Synthesis of Comb-Like ZnO Nanostructures", Vol. 12, pp. 4829–4833, (2012)
48. S. Rajasekhara, K. Hattar, K. J. Ganesh, J. A. Knapp, P. J. Ferreira, "Evidence of metastable *hcp* phase grains in as-deposited nanocrystalline nickel films", *Scripta Materialia*, Vol. 67, No. 2. pp. 189-192, (2012).
49. K.A. Jarvis, Z.Q. Deng, L. F. Allard, A. Manthiram, and P.J. Ferreira, "Understanding structural defects in lithium-rich layered oxide cathodes", *Journal of Materials Chemistry*, Vol. 22 (23), pp. 11550 – 11555, (2012).

50. K.J. Ganesh, A.D. Darbal, S. Rakasekhara, G.S. Rohrer, K. Barmak and P.J. Ferreira, "Effect of Downscaling Nano-copper Interconnects on the Microstructure Revealed by High Resolution TEM-Orientation-Mapping", *Journal of Nanotechnology*, Vol. 23, pp. 135702-135708, (2012),
51. Christopher E. Carlton, Shuo Chen, Paulo J. Ferreira, Lawrence F. Allard, and Yang Shao-Horn, "Sub-Nanometer-Resolution Elemental Mapping of "Pt<sub>3</sub>Co" Nanoparticle Catalyst Degradation in Proton-Exchange Membrane Fuel Cells", *The Journal of Physical Chemistry Letters*, Volume: 3 Issue: 2 Pages: 161-166 (2012).
52. J. Graham, S. Landsberger, P. J. Ferreira, J. Ihlefeld and G. Brennecke, "Neutron flux characterization techniques for radiation effects studies", *Journal of Radioanalytical and Nuclear Chemistry*, 291, pp. 503-507 (2012)
53. Daniel R. Dreyer, Karalee A. Jarvis, Paulo J. Ferreira, and Christopher W. Bielawski, "Graphite Oxide as a Dehydrative Polymerization Catalyst: A One-Step Synthesis of Carbon-Reinforced Poly(phenylene methylene) Composites", *Macromolecules*, Vol. 44, pp.7659-7667 (2011).
54. K. Jarvis, Z. Deng, L.F. Allard, A. Manthiram, P.J. Ferreira, "Atomic Structure of a Lithium-Rich Layered Oxide Material for Lithium-ion Batteries: Evidence of a Solid Solution", *Chemistry of Materials*, 23, 16, pp. 3614-3621, (2011).
55. Y. Zhu, S. Murali, M. Stoller, K.J. Ganesh, W. Cai, P.J. Ferreira, A. Pirkle, R. M. Wallace, K.A. Cychoz, M. Thommes, D. Su, E. Stach, R. Ruoff, "Carbon-Based Supercapacitors Produced by Activation of Graphene", *Science*, 24 June, pp. 1537-1541, (2011)
56. S. Rajasekhara, B. H. Neuner III, G. Ferro, C. A. Zorman, G. Shvets, P.J.Ferreira and D. Kovar, "The influence of impurities and planar defects on the infrared properties of silicon carbide films", *Applied Physics Letters*, 98, 191904, (2011).
57. J. Zhao, K. Jarvis, P.J. Ferreira, and A. Manthiram, "Performance and stability of Pd-Pt-Ni nanoalloy electrocatalysts in proton exchange membrane fuel cells" *Journal of Power Sources*, Vol.196, 10, pp. 4515-4523, (2011).
58. S. Rajasekhara, P.J. Ferreira, "Martensite austenite phase transformation kinetics in an ultrafine-grained metastable austenitic stainless steel", *Acta Materialia*, Vol.59, pp. 738-748, (2011).
59. A. Velamakanni, J.R. Torres, K.J. Ganesh, P.J. Ferreira, J.S. Major, "Controlled Assembly of Silane-Based Polymers: Chemically Robust Thin-Films", *Langmuir*, Vol.26, pp. 15295-15301, (2010).
60. K.J. Ganesh, M. Kawasaki, J.P. Zhou, P.J. Ferreira, "D-STEM: A Parallel Diffraction Technique Applied to Nanomaterials", *Microscopy and Microanalysis*, Vol.16, pp. 614-621 (2010)
61. K.J. Ganesh, S. Rajasekhara, J.P. Zhou, P.J. Ferreira, "Texture and stress analysis on 120 nm copper interconnects", *Scripta Materialia*, Vol.62, pp.843-846 (2010).

62. S. Simões, R. Calinas, M.F. Vieira, M.T. Vieira, P.J. Ferreira "In-situ TEM study of grain growth In nanocrystalline copper thin films", *Journal of Nanotechnology*, Vol. 21, pp. 145701 (2010).
63. A. Velamakanni, C.W. Magnuson, K.J. Ganesh, Y.W. Zhu, J.H. An, P.J. Ferreira, R.S. Ruoff, "Site-Specific Deposition of Au Nanoparticles in CNT Films by Chemical Bonding" *ACS NANO*, Vol. 4, Issue: 1, pp. 540-546 (2010).
64. S. Rajasekhara, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, "Microstructure evolution in nano/submicron grained AISI 301LN stainless steels", *Materials Science and Engineering A*, Vol.527, pp. 1986-1996, (2010)
65. M.A.Asoro, D. Kovar, Y. Shao-Horn, L.F. Allard, P.J. Ferreira, "Coalescence and sintering of Pt nanoparticles: In-situ observation by aberration-corrected HAADF STEM", *Journal of Nanotechnology*, Vol. 21, pp. 025701-025706 (2010).
66. Aruna Velamakanni, K. J. Ganesh, Yanwu Zhu, P. J. Ferreira, Rodney S. Ruoff, "Catalyst-Free Synthesis and Characterization of Metastable Boron Carbide Nanowires", *Advanced Functional Materials*, Vol. 19, pp. 1-8, (2009).
67. A. Vadivel Murugan, T. Muraliganth, P. J. Ferreira, and A. Manthiram, "Dimensionally Modulated, Single-crystalline LiMPO<sub>4</sub> (M=Mn,Fe,Co, and Ni) with Nano-Thumblike Shapes for High-Power Energy Storage," *Inorganic Chemistry*, Vol. 48, pp. 946-952, (2009).
68. Shuo Chen, Wenchao Sheng, Naoaki Yabuuchi, Paulo J. Ferreira, Lawrence F. Allard and Yang Shao-Horn, "Origin of Oxygen Reduction Reaction Activity on "Pt<sub>3</sub>Co" Nanoparticles: Atomically Resolved Chemical Compositions and Structures", *Journal of Physical Chemistry C*, Vol. 113, pp. 1109-1125, (2009).
69. Shuo Chen, P. J. Ferreira, Wenchao Sheng, Naoaki Yabuuchi, Larry Allard, and Yang Shao-Horn, "Enhanced Activity for Oxygen Reduction Reaction on "Pt<sub>3</sub>Co" Nanoparticles: Direct Evidence of Percolated and Sandwich-Segregation Structures", *Journal of the American Chemical Society*, Vol. 130, pp. 13818-13819, (2008)
70. C.E. Carlton, L. Rabenberg, P.J. Ferreira, "On the nucleation of partial dislocations in nanoparticles", *Philosophical Magazine Letters*, Vol. 88, No 9-10, pp. 715-724, (2008).
71. R. Calinas, M.T. Vieira, P.J. Ferreira, "The Effect of Nitrogen on the Formation of Nanocrystalline Copper Thin Films", *Journal of Nanoscience and Nanotechnology*, Vol. 9, No. 6, pp. 3921-3926, (2008)
72. C. E. Carlton, P.J. Ferreira, "Dislocation motion-induced strain in nanocrystalline materials: Overlooked considerations", *Materials Science and Engineering A*, 486, pp. 672-674, (2008).
73. R. Perez-Bustamante, I. Estrada-Guel, W. Antunez-Flores, M. Miki-Yoshida, P.J. Ferreira, R. Martinez- Sanchez, "Novel Al-matrix nanocomposites reinforced with multi-walled carbon nanotubes", *Journal of Alloys and Compounds*, Vol. 450, Issue 1-2, pp. 323-326, (2008).

