PUBLICATIONS

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6. Publications

6. 1 Patents and Patents Pending

1. "*Carbon Nanoparticle-Containing Lubricant and Grease*" Hong, H., Waynick, J.A and Marquis, F.D.S., US 20070158609.
2. "*Carbon Nanoparticle-Containing Hydrophilic Nanofluid*" Hong, H. and Marquis, F.D.S., US 20070158610.
3. "*Measurement of Dynamic Thermal Conductivity of Nanofluids*", pending
4. *"Concentrated Carbon Nanotube Nanofluids*", pending
5. "*Magnetic Manipulation of Nanofluid Nanostructures*", pending

6.2. Books and Special Publications

1. F.D.S. Marquis and J.M. Dubois "*Physics, Advanced Materials and Multifunctional Materials*" ISBN 978-1-987820-35-5, Volume 9, 2015
2. F. D.S. Marquis "*Proc. of the First Intl. Symp. on Advanced Materials and Technologies for Sustainable Energy and the Environment (AMTSEE*) in 2015 Sustainable Industrial Processing Summit & Exhibition, ISBN 978-1-987820-35-5, Volume 9, 2015
3. F. D.S. Marquis "*Proc. of the First Intl. Symp. on Multifunctional and Smart Materials, Systems and Structures for Sustainability (MSMSSS***),** in 2015 Sustainable Industrial Processing Summit & Exhibition, ISBN 978-1-987820-35-5, Volume 9, 2015
4. "Advanced Materials and Processing" F.D.S. Marquis, Proceedings of the 8th Pacific Rim International Congress, Wiley, ISBN 978-0-470-94309-0, 2013.
5. "Functional *Composites of Carbon Nanotubes and Applications*", Lee, K-P, Gopalan, A.I. and Marquis, F.D.S. Marquis, Research Signpost (2009), ISBN 978-81-7895-413-4.
6. "*Nanocomposites -Their Science, Technology and Applications*", Schneider, J., Marquis, F.D.S., Schadler, L.S., and Simmons, K, TMS, 2006.

7. "*The Science and Technology of Powder Materials: Synthesis, Consolidation and Properties*", L.L. Shaw, F.D.S. Marquis, E.A. Olevsky, I.E. Anderson, M.G. McKimpson, J.P. Singh and J.H. Adair, ISBN 978-0-87339-601-1, TMS, 2005.
8. "*Powder Materials: Current Research and Industrial Practices III*", F.D.S. Marquis, ISBN 0-87339-563-8, TMS, 2003.
9. "*Rapid Prototyping of Materials*", Marquis, F.D.S. and Bourell, D. L., ISBN 0-87339-530-1, TMS, 2002
10. "*Powder Materials: Current Research and Industrial Practices II*", Marquis, F.D.S., Thadhani, N.N., and Barrera, E. V, ISBN 0-87339-507-7, TMS, 2001.
11. "*Powder Materials: Current Research and Industrial Practices I*", F.D.S. Marquis, ISBN 0-87339-456-9, TMS, 1999.
12. Marquis, F.D.S., Barrera, E. V., Frazier, W.E., Fishman, S.G., Thadhani, N.N. and Munir, Z.A., "*In Situ Reactions for Synthesis of Composites, Ceramics, and Intermetallics"* TMS, The Minerals, Metals & Materials Society, 1995.
13. Marquis, F.D.S., Symposium on "*In Situ Reactions for Synthesis of Composites, Ceramics, and Intermetallics*", Metallurgical and Materials Transactions, Vol. 27A-No. 8 (August 1996), 2069-2150.

6.3. Book Chapters

1. Marquis, F.D.S. "*The Nanotechnology of Carbon Nanotube Nanofluids*" in "Functional Composites of Carbon Nanotubes and Applications", Lee, K-P, Gopalan, A.I. and Marquis, F.D.S. Marquis, ISBN 978-81-7895-413-4, (2009).
2. Sequeira, C., Chen, Y. and Marquis, F.D.S. "Solubility of Silicon and Alumina in Sodium Sulphate-Sodium Vanadium Pentoxide Melts" in High Temperature Corrosion in Molten Salts" Ed. Sequeira, C., Trans tech Publ., Switzerland (2003).
3. Marquis, F.D.S., "Airplane and Aerospace Structures," in Van Sickle's Modem Airmanship, 7th Ed. by J. F. Welch, Colonel, 1995.
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6.4 Papers

1. M. Chikhradze, G, Oniashvili, N.Chikhradze and F.D.S. Marquis" Synthesis and Explosive Consolidation of Titanium, Aluminum, Boron and Carbon Containing Powders" IOP Science 44(2016)052014
2. 1. N. M. Chikhradze, F.D.S. Marquis, G.S. Abashidze, "Hybrid Fiber and Nanopowders Reinforced Composites for Wind Turbine Blades" J. Mater. Research and Tech., 2015, 4-1 (2015)60-67.
3. F. Marquis and G. Bokuchava, "The Physics of Carbon Nanotube Nanofluids and Nanostructured Materials for Multifunctional Applications" Proc. International Conference on Advanced Materials and Technologies, Tbilisi, Georgia, October 21-23, 2015, Pages 1923.
4. F. Marquis, N. Jagalonia et all "Impregnation of Zero-Valent Iron in Biomaterials for Remediation of Wastewater", Proc of the First Intl. Symp. on Advanced Materials and Technologies for Sustainable Energy and the Environment (AMTSEE), in 2015 Sustainable Industrial Processing Summit & Exhibition, ISBN 978-1-987820-35-5, Volume 9, 2015

5. Chikhradze, N., Marquis, F., Abashidze, G, Gigineishvili, A. and Chikhradze, M. "Syntheses of Bulk Nanostructured materials in Dynamic Conditions" Third Inter. Conf. on Nanotechnologies, Tbilisi, Georgia (2014) 25.
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8. Chikhradze, N.M. and Marquis, F.D.S. "Development and Performance of New Gadolinium and Boron Containing Radiation Absorbing Composite Systems", JOM, 65, 6 (2013) 728
9. Marquis, F.D.S. "Powder Materials, Processes and Systems for Enhanced Performance in Multifunctional Applications" *JOM*, 65, 6 (2013) 687.
10. Marquis, F.D.S. "The Role of Powder Materials in Energy Efficiency in the Transportation Industry" *JOM*, 64, 3 (2012) 367-373.
11. Marquis, F.D.S. "Powder Materials and Energy Efficiency in Transportation: Opportunities and Challenges" *JOM*, Vol 64, 3 (2012) 365.
12. Marquis, F.D.S. "The Role of Nanomaterial Systems in Energy and Environment: Renewable Energy" *JOM*, Vol 63, 1 (2011) 43.
13. Marquis, F.D.S. "Carbon Nanotube Nanostructured Hybrid Materials Systems for Renewable Energy Applications" *JOM*, Vol 63, 1 (2011) 48
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96. Marquis, F.D.S. “Precipitation Hardening of Zirconium-Based Martensites*”, Strength of Metals and Alloys*, Pergamon Press 1 (1979) 699-704.
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100. Marquis, F.D.S. “The Structure, Strength and Transformation Kinetics of ZirconiumBased Martensites”, *PhD Thesis, Imperial College of Science and Technology*, Univ. of London (1977) pgs 330.
101. Marquis, F.D.S. “The Structure and Strength of Quenched and Strain Induced Zirconium-Based Martensites Containing Mo, Si, Ti, Al, Sn and O”, *Proc. 4th Int. Conf. on Strength of Metals and Alloys*, Nancy 1 (1976) 736-740.

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6.5. Special Technical Reports