74. I.M. Robertson, P.J. Ferreira, G. Dehm, R. Hull, E.A. Stach, "Visualizing the Behavior of Dislocations - Seeing is Believing", *MRS Bulletin*, Vol. 33, No.2, pp. 122-131, (Feb. 2008).
75. Y. Shao-Horn, W.C. Sheng, S. Chen, P.J. Ferreira, E. Holby, D. Morgan, "Instability of Supported Platinum Nanoparticles in Low-Temperature Fuel Cells", *Topics of Catalysis*, 46, (3-4), pp. 285-305, (2007).
76. H. Mei, J.H. An, R. Huang, P.J. Ferreira, "Stresses in Multilayer Thin-Film Specimens for In-situ Transmission Electron Microscopy Experiments", *Journal of Materials Research*, Vol. 22, pp. 2737-2741, (2007)
77. S. Rajasekhara, P.J. Ferreira, L.P. Karjalainen, A. Kyrolainen, "Hall-Petch Behavior in Ultra-Fine-Grained AISI 301LN Stainless Steel", *Metallurgical and Materials Transactions*, Vol. 38 A, pp. 1202-1210, (2007)
78. C. E. Carlton, P.J. Ferreira, "What is Behind the Inverse Hall-Petch Effect in Nanocrystalline Materials?", *Acta Materialia*, Vol. 55, pp. 3749-3756 (2007).
79. P.J. Ferreira, Y. Shao-Horn, "Formation Mechanism of Pt Single-Crystal Nanoparticles in Proton Exchange Membrane Fuel Cells", *Electrochemical and Solid State Letters*, 10, (3), B60-B63 (2007).
80. J. H. An, P.J. Ferreira, "In-situ Transmission Electron Microscopy Observations of 1.8 micron and 180 nm Cu Interconnects Under Thermal Stresses", *Applied Physics Letters*, 89, 151919, pp. (2006).
81. D.L. Johannsen, A. Kyrolainen, P.J. Ferreira, "Influence of Annealing Treatment on the Formation of Nano/Submicron Grain Size AISI 301 Austenitic Stainless Steels", *Metallurgical and Materials Transactions*, Vol.37, 8, pp. 2325-2338, (2006).
82. V. Raguveer, P.J. Ferreira, A. Manthiram, "Comparison of Pd-Co-Au electrocatalysts prepared by conventional borohydride and microemulsion methods for oxygen reduction in fuel cells", *Electrochemistry Communications*, Vol.8, 5, pp. 807-814, (2006).
83. P.J. Ferreira, R. Makharia, S. Kocha, H. Gasteiger, D. Morgan, G.J. Ia O', Y. Shao-Horn, "Instability of Pt/C Electrocatalysts in Proton Exchange Membrane Fuel Cells: A mechanistic investigation", *Journal of Electrochemical Society*, 152, pp. A2256-A2271, (2005)
84. S. Rajasekhara and P. J. Ferreira; "A Dislocation Model for the Magnetic Field Induced Shape Memory Effect in Ferromagnetic Ni<sub>2</sub>MnGa", *Scripta Materialia*, Vol.53, 7, pp. 817-822 (2005)
85. Bruce Y.C. Wu, P.J. Ferreira and Christopher A. Schuh, "Nanostructured Ni-Co Alloys with Tailorable Grain Size and Twin Density", *Metallurgical and Materials Transactions*, Vol.36, 1927, (2005).
86. Chinedum Osuji, P.J. Ferreira, Guoping Mao, Christopher K. Ober, J.B. Vander Sande, Edwin L. Thomas, "Alignment of Self-Assembled Hierarchical Microstructure in Liquid Crystalline

- Diblock Copolymers Using High Magnetic Fields”, *Macromolecules* 37 (26): 9903-9908 (2004).
87. P. J. Ferreira, J. B. Vander Sande, M. A. Fortes and A. Kyrolainen; “Microstructure Development During High-Velocity Deformation”, *Materials and Metallurgical Transactions A*, 35A, pp.3091, 2004.
  88. De Deus, M. A. Fortes, P. J. Ferreira and J. B. Vander Sande; “A General Approach to Grain Growth Driven by Energy Density Differences”, *Acta Materialia*, 50, 3317, 2002.
  89. E. Cecchetti , P. J. Ferreira and J. B. Vander Sande, "A Model for Texture Development in High-Tc BSCCO Superconductors", *Superconductor Science and Technology*, 13, 1270, 2000
  90. E. Cecchetti, P. J. Ferreira and J. B. Vander Sande; “The Influence of Elevated Magnetic Fields on the Texture Formation of Melt-Processed Bi-2212”, *Physica C*, 336, 192, 2000.
  91. P. J. Ferreira, H. Liu and J. Vander Sande; “Magnetic Field Induced Texture in High-Tc Superconductors”, *IEEE Transactions on Applied Superconductivity*, vol. 9, No.2, 2231, 1999.
  92. P. J. Ferreira, I. M. Robertson and H. K. Birnbaum; "Hydrogen Effects on the Character of Dislocations in High-Purity Aluminum", *Acta Materialia*, 47, 10, 2291, (1999).
  93. P. J. Ferreira and J. B. Vander Sande; “Magnetic Field Effects on Twin Dislocations”; *Scripta Materialia*, 41, 2, 117, 1999
  94. H. Liu, P. J. Ferreira, J. B. Vander Sande and A. Otto; “Bi-2212/Ag Tapes Melt-Grown Under an Elevated Magnetic Field (0-10 T)”; *Physica-C*, 316, 234, 1999
  95. P. J. Ferreira, H. Liu, and J. B. Vander Sande; “A Model for the Texture Development of High-Tc Superconductors under an Elevated Magnetic Field”, *Journal of Materials Research*, vol.14, 7, 1999.
  96. H. Liu, P. J. Ferreira, and J. B. Vander Sande; “Jc Enhancement of Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8</sub>/Ag Thick Films Melt-Grown under an Elevated Magnetic Field (0~10 T); *Physica C* 316, 261, 1999
  97. H. Liu, P. J. Ferreira, and J. B. Vander Sande; “Processing Bi-2212/Ag Thick Films under a High Magnetic Field: On the Bi-2212/Ag Interface Effect, *Physica C*, 303, 3-4, 161 (1998).
  98. P. J. Ferreira, P. Müllner; "A Thermodynamic Model for the Stacking Fault Energy", *Acta Materialia*, 46, 13, 4479, (1998)
  99. P. J. Ferreira, I. M. Robertson and H. K. Birnbaum; "Hydrogen effects on the interaction between dislocations", *Acta Materialia*, vol. 46, 5, 1749, (1998).
  100. S. Hertzman, P. J. Ferreira, B. Brolund; "An Experimental and Theoretical Study of Heat-Affected Zone Austenite Reformation in Three Duplex Stainless Steels", *Metallurgical and Materials Transactions*, vol. 28A:277, (1997).

101. P. Müllner, P. J. Ferreira; "On the Energy of Terminated Stacking-Faults", *Philosophical Magazine Letters*, 73, 289 (1996).
102. P. J. Ferreira, I. M. Robertson and H. K. Birnbaum; "The influence of hydrogen on the stacking-fault energy of an austenitic stainless steel", *Materials Science Forum* p. 98, (1996).