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2. "*Nanomaterials with Carbon Nanotubes: Heat Transfer Nanofluids and Nanolubricants*", *Army Research Laboratory*, March 1, 2003-September 30, 2004. Phase II. Five quarter reports for this period.
3. "*Nanomaterials with Carbon Nanotubes: Heat Transfer Nanofluids and Nanolubricants*", *Army Research Laboratory*, May 1, 2004-April 30, 2005. Third Phase. Includes Four Quarter Reports quarter reports for this period.
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5. Peikrishvili, A., Japaridze, L.A., Staudhammer, K.P., Marquis, F.D.S., Chikradze N.M, Gobejishvili, T.G.and Bantzuri, E.G. "*Explosive Compaction of Clad Graphite Powders and Obtaining of Coatings on Their Base*", *LANL report LA-UR-00-5226* (2000).
6. Marquis, F.D.S., "*Design & Advanced Manufacturing for the Optimization of the Fracture Toughness & Fatigue Resistance of 7X50 Aluminum Alloys*," *NSF Institute for Mechanics and Materials,* Report No. 94-16, UCSD, (1994), pgs 62.
7. Meyers, M.A., Batsanov, S.S., Gavrilkin, S.M., Chen, H.C., Lasalvia, J.C., and Marquis, F.D.S. "*Effect of Shock Pressure and Plastic Strain on Chemical Reactions in Nb-Si and Mo-Si Systems,*" *NSF Institute for Mechanics and Materials*, Report No. 94-22, UCSD, (1994), pgs 26.
8. Meyers, M.A., Chen, Y.J., Marquis, F.D.S., and Isaacs, J.B. *"High Strain, High-Strain-Rate Behavior of Tantalum," NSF Institute for Mechanics and Materials*, Report No. 94-25, UCSD, (1994), pgs 28.
9. Marquis, F.D.S., "Recrystallization Dynamics of 7050/7150 Aluminum Alloys," *South Dakota Governor's Office for Economic Development*, Pgs. 47, 1990.
10. Marquis, F.D.S., "Fatigue Crack Growth in 7050/7150 Aluminum Alloys," *South Dakota Governor's Office for Economic Development*, Pgs. 62, 1990.
11. Marquis, F.D.S., "Microstructural Control of 2124 Aluminum Alloys for the Aerospace Industry," *Kaiser Aluminum Chemical Corporation*, Pgs. 63, 1990.
12. Marquis, F.D.S., "Computer Modeling and Processing Optimization of 5454 Hot Line Recovery," *Kaiser Aluminum Chemical Corporation*, Pgs. 41, 1990.
13. Marquis, F.D.S., "Metallurgical, Mechanical, and Forensic Examination of Certain Engineering Components," *Materials Research and Development Corporation,* 1987.
14. Marquis, F.D.S., "Mechanical Response of Rock Bolt Plates," *Homestake Mining Company*, 1986.
15. Marquis, F.D.S., "Forensic Examination of Arsenic Distribution in Certain Materials, *Analytical Technical Laboratories*," 1986.
16. Marquis, F.D.S., "Failure Modes of Mining Drill Steel Samples," *Homestake Mining Company,* 1986.

17. Marquis, F.D.S, "Fracture of Studs/Flanges Weldings in Electrical Power Circuit Breakers," *Black Hills Power and Light Co.,* 1985.
18. Marquis, F.D.S., "Analysis of Crack Propagation During Structural Damage of Scaffolding Bracket," *Bangs, Butler, et al*., 1985.
19. Marquis, F.D.S, "Fracture of Studs and Flanges of Weldings in Electrical Power Circuit Breakers," *Black Hills Power & Light Corporation,* 1985.
20. Marquis, F.D.S, "Forensic Investigation of Certain Glass Particles," *State of South Dakota,* 1984.
21. Marquis, F.D.S, "Metallurgical Examination of the Failure of a Steel Pressure Pipe," *Wyoming Oil Company,* 1983.
22. Marquis, F.D.S, Metallurgical and Mechanical Examination of the Failure of a Diesel Engine Crankshaft," *Dakota Claim Services,* 1983.
23. Marquis, F.D.S, "The Structure and Strength of Implant Materials," *Greenwood, Greenwood and Greenwood,* 1983.
24. Marquis, F.D.S, "Failure Analysis of a Mobile Home Coupler and Jack Assemblies," *Richards, Hood and Brady,* 1982.
25. Marquis, F.D.S, Failure Analysis of a PVC Pipe," *Dakota Claim Services,* 1982.
26. Marquis, F.D.S, "Failure Analysis of Bolts and Assembly Parts of a Tandem Trailer," *Dakota Claim Services,* 1981.
27. Marquis, F.D.S, "The Effect of Iron Additions on the Micro-structure and Environmental Resistance of Unalloyed Titanium and Certain Ti-Based Alloys," *Titanium Metals Corporation of America,* 1981.
28. Marquis, F.D.S, "Materials Engineering Investigation of anAutomobile Accident," *State of South Dakota,* 1981.
29. Marquis, F.D.S, "Failure Analysis of Cobalt-BasedProsthetic Hip Pin," *Greenwood, Greenwood and Greenwood,* 1981.
30. Marquis, F.D.S, Failure Analysis of a Mild Steel Chain Used in the Construction Industry," *Dakota Claim Services,* 1981.
31. Marquis, F. D. S., "Failure Analysis of the Shaft of a Howell Red Bank 300 HP Motor," Pete Lien and Sons, 1980.
32. Marquis, F.D.S., Gronvold, F., and Kveseth, N.J. "Thermophysical Properties of Manganese Monoleluride", *Unviversity of Oslo,* (1970).
33. Marquis, F.D.S "Corrosion Test of Zirconium Based Alloys", *Danish Atomic Energy Commision,* Riso, (1969).