### C. Refereed Conference Proceedings (78)

1. S. Zafari, T. Eerola, P.J. Ferreira, H. Kalviainen, Alan Bovik, "Automated Segmentation of Nanoparticles in BF TEM Images by U-Net Binarization and Branch and Bound", 18th International Conference on Computer Analysis of Images and Patterns, 2-5 September, Salerno, Italy, (2019)
2. S Rasouli, D Groom, K Yu, A Godoy, A Bovik, D Myers, Naotoshi Nakashima, PJ Ferreira, "On the Study of PEM Fuel Cells by Transmission Electron Microscopy", *Microscopy and Microanalysis*, Vol. 22, S3, pp. 1280-1281, (2016)
3. D Groom, S Rasouli, K Yu, A Bovik, PJ Ferreira, "A Precise Description of Inorganic Nanoparticles in HRTEM Micrographs", *Microscopy and Microanalysis*, Vol. 22 (S3), 548-549, (2016)
4. ST Hu, K Hattar, P Ferreira, "Texture and Phase Analysis in Nanocrystalline Ni Thin Films by Precession Electron Diffraction Microscopy", *Microscopy and Microanalysis*, Vol. 22 (S3), 526-527, (2016)
5. C Amos, MA Roldan, M Varela, JB Goodenough, PJ Ferreira, "Understanding the Surface Structure of LiMn<sub>2</sub>O<sub>4</sub> Spinel Cathodes with Aberration-Corrected HAADF STEM and EELS", *Microscopy and Microanalysis*, Vol. 21 (S3), 1375-1376, (2015)
6. ST Hu, L Morganti, S Rajasekhara, K Hattar, P Ferreira, "Texture and Phase Analysis in Nanocrystalline Ni Thin Films by Precession Electron Diffraction Microscopy", *Microscopy and Microanalysis*, Vol. 21 (S3), 1457-1458, (2015)
7. S Rasouli, MR Berber, IH Hafez, T Fujigaya, P Ferreira, N Nakashima, "Identical Location Aberration Corrected TEM Study on the Degradation Mechanism of Platinum Nanoparticles on Carbon Nanotubes in High Temperature Fuel Cells", *Microscopy and Microanalysis*, Vol. 21 (S3), E2-E3, (2015)
8. RF Santos, F Viana, PJ Ferreira, "Microstructure Evolution with Direct Current Density on Electrodeposited Copper Films", *Microscopy and Microanalysis*, Vol. 21 (S5), 45-46, (2015)
9. Somaye Rasouli, Jonathan Sharman, Alex Martinez, Dash Fongalland, Graham Hards, Tomokazu Yamamoto, Deborah Myers, Kenji Higashida, Paulo Ferreira, "Aberration-Corrected STEM Study on Pt 0.8 Ni De-alloyed Nanocatalysts for Proton Exchange Membrane Fuel Cells", *Microscopy and Microanalysis*, Vol. 20 (S3), pp. 480-481, (2014)
10. Shreyas Rajasekhara, PJ Ferreira, K Hattar, "Microstructural evolution of nanocrystalline

nickel thin films due to high-energy heavy-ion irradiation”, Application of Accelerators in Research and Industry: Twenty-Second International Conference, Vol. 1525, pp. 630-635, AIP Publishing, (2013)

11. J. T. Graham, S. Landsberger, D. Millsap, P.J. Ferreira, C. Frahme, R. L. Dougherty, “Curriculum Development for a Modular Short Course on Radiation Effects in Electronics”, Transactions European Nuclear Society, Madrid, Spain, November 17-21, pp. 281-287, (2013)
12. K.A. Jarvis, Z.Q. Deng, L. F. Allard, A. Manthiram, and P.J. Ferreira, “Understanding Structural Defects in Lithium-rich Layered Oxide Cathodes by Aberration-Corrected STEM”, Microscopy and Microanalysis, 18 (suppl. 2), pp. 1414-1415, (2012).
13. K. Jarvis, Z. Deng, A. Manthiram, P.J. Ferreira, “Understanding the Role of Lithium Content on the Structure and Capacity of Lithium-Rich Layered Oxides by Aberration-Corrected STEM, D-STEM, and EDS”, Microscopy and Microanalysis, 18 (suppl. 2), pp. 1484-1485, (2012).
14. E.A. Stach, D. Su, P. Ercius, K. J. Ganesh, P.J. Ferreira, Y. Zhu, K. Yager, S. Murali, M.D. Stoller, W. Cai, Adam Pirkle, Robert M. Wallace, Katie A. Cychosz, Matthias Thommes, and R.S. Ruoff, “High-Resolution Characterization of Activated Graphene for Supercapacitor Applications”, Microscopy and Microanalysis, 18 (suppl. 2), pp. 1536-1537, (2012).
15. K. J. Ganesh, S. Rajasekhara, D. Bultreys, P. J. Ferreira, “Rapid and Automated Grain Orientation and Grain Boundary Analysis in Nanoscale Copper Interconnects”, Reliability Physics Symposium, 2011 IEEE International, pp. 5C.2.1 - 5C.2.3.
16. K. Jarvis, Z. Deng, L.F. Allard, A. Manthiram, P. Ferreira, “Structural Characterization of Li-Excess Cathode Materials for Lithium-Ion Batteries by Aberration-Corrected STEM and D-STEM”, Microscopy and Microanalysis, 17 (suppl. 2), pp. 1578-1589, (2011).
17. K. J. Ganesh, A. Darbal, S. Rajasekhara, G. S. Rohrer, K. Barmak; P. J. Ferreira, “Characterizing Texture and Grain Boundaries in Nanoscale Cu Interconnects by Precession Electron Diffraction”, Microscopy and Microanalysis, 17 (suppl. 2), pp. 1346-1347, (2011).
18. D. J. Groom, S. Rajasekhara, S. A. Matyas, Z. Yang, M. Gummalla, S. C. Ball, P. J. Ferreira, “The Effect of Particle Size on Pt/C Electrocatalyst Degradation in Proton Exchange Membrane Fuel Cells”, Microscopy and Microanalysis, 17 (suppl. 2), pp. 1616-1617, (2011).
19. A. Darbal, K. J. Ganesh, K. Barmak, G. S. Rohrer, P. J. Ferreira, T. Sun, K. R. Coffey, “Grain Boundary Characterization of Nanocrystalline Cu from the Stereological Analysis of Transmission Electron Microscope Orientation Maps”, Microscopy and Microanalysis, 17 (suppl. 2), pp. 1416-1417, (2011).
20. E. F. Rauch, K. Barmak, J. K. Ganesh, P. J. Ferreira, A. Darbal, D. Choi, T. Sun, B. Yao, K. R. Coffey and S. Nicolopoulos, “Automated Crystal Orientation and Phase Mapping for Thin Film Applications by Transmission Electron Microscopy”, Microscopy and Microanalysis, 17 (suppl. 2), pp. 1086-1087, (2011).

21. K. J. Ganesh, S. Rajasekhara, D. Bultreys, K. Hattar, J. A. Knapp and P. J. Ferreira, "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation and Phase Mapping", *Microscopy and Microanalysis*, 17 (suppl. 2), pp. 1090-1091, (2011).
22. S. Rajasekhara, K. J. Ganesh, K. Hattar, J. A. Knapp, P. J. Ferreira, "The Influence of Film Thickness on the Microstructure of Nanocrystalline Nickel Films: A Precession Electron Diffraction Microscopy Study", *Microscopy and Microanalysis*, 17 (suppl. 2), pp. 1080-1081, (2011).
23. M. A. Asoro, D. Kovar, P. J. Ferreira, "In-Situ TEM Study of Sintering of Capped Silver Nanoparticles", *Microscopy and Microanalysis*, 17 (suppl. 2), pp. 486-487, (2011).
24. S. Rajasekhara, L.P Karjalainen, A. Kyröläinen and P. J. Ferreira, "Development of Stainless Steels with Superior Mechanical Properties: A Correlation Between Structure and Properties in Nanoscale/ Sub-micron Grained Austenitic Stainless Steel", *Proceedings of International Conference on Advanced Steels 2010*, edited by Y. Weng, H. Dong and Y. Can, Metallurgical Press, pp. 357-370, (2010).
25. Brian N. Patrick, Lawrence F. Allard, Yang Shao-Horn and Paulo J. Ferreira, "Aberration-Corrected STEM Image Simulation of Segregation in Pt<sub>3</sub>Co Nanoparticles for PEM Fuel Cells", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 252-253, (2010).
26. K. A. Jarvis, Lawrence F. Allard, Timothy Y. Jerome, Thomas C. Isabell, Douglas A. Blom and P.J. Ferreira, "Aberration-Corrected STEM Imaging Through Off-Site Remote Operation", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 1330-1331, (2010).
27. S. Rajasekhara, B. Neuner III, G. Shvets, P.J. Ferreira, D. Kovar, "Influence of the Microstructure on the Optical Properties of Silicon Carbide Films: A TEM Study", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 1450-1451, (2010).
28. K.J. Ganesh, S. Rajasekhara, D. Bultreys, J.P. Zhou, P.J. Ferreira, "Automated Local Texture and Stress Analysis in Cu Interconnects using D-STEM and Precession Microscopy", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 1728-1729, (2010).
29. M. A. Asoro, D. Kovar, J. Damiano, P.J. Ferreira, "Scale Effects on the Melting Behavior of Silver Nanoparticles", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 1802-1803, (2010)
30. K.A. Jarvis, J. Zhao, L.F. Allard, A. Manthiram, P.J. Ferreira, "Characterization of the Ternary Compound Pd<sub>5</sub>Pt<sub>3</sub>Ni<sub>2</sub> for PEMFC Cathode Electrocatalysts", *Microscopy and Microanalysis*, 16 (suppl. 2), pp. 1812-1813, (2010).
31. F. Sola, M. Lebron-Colon, P.J. Ferreira, L.F. Fonseca, M.A. Meador and C. Marin, "In-situ TEM-STM Observations of SWCNT Ropes/Tubular Transformations", *MRS Symp. Proc.*, Vol. 1204, K10, pp. 26-31, (2009)
32. S. Rajasekhara, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, "Nano/sub-micron Grain Structures in Austenitic Stainless Steels", *2<sup>nd</sup> International Conference on Steel Science*, Kyoto, Japan, pp. 105-114, Oct. 2009.



33. Jinho An, Jeff Pickering, K.J. Ganesh, P.J Ferreira, "TEM Measurements of Grain Orientation in Nanoscale Cu Interconnects using ACT", Stress Induced Phenomena in Metallization, Book Series: AIP Conference Proceedings Volume: 1143, pp. 166-171, (2009).
34. M. A. Asoro, J. Damiano, P.J. Ferreira, "Size Effects on the Melting Temperature of Silver Nanoparticles: In-situ TEM Observations", Microscopy and Microanalysis, 15 (suppl. 2), pp. 706-707, (2009).
35. M.A. Asoro, D. Kovar, Y. Shao-Horn, L.F. Allard, P.J. Ferreira, "Determination of Sintering Parameters from In-situ Aberration-Corrected STEM Imaging of Coalescence in Pt Nanoparticles", Microscopy and Microanalysis, 15 (suppl. 2), pp. 730-731, (2009).
36. C.E. Carlton, P.J. Ferreira, "Are Dislocations Present in Nanoparticles?: Fourier Filtering Images obtained from In-situ TEM Nanoindentation", Microscopy and Microanalysis, 15 (suppl. 2), pp. 736-737, (2009).
37. K.J. Ganesh, M. Kawasaki, J.P. Zhou, P.J. Ferreira, "A STEM Parallel Diffraction Technique Applied to Nanomaterials", Microscopy and Microanalysis, 15 (suppl. 2), pp. 752-753, (2009).
38. I.M. Robertson, D. Lillig, P.J. Ferreira, "Revealing the fundamental processes controlling hydrogen embrittlement", Jackson Hole, WY, March 2009.
39. S. Simoes, R. Calinas, P.J. Ferreira, F. Viana, M.T. Vieira, M.F. Vieira, "TEM and SEM in-Situ annealing of nanocrystalline copper thin films", Microscopy and Microanalysis, 14 (suppl. 3), pp. 49-52, (2008).
40. C.E. Carlton, P.J. Ferreira, "Self-Healing Nanoparticles: In-Situ High Resolution TEM Indentation of Nanoparticles", Microscopy and Microanalysis, 14 (suppl. 2), pp. 252-253, (2008)
41. P.J. Ferreira, L.F. Allard, S. Chen, N. Yabuuchi, Y. Shao-Horn, "Surface Segregation and Ordering in Pt<sub>3</sub>Co Nanoparticles Observed by Aberration-Corrected STEM", Microscopy and Microanalysis, 14 (suppl. 2), pp. 218-219, (2008).
42. S. Rajasekhara, P.J. Ferreira, L. P. Karjalainen, A. Kyröläinen, "Microstructure Evolution in Nano/Submicron Grained AISI 301 Stainless Steel", TMS 2008 Annual Meeting Supplemental Proceedings Volume 3: General Paper Selections, pp. 257-268, New Orleans, March, (2008).
43. S. Rajasekhara, P.J. Ferreira, L. P. Karjalainen, A. Kyröläinen, "Kinetics of  $\alpha'$   $\rightarrow$   $\gamma$  reversion in a cold-rolled AISI 301 LN Stainless Steel", 6<sup>th</sup> European Stainless Steel Conference, Helsinki, Finland, pp. 483-488, (2008).
44. S. Rajasekhara, P.J. Ferreira, L. P. Karjalainen, A. Kyröläinen, "Microstructure Evolution in Nano/Submicron Grained AISI 301 Stainless Steel", 6<sup>th</sup> European Stainless Steel Conference, Helsinki, Finland, pp. 505-510, (2008).

45. S. Rajasekhara, P.J. Ferreira, L. P. Karjalainen, A. Kyröläinen, "Kinetics of Grain Growth in Ultra-Fine Grained AISI 301LN Stainless Steel", 6<sup>th</sup> European Stainless Steel Conference, Helsinki, Finland, pp. 511-517, (2008).
46. S. Simoes, R. Calinas, P.J. Ferreira, M.T. Vieira, F. Viana, M.F. Vieira, "Effect of Annealing Conditions on the Grain Size of Nanocrystalline Copper Thin Films", Materials Science Forum, Vols. 587-588, pp. 483-487, (2008)
47. S. Rajasekhara, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, "Kinetics of grain growth in ultra-fine grained AISI 301LN stainless steel" - International Symposium on Ultra-fine Grained Steels – October 2007, Kitakyushu, Japan.
48. S. Rajasekhara, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, "Kinetics of martensite to austenite phase reversion in cold rolled AISI 301LN Stainless Steel", International Symposium on Ultra-fine Grained Steels – October 2007, Kitakyushu, Japan.
49. S. Chen, P.J. Ferreira, Y. Shao-Horn, "Surface Segregation in Pt<sub>3</sub>Co Nanoparticles Characterized by Scanning Transmission Electron Microscopy", Proceedings Microscopy Society of America, Florida, 13, S02, pp. 604-605 August 2007.
50. P.J. Ferreira, Y. Shao-Horn, "Formation Mechanism and Characterization of Pt Single Crystal Nanoparticles in Proton Exchange Membrane Fuel Cells", Proceedings Microscopy Society of America, Florida, 13, S01, pp. 606-607, August 2007.
51. P.J. Ferreira, P. Szakalos, J.B. Vander Sande, "Formation of Carbon Nanofilaments by Metal Dusting", Proceedings Microscopy Society of America, Florida, 13, S02, pp. 774-775, August 2007.
52. S. Simões, R. Calinas, P.J. Ferreira, F. Viana, M.F. Vieira, M.T. Vieira, "Thermal Stability of Nanocrystalline Copper thin films" Proceedings Microscopy Society of America, Florida, 13, S02, pp. 628-629, August 2007
53. S. Simões, R. Calinas, P.J. Ferreira, M.F. Vieira, M.T. Vieira "In-Situ TEM Annealing of Nanocrystalline Copper Thin Films", Proceedings Microscopy Society of America, Florida, 13, S02, pp. 574-575, August 2007
54. J.H. An, P. J. Ferreira, "TEM Measurements of Grain Orientation in Nanoscale Cu Interconnects using ACT Software", Proceedings Microscopy Society of America, Florida, 13, S02, pp. 538-539, August 2007
55. J.H. An, P.J. Ferreira, "Quantitative Thickness Variation Measurements in 180 nm Cu Interconnects by HAADF STEM: Implications for in-situ Heating Experiments", Proceedings Microscopy Society of America, Florida, 13, S02, pp.668-669, August 2007
56. C.E. Carlton, O. Lourie, P. J. Ferreira, "In-situ TEM Nano-Indentation of Individual Single-Crystal Nanoparticles", Proceedings Microscopy Society of America, Florida, 13, S02, pp. 576-577, August 2007.

57. J. Cheng, S. Lao, J. Yong, J. H. Koo, P. J. Ferreira, L. Pilato, G. Wissler, and Z.P. Luo "Cyanate Ester-Buckytubes Nanocomposites: Processing and Characterization", SAMPE 2007 ISSE, Baltimore, Maryland (2007).
58. Joseph H. Koo, S. Lao, Justin Cheng, Jason Yong, and P.J. Ferreira, Louis A. Pilato, Gerry E. Wissler, Zhiping Luo, "Cyanate Ester Nanocomposites: Processing and Characterization", Paper AIAA-2007-2040, 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, HI, 23-26 April 2007
59. S. Rajasekhara, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, "Nano/Submicron grained stainless steels", International Symposium on Advanced in Stainless Steels, Chennai, India, April 7-9, CD Conference Proceedings, (2007)
60. C.E. Carlton, P.J. Ferreira, "What is behind the Inverse Hall-Petch Behavior in Nanocrystalline Materials", in Size Effects in the Deformation of Materials — Experiments and Modeling, edited by E. Lilleodden, P. Besser, L. Levine, A. Needleman (Mater. Res. Soc. Symp. Proc. 976E, p.0976-EE01-04, Warrendale, PA, 2007).
61. S. Rajasekhara, M. C. Somani, M. Koljonen, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, 'Sub-micron/nano grained stainless steels with superior mechanical properties', MRS 2005 Fall Meeting, Boston, MA, USA, Vol. 903E, pp. 40.1-40.6.
62. J.H. An, P.J. Ferreira, "In-situ TEM Study of Thermally Induced Voids in 180 nm Cu Interconnects", MRS 2005 Fall Meeting, Boston, MA, USA, Vol. 907E, pp.03.1-03.6.
63. C.E. Carlton, P.J. Ferreira, "Dislocation Instability in Nanoscale Particles", MRS 2005 Fall Meeting, Boston, MA, USA, Vol.903E, pp. 0903-Z14-09.1-6.
64. D.L. Johannsen, A. Kyröläinen, P.J. Ferreira, "Martensite Reformation in Nano/Submicron Austenitic Stainless Steels", Iron & Steel, Vol.40, Joint Conference of HSLA Steel 2005, Sanya, China.
65. S. Rajasekhara, M. C. Somani, L. P. Karjalainen, A. Kyröläinen, P. J. Ferreira, 'Role of alloying elements on grain evolution in cold-rolled metastable austenitic stainless steels', Joint Iron & Steel, Vol.40, pp. 232-237, Conference of HSLA Steel 2005 and ISUGS, Sanya, China
66. M. Somani, P. Karjalainen, P. Juntunen, S. Rajasekhara, P. J. Ferreira, A. Kyröläinen, T. Taulavuori, P. Aspegren, 'Microstructure and Mechanical Properties Achieved during Short Annealing of Cold-Rolled Austenitic Stainless Steels', Iron & Steel, Vol.40, pp. 283-289, Conference of HSLA Steel 2005 and ISUGS, Sanya, China.
67. Y. Shao-Horn, P. J.Ferreira, G.J. Ia O', D.D. Morgan, H.A. Gasteiger, R. Makharia, "Coarsening of Pt Nanoparticles in Proton Exchange Membrane Fuel Cells Upon Potential Cycling" the Electrochemical Transactions, 1, 185-195 (2005), Symposium on Durability and Reliability of Low-Temperature Fuel Cells and Fuel Cell Systems (X2) at the 208th Electrochemical Society Meeting, Los Angeles, October 16-21, 2005.

68. J. Veiga, P.J. Ferreira, "Smart and Nano Materials in Architecture", Smart Architecture: Integration of Digital and Building Technologies, Proceedings of the 2005 Annual Conference of the Association for Computer Aided Design In Architecture, Savannah, Georgia, 13-16 October 2005, pp. 58-67.
69. Y. Shao-Horn, P.J. Ferreira, G.J. Ia O, "Instability of Pt/C Electrocatalysts in Proton Exchange Membrane Fuel Cells: A Mechanistic Investigation";, 2nd International Conference on Polymer Batteries and Fuel Cells, June 12-17, Las Vegas, Nevada, 2005.
70. J. H. An, P.J. Ferreira; "In-situ TEM Studies of Nanoscale Cu Interconnects Under Thermal Stress", MRS Symp. Proc. Vol.854E, pp. U11.13.1-6 (2004).
71. P. J. Ferreira and J. Vander Sande; "A Mechanism for Magnetically Driven Shape Memory Alloys", Materials Research Society Symposium Proceedings, Vol. 604, p.291, (1999).
72. P. J. Ferreira, H. Liu and J. Vander Sande; "Magnetic Field Induced Texture in High-Tc Superconductors", Applied Superconductivity Conference, Palm Desert, CA, 1999.
73. P. J. Ferreira, P. Müllner; "On Alloy Design Based on Stacking Fault Energy Calculations", International Conference Stainless Steels 96, Düsseldorf, Germany
74. D. Teter, P. J. Ferreira, I. M. Robertson and H. K. Birnbaum; "An Environmental Cell TEM for Studies of Gas-Solid Interactions", in New Techniques for Characterizing Corrosion and Stress Corrosion, TMS Fall Meeting 95, ed. R.H. Jones and D.R. Baer, Cleveland, Ohio. TMS, Warrendale, PA, p 53, 1995.
75. RFA Jargelius Pettersson, S. Hertzman, P. Szakalos and P. J.Ferreira; "The influence of microstructure on pitting corrosion in autogenous TIG duplex stainless steel welds", in Proc. of Fourth International Conference on Duplex Stainless Steels, Glasgow, Scotland, Nov. (1994).
76. P. J. Ferreira; "On the determination of Stacking Fault Energy from Dislocation Nodes Observed by TEM", Proceedings of International Conference of the Microscopy Society of America, pp 686, New Orleans, Louisiana, July/August (1994).
77. S. Hertzman, P. J. Ferreira, B. Brolund ; "An experimental and theoretical study on HAZ austenite reformation in duplex stainless steels", in Proc. of International Conference on Processes and Materials Innovation Stainless Steels, Vol. 3, p 243, Florence, Italy, 11-14 Oct. (1993)
78. P. J. Ferreira, S. Hertzman ; "d-Ferrite Grain Growth in Simulated High Temperature HAZ of duplex stainless steels", in Proc. of International Conference on Duplex Stainless Steels, Vol. 2, Beaune, France, 28-30 Oct., (1991).

#### **D. Other Major Publications**

P.J. Ferreira, Ph.D Thesis, "Hydrogen Effects on Crystal Dislocations", University of Illinois, Urbana, (1997).

## **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)

### **Books Edited**

1. In-situ Electron Microscopy, (On-line Proceedings), MM Symposium, MRS Fall Meeting 2005, 1 volume, edited by Paulo J. Ferreira (University of Texas at Austin), Ian M. Robertson (University of Illinois), Gerhard Dehm (University of Leoben, Austria) and Hiroyasu Saka (Nagoya University, Japan).
2. Materials: Years 2000, edited by M.A. Fortes (IST, Portugal) and P.J. Ferreira (University of Texas at Austin), Instituto Superior Tecnico/Univ. Of Texas, 1st edition, 1 volume, 546 pages, Marco 2003, published by IST Press, English/Portuguese.
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.

### **Book Chapters**

1. R.O. Sousa, I. Felde, P.J. Ferreira, A.M. Deus, L.M.M. Ribeiro, "Inverse Methodology for Estimating the Heat Transfer Coefficient in a Duplex Stainless Steel Casting". In: Silva L. (eds) Materials Design and Applications II. Advanced Structured Materials, vol 98. Springer, Cham, (2019)
2. S. Rasouli, P.J. Ferreira, "Understanding the Stability of Nanoscale Catalysts in PEM Fuel Cells by Identical Location TEM", In: Nakashima N. (eds) Nanocarbons for Energy Conversion: Supramolecular Approaches. Nanostructure Science and Technology. Springer, Cham, (2019)
3. Pedro Costa and Paulo Ferreira, "In situ TEM of Carbon Nanotubes", "Advances in Transmission Electron Microscopy", published by Springer Verlag, pp. 207-247 (2015)
4. S. Rajasekhara, L.P. Karjalainen, A. Kyrolainen and P. J. Ferreira, "Development of Stainless Steels with Superior Mechanical Properties: A Correlation Between Structure and Properties in Nanoscale/ Sub-micron Grained Austenitic Stainless Steel", "Advanced Steels: The Recent Scenario in Steel Science and Technology", published by Springer, editors are Yuqing Weng, Han Dong, Yong Gan, pp. 371-384 (2011).

5. S. Rajasekhara, L.P. Karjalainen, A. Kyrolainen and P. J. Ferreira, "Nano/Sub micron Grained Austenitic Steels", "Advances in Stainless Steels" published by Universities Press, India, editors are Baldev Raj, K B S Rao, T Jayakumar, P V Sivaprasad, Saroja Saibaba and P. Shankar, pp. 221-233 (2009).
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.
8. P.J. Ferreira, "Nanotechnology", Engineering In Portugal During The 20th Century, edited by Jose Brito, Manuel Heitor and Maria Rollo, published by Dom Quixote, Vol.1, pp. 575-585, 2004.
9. P.J. Ferreira, "Superconductor Materials", Nova Activa Multimedia Encyclopedia, Lexicultural Press, pp. 218-219, 2004,
10. P.J. Ferreira, "Ferromagnetic and Paramagnetic Materials", Nova Activa Multimedia Encyclopedia, Lexicultural Press, pp. 220-221, 2004.
11. P.J. Ferreira, "Nanotechnology", Nova Activa Multimedia Encyclopedia, Lexicultural Press, pp. 230-231, 2004.

## **Plenary, Keynote, Invited Lectures (146)**

### **Plenary Lectures (3)**

1. "Understanding Nanoparticles by Advanced Transmission Electron Microscopy", CQE Days, National Academy of Sciences, Lisbon, May 30, 2019
2. "The Science of the Small: Understanding the Thermal Behavior of Nanoparticles", Brazilian Congress of Microscopy, Buzios, Brazil, June 4-7, 2017
3. "The Science of the Small: Understanding the World of Nanoparticles", Nano Monterrey 2015, International Forum, Monterrey, Mexico, October 2015

### **Keynote Lectures (11)**

1. "Seeing Small: Understanding Catalysts Nanoparticles in Fuel Cells by Advanced Transmission Electron Microscopy", Nanotech France 2019, Paris, France, June 26-28, 2019
2. "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

3. "Understanding the Surface of  $\text{LiMn}_2\text{O}_4$  Spinel Cathodes with Aberration-Corrected HAADF STEM and EELS", Hyceltec 2017, Porto, Portugal, June 19-23, 2017
4. "Seeing is Believing: The Beauty of *In Situ* Transmission Electron Microscopy" 50<sup>th</sup> Anniversary of the Portuguese Society of Microscopy, Porto, Portugal, June 29-30 2016
5. "The Science of the Small: Understanding Coalescence of Nanoparticles by Advanced Transmission Electron Microscopy", International Conference "NanoSpain 2016", Logrono, Spain, March 2016.
6. "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
7. "Nanotechnology: Science or Fiction?", International Conference on "Sustainable Intelligent Manufacturing", Lisbon, Portugal, June 26-29, 2013
8. "Nano/Submicron Grained Stainless Steels"; 7th International Conference on Physical and Numerical Simulation of Materials Processing, Oulu, Finland, June 16-19, 2013
9. "Nano/Submicron Austenitic Stainless Steels with Superior Mechanical Properties"; Conference "International Conference on Advanced Steels 2010", Guilin, China, November 2010.
10. "Nano/Submicron Grained Stainless Steels", International Symposium on "Advances in Stainless Steels 2007", Chennai, India, April 9-11, 2007.
11. 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 (132)**

1. "Understanding  $\text{LiMn}_2\text{O}_4$  by Aberration-Corrected HAADF STEM and Differential Phase Contrast", 12<sup>th</sup> Asia-Pacific Microscopy Conference, 3-7 February, Hyderabad, India, 2020
2. "Understanding  $\text{LiMn}_2\text{O}_4$  by Aberration-Corrected HAADF STEM and Differential Phase Contrast", Conference on Electronic Materials and Applications, American Ceramic Society, January 22-24, Orlando, Florida, USA, 2020
3. "On the Degradation of Pt-Ni Nanocatalysts for PEM Fuel Cells: An Identical Location Aberration-Corrected TEM Study", 4th Israeli Fuel Cells Consortium Workshop, Tel Aviv, Israel, October 28-29, 2019
4. Seminar, "Understanding Nanoparticles by Advanced Transmission Electron Microscopy", Bar-Ilan University, Tel Aviv, Israel, October 30, 2019
5. Seminar, "Understanding Nanoparticles by Advanced Transmission Electron Microscopy", École Polytechnique, Laboratoire de Physique des Interfaces et des Couches Minces, Paris, June 27, 2019

6. On the Degradation of Nanocatalysts in PEM Fuel Cells: An Identical Location Aberration-Corrected TEM Study, "6<sup>th</sup> International Congress on Microscopy and Spectroscopy", Oludeniz, Turkey, May 12-18, 2019
7. 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
8. "A Novel Approach to Identify the Ionomer Phase in PEM Fuel Cells by EELS", Brazil MRS Meeting, September 16-20, 2018, Natal, Brazil
9. "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
10. "Understanding Amorphous Mesoporous Silica Superstructures by Aberration-Corrected STEM", XXVII International Materials Research Congress, August 19-24, 2018, Cancun, Mexico
11. "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
12. "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.
13. "Seeing Small: There is Plenty Our Eyes Can't See", FCCN Meeting, INL, Braga, Portugal, April 12, 2018
14. Seminar, "Understanding Nanomaterials by TEM", Paul Scherrer Institute, Zurich, Switzerland, February 23, 2018.
15. Seminar, "Nanotechnology and the 4<sup>th</sup> Industrial Revolution", PAPS XXI Forum, Harvard University, Cambridge, MA, USA, June 9
16. "Imaging Single Atoms by Differential Phase Contrast", Portuguese Society of Microscopy, Annual Conference, Coimbra, Portugal, October 12, 2018
17. "Nanotechnology, Science or Fiction", TED Braga, Braga, Portugal, October 20, 2018
18. "Nanotechnology, Science or Fiction", ENEM, FEUP, Porto, Portugal,
19. Seminar, "Nanotechnology and the 4<sup>th</sup> Industrial Revolution", Congress of the National Association of Engineers, Coimbra, Portugal, November 23, 2017
20. 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
21. "Seeing Small: There is Plenty Our Eyes Can't See", INL Summit, Braga, Portugal, October 19, 2017
22. Seminar, "Seeing Small: Enabling New Discoveries in Nanomaterials Through Advanced Transmission Electron Microscopy", Beijing University, Beijing, China, August 28, 2017



23. Seminar, "Seeing Small: Enabling New Discoveries in Nanomaterials Through Advanced Transmission Electron Microscopy", National University of Singapore, Singapore, July 24, 2017
24. Seminar, "Thermal Behavior of Nanoparticles", University of Tras-dos-Montes, Vila Real, Portugal, May 24, 2017
25. Seminar, "Thermal Behavior of Nanoparticles", University of Vigo, Vigo, Spain, May 11, 2017
26. Seminar, "The Odyssey of Materials and The Age of Nanotechnology", Air Force Base, Lisbon, Portugal, May 10, 2017
27. "Understanding Metallic Nanoparticles by Advanced Transmission Electron Microscopy", Conference, "Energy, Materials, Nanotechnology – Catalysis", Dubrovnik, Croatia, May 3-7, 2017
28. Seminar, "Seeing small: Enabling New Discoveries in Nanomaterials through Advanced Transmission Electron Microscopy", University of Oslo, Oslo, Norway, March 27, 2017
29. Seminar, "The Odyssey of Materials", Workshop, "The Future of Ideas", Universidade Nova de Lisboa, Lisboa, Portugal, May 9, 2017
30. "Understanding the Surface of  $\text{LiMn}_2\text{O}_4$  Spinel Cathodes with Aberration-Corrected HAADF STEM and EELS", Conference, "Electronic Materials and Applications 2017", American Ceramic Society, Orlando, Florida, January 18-20, 2017.
31. "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
32. "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.
33. "On the Study of PEM Fuel Cells by Transmission Electron Microscopy", Conference, "Microscopy and Microanalysis, Columbus, Ohio, July 24-28, 2016
34. "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.
35. Seminar, "Seeing Small: Understanding the Behavior of Nanoparticles by Advanced Transmission Electron Microscopy", Instituto Superior Tecnico, Lisbon, Portugal, May 9, 2016.
36. Seeing Small: Enabling New Discoveries in Nanomaterials Through Transmission Electron Microscopy", Instituto Nacional Ricardo Jorge, Lisbon, Portugal, April 5, 2016
37. Seminar, "Seeing small: Enabling new discoveries in energy materials through advanced transmission electron microscopy", AGH University of Science and Technology, Krakow, Poland, December 2015

38. Colloquium, "Living with Complexity: The Value of Interdisciplinarity", University of Porto, October 15-16, 2015.
39. Seminar, "Seeing small: Enabling new discoveries in nanomaterials through advanced transmission electron microscopy", National Center for Electron Microscopy, Berkeley, October 2015
40. "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
41. "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
42. "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Universidad de Complutense, Madrid, Spain, April 13, 2015.
43. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", University of Houston, Houston, Texas, November 18, 2014.
44. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Iberian Institute of Nanotechnology, Braga, Portugal, Sept. 19, 2014.
45. "Thermal Behavior of Nanoparticles", AVS Pacific Northwest Chapter Annual Symposium, Pacific Northwest National Laboratory, Richland, WA, Sept 16-19, 2014
46. "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
47. "Are Dislocations Possible in Nanoparticles?", 3rd Congress of International Union of Crystallography, Montreal, Canada, 5-11th August, 2014.
48. "Thermal Behavior of Metallic Nanoparticles: An in Situ TEM Study", Zing Conference, Nanocrystals, Punta Cana, Dominican Republic, 14-17th July, 2014.
49. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Department of Materials Science and Engineering, KAUST, Saudia Arabia, June 26, 2014
50. "Seeing Small: Enabling New Discoveries in Energy Materials Through Advanced Transmission Electron Microscopy", BIT's 3rd Annual Conference, Dalian, China, 25-28 April, 2014
51. Seminar, "Thermal Behavior of Ag Nanoparticles", Department of Materials Science and Engineering, Universidade Federal do Rio de Janeiro, Brazil, 20th February, 2014.
52. "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

53. "Thermal Behavior of Nanoparticles", 12th Inter-American Congress of Microscopy, Cartagena, Columbia, 24th-28th September, 2013.
54. "Behavior of Pt and Pt<sub>3</sub>Co 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
55. "Thermal Behavior of Metallic Nanoparticles: An In Situ TEM Study", Frontiers of Electron Microscopy in Materials Science, Lorne, Australia, 8th-13th September, 2013.
56. Seminar, "Seeing small: Enabling new discoveries in materials through advanced transmission electron microscopy", Aalto University, Helsinki, Finland, June, 2013.
57. "Seeing small: Enabling new discoveries in energy materials through advanced transmission electron microscopy", American Chemical Society 245th National Meeting, New Orleans, April, 2013.
58. "Behavior of Pt and Pt<sub>3</sub>Co 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.
59. "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.
60. 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.
61. "Sintering of Nanoparticles: In Situ TEM Studies", Materials Science and Technology Conference, Pittsburgh, PA, October 8, 2012.
62. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy", Department of Physics, Kharkov University, Kharkov, Ukraine, Sept. 1, 2012.
63. "Dislocations in Individual Nanoparticles: An In Situ TEM Nanoindentation Study" XI Nanomaterials conference on Nanostructured Materials, Rhodes, Greece, August 2012.
64. Prochips Workshop, "In Situ TEM Observations of Solid to Vapor Phase Transitions in Silver Nanoparticles", Phoenix, AZ, August 2012
65. NanoMEGAS ASTAR Workshop, "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation and Phase Mapping, Phoenix, AZ, August 2012
66. 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
67. 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

68. Seminar, "Are Dislocations Possible In Nanoparticles", Kyoto University, Kyoto, Japan, May 31, 2012
69. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy", Department of Materials Science and Engineering, University of Pennsylvania, PA, February 2012.
70. Seminar, "Seeing Small: Enabling New Discoveries through Transmission Electron Microscopy", Department of Physics, University of Texas at San Antonio, November 11, 2011
71. "Structural Characterization of Li-Excess Cathode Materials for Batteries", 11th Interamerican Congress on Microscopy, Merida, Mexico, September 2011.
72. "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation", Conference "XX International Materials Congress", Cancun, Mexico, August 2011
73. "D-STEM Combined with Precession Microscopy for Nanoscale Crystal Orientation and Phase Mapping", Conference "Microscopy and Microanalysis", 2011", Nashville, TN, July 2011
74. "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.
75. "Temporal and Spatial Resolution of Mechanical Deformations Resolved by TEM", Workshop "ARO/AFOSR Multiscale Experiments, Washington DC, May 2, 2011
76. "Rapid and Automated Grain Orientation and Grain Boundary Analysis in Nanoscale Copper Interconnects", Conference "IEEE International Reliability Physics Symposium", Monterey, California, April 2011
77. "Are Dislocations Possible in Nanoparticles", Conference "TMS Annual Spring Meeting", San Diego, California, March 2011
78. 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.
79. "Behavior of Pt and Pt<sub>3</sub>Co 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.
80. Seminar, "Are Dislocations Possible In Nanoparticles", Department of Materials Science and Engineering, Pontificia University Catholic, Rio de Janeiro, Brazil, September 2010.
81. "Are Dislocations Possible in Nanoparticles", 2010 APS/EMC Users Meeting, Argonne National Laboratory, IL, May 2010.
82. "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

83. Seminar, "Seeing Small", University of Porto, Portugal, May 2010
84. "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.
85. "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.
86. 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.
87. "Self Healing Nanoparticles: In-situ TEM Indentation of Nanoparticles Workshop", Advanced Electron Microscopy in Materials Science", Oak Ridge, TN, November 2008
88. "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.
89. "Self-Healing Nanoparticles: In Situ TEM Nanoindentation", Workshop, "2008 European in Situ TEM probing", Goteborg, Sweden, October 2008.
90. Seminar, "In Situ Transmission Electron Microscopy", PASI School in Microscopy, Cancun, Mexico, August 2008.
91. "In situ Transmission Electron Microscopy", Conference, Texas Society of Microscopy, Spring 2008 Meeting, University of Texas at Austin, April 2008.
92. "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.
93. Seminar, "Nanomaterials and Nanostructures – Applications to Molecular Electronics and Biotechnology", University of Texas at Austin, October 2007.
94. 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.
95. "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.
96. Seminar, "In-situ and High Resolution Transmission Electron Microscopy Applied to Nanomaterials", INETI, Porto, Portugal, April 2007
97. "In-situ Transmission Electron Microscopy on Cs-Corrected TEMs", Symposium on "Electron Microscopy at Sub- Angstrom Resolution", Austin, TX, March 7, 2007.

98. "In-situ Transmission Electron Microscopy: Mapquest for Materials Conference", CBECIMAT, Foz do Iguacu, Brazil, November 18, 2006.
99. "In-situ Transmission Electron Microscopy: Mapquest for Materials", Nano/Materials Science Seminar, University of Texas at Austin, April, 2006.
100. "Government-Industry-University Relationships in a Global Economy", Conference, "Engineers for a Sustainable World", Austin, TX, October 8, 2005.
101. Seminar, "Research & Development: Effects of Scale on The Economy", University of Minho, Portugal, by Video Conference, October 6, 2005.
102. Seminar, "In-situ TEM Studies of Nanoscale Cu Interconnects under Thermal Stress", Howard's Birbaum Symposium, University of Illinois, June 2005.
103. Seminar, "Science and Technology in the World: A Comparison", Portuguese Ministry of Economics and Innovation, Lisbon, Portugal, August 2005.
104. Seminar, "Carbon Nanostructures Formed by Metal Dusting", Winstead Sechrest & Minick P.C, Austin, TX, April 2005.
105. Seminar, "In-situ Transmission Electron Microscopy", Brookhaven National Laboratory, Long Island, NY, April 2005.
106. 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.
107. Seminar, "Texture Development in High-Temperature Superconductors", CEPEL, Rio de Janeiro, Brazil, March 2005.
108. Seminar, "Transmission Electron Microscopy Applied to Crystalline Defects", PUC, Rio de Janeiro, Brazil, March 2005.
109. Seminar, "High-Velocity Forming of Nano/Submicron Stainless Steels", University of Oulu, Oulu, Finland, August 2004.
110. Seminar, "Development of Nano/Submicron Stainless Steels", University of Oulu, Oulu, Finland, June 2004.
111. "The Role of Ph.Ds in Strengthening University-Industry Relationships", Conference, , Portuguese-American Foundation, Lisbon, Portugal, July 2003
112. Seminar, "Nanotechnology: Science or Fiction", Univ. of Coimbra, Coimbra, Portugal, July 2003.
113. Seminar, "Microstructure Development of Stainless Steels During High Velocity Deformation", Swedish Institute for Metals Research, Stockholm, Sweden, June 2003.
114. Seminar, "Microstructure Development of Stainless Steels During High Velocity Deformation", University of Texas, Aeronautic and Aerospace Eng. Dept., Austin, TX, April.2003.

115. Seminar, "Nanotechnology: Science or Fiction?" UT Quest "Physics Today and Tomorrow Series", Austin, TX, Jan.2003.
116. Seminar, "Nanotechnology: Science or Fiction?", University of Porto, Porto, Portugal, Jan. 2003.
117. Seminar, "Nanotechnology, Science or Fiction?", University of Minho, Braga, Portugal, Jan. 2003
118. Seminar, "In-situ Transmission Electron Microscopy Applied to the Study of Crystalline Defects", University of Tokyo, Tokyo, Japan, Nov. 2002.
119. "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.
120. Seminar, "Applied Magnetic Field Effects on Materials Behavior", Swedish Institute for Metals Research, Stockholm, Sweden, March 2002.
121. Seminar, "A Multi-Channel Structure for Processing High-Tc BSCCO Superconductor Oxides", CNRS, Grenoble, France, January, 2002
122. Seminar, "Hydrogen Effects on Crystal Dislocations", Lawrence Livermore National Laboratory, Berkeley, California, June 2001
123. Seminar, "Microstructure Development During Plastic Deformation", Helsinki University of Technology, Finland, May 2001.
124. Seminar, "Relationship between Microstructure and Properties in Magnetically Driven Materials", Russian Academy of Sciences, Institute of Solid State Physics, Chernogolovka, Moscow, Russia, May 2001.
125. Seminar, "Texture Formation in High-Temperature Superconductors", Institute of Physics, Academy of Sciences, Czech Republic, May 2001
126. "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
127. Seminar, "Hydrogen Effects on Crystal Dislocations", Lawrence Livermore National Laboratory, Berkeley, California, June 2000
128. "Hydrogen Effects on Crystal Dislocations", MURI Conference on Multiscale Modeling of Materials, " , Newport, Rhode Island, USA, May 2000
129. Seminar, "Magnetic Field Effects on Materials Behavior", University of California at Los Angeles, USA, April 2000
130. Seminar, "Magnetic Field Effects on Materials Behavior", University of Texas at Austin, USA, March. 2000
131. Seminar, "Hydrogen Effects on Crystal Dislocations", University of Virginia, USA, Dec. 1999

132. "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 electron microscopy observation	BINA/INL	€68,750 (€34,375)	10/01/2018-09/30/2020
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	HealthyDent-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
	Rationally Designed	DOE – Argonne	\$391,608	09/01/2013-



PI: Paulo Ferreira	Catalyst Layers for PEMFC Performance Optimization	National Laboratory	(\$391,608)	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 Landsberger, Co-PI: Paulo Ferreira	Radiation Effects in PZT Materials	Sandia National Laboratories	\$186,000 (\$93,000)	09/01/2010-08/31/2013
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	NSF-DMR	\$240,000	06/01/2004-

	of Nano/Submicron Grain Stainless Steels		(\$240,000)	06/01/2008
<b>Career Total</b>			\$19,089,186	
<b>Career Total (my share)</b>			\$2,679,029	

### In-Kind Gifts (Total: \$216,4k; Ferreira Share: \$208.4k)

<b>Institution/ Sponsor</b>	<b>Funding (in US Dollars)</b>
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
<b>Total</b>	<b>216,414</b>

## TRANSFER OF KNOWLEDGE

### Conferences Organized

1. Conference Organizer, Symposium on "Materials for energy production, storage and catalysis", 19<sup>th</sup> International Microscopy Congress, September 9-14, Sydney, Australia, 2018
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, 201

5. Symposium Organizer, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 11-15, 2013
6. Conference Organizer, 4<sup>th</sup> 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 "Nanomaterials for Energy / Nanoelectronics", Nanotech France 2019, Paris, France, June 26-28, 2019
2. Session Chairman, Symposium on "Materials for energy production, storage and catalysis", 19<sup>th</sup> International Microscopy Congress, September 9-14, Sydney, Australia
3. Session Chairman, Symposium "Batteries" on "Hyceltec 2017", Porto, Portugal, June 19-23, 2017
4. Session Chairman, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 12-16, 2015
5. Session Chairman, 16<sup>th</sup> Annual Conference, Yucomat 2014, Herceg Novi, Montenegro, Sept 1-5, 2014
6. Session Chairman, Symposium 5A on "Electron Microscopy of Materials", XXII International Materials Congress, Cancun, Mexico, August 11-15, 2013
7. Session Chairman, 4<sup>th</sup> International Conference on Remote and In situ Microscopy, Lisbon, Portugal, May 22-24, 2013.

8. Session Symposium Organizer, Symposium on "Energy Materials", Microscopy and Microanalysis, Phoenix, AZ, July 29-August 2, 2012
9. Session Chairman, Symposium P on "Electron Microscopy/Spectroscopy of Energy Related Materials", Microscopy and Microanalysis, Phoenix, AZ, July 29-August 2, 2012
10. Session Chairman, Symposium 19 on "Advanced Electron Microscopy and Nanospectroscopy", XX International Materials Congress, Cancun, Mexico, August 14-19, 2011
11. 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.
12. Session Chairman, 3<sup>rd</sup> International Workshop on Remote Electron Microscopy and In Situ Studies, Carnegie-Mellon University, Pittsburgh, June 6-8, 2011
13. 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
14. Session Chairman, Microscopy and Microanalysis 09, Richmond Virginia, August, 2009.
15. Session Chairman, Texas Society of Microscopy, Spring 2008 Meeting, University of Texas at Austin, April, 2008

## Consulting

Samsung, USA (2016-2018)

Porocel, Canada, (2015-2017)

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

Vice- President, Portuguese Society of Microscopy, 2020-present

## **UNIVERSITY MANAGEMENT**

### **International Committees**

#### **Nomination Selection Committee**

Japan Prize (2017-present)

#### **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 Program, 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