6.6. Monographs

1. Marquis, F.D.S., "*Nanomaterials and Nanostructures: Carbon Nanotube Composites*", Bush Faculty Development. Committee, *South Dakota School of Mines & Technology,* 2002, pgs 1-48.
2. Marquis, F.D.S. "Practical Mechanical Metallurgy," *South Dakota School of Mines & Technology*, 1988.
3. Marquis, F.D.S, "Dislocations: Theory and Applications," *South Dakota School of Mines & Technology*, 1987.
4. Marquis, F.D.S. "Recommended Proceedures for the Graduate Seminar in Materials Engineering and Science", *South Dakota School of Mines & Technology,* 1998.

7. Theses Directed in US as Major Professor

1. "*Expeditionary Energy Architecture: Electricity Generation Exploiting Geothermal Triggered Shape Memory Alloy Engines*", LT McClure, M.M., NPS Thesis, 2012/2013.
2. "*Feasibility Study and System Architecture of Radioisotope Thermoelectric Generation Power Systems for USMC Forward Operating Bases"*, LT. Langham, R.C. NPS Thesis, 2012/2013.
3. *"Development of Polymer Based Carbon Nanotube Nano Composites and Hybrid Materials*", LT. Follett, D.A., NPS Thesis, 2007/2008.
4. "*Development of Thermal Management Systems for High Energy Applications*", LCRD. Kuhlmann, J.A., NPS Thesis, 2007/2008.
5. *"Design and Manufacture of Fully-Integrated Carbon Nanotube Nanoceramic Composites for Multifunctional Applications*, LT Holmes, A.C. *NPS Thesis*. 2006/2007
6. *"Development of Fully-Integrated Carbon Nanotube Nanogreases*, LT Hicks, T.D, NPS Thesis, 2006/2007.
7. "*Characterization of Carbon Nanotubes, Nanofluids and Nanocomposites*", F. Farokhi 20032005, PhD in MES.
8. "*Functionalization and Dispersion of Carbon Nanotubes*", J. Wensel, 2004-2005, MS in MES.
9. "*The structure and Strength of Shock Synthesized and Densified Tungsten Based Alloys*" A. Mahajan, M.S. in Materials Engineering and Science, SDSM&T, 2001/2003.
10. "*Development of Ceramic Based Composites by Combustion Synthesis for Impact Resistance Applications"*, J. Akula, M.S. in Materials Engineering and Science, SDSM&T, 2001/2003.
11. *"Combustion Synthesis and Densification of □ - Sialons*", R.R. Korlahalli. M.S. in Materials Engineering and Science, SDSMT, 1998/2000.
12. "*Mechanisms of Porosity Formation and Evolution During Processing of 2024 Alminum Alloys*", Deshmukh, A.R., M.S. in Materials Engineering and Science, SDSMT, 1995/1996.
13. "*Effects of Porosity in the Mechanical Behavior of Aluminum Alloys*," Obanor, F.I., M.S., SDSMT, 1995/1996.
14. "*Stability of the Ferroelectric Phase III in Potassium Nitrate Atmospheric Pressure*," M. J. Westphal, Ph.D., SDSMT, 1992/1994.
15. "*High Strain, High-Strain Rate Behavior of Tantalum and Tantalum-Based Alloys*," Chen,Y.J., Ph.D., UCSD, 1993/1998.
16. "*The Aging Response of a 6061 Aluminum - SiC Whiskers Composite*," Chen, Y., M.S., SDSMT, 1992/1993.
17. "*Quantitative Relationships Between Microstructure and Mechanical Properties in a Low Activation Stainless Composite*," Roy, A.K., M.S., SDSMT, 1992/1993.
18. "*Effect of Interfaces, Interface Phases, and Matrix Modification on the Strength of Low Activation Composites*," Makin, B., M.S., SDSMT, 1992/1993.
19. "*The Structure and Strength of Aluminum-Lithium Alloys*", M. N. Datar, M.S., SDSM&T, 1987/1989.
20. "*The structure and Strength of Aluminum 2124-SiC Composites*", B. H. Ovreas, M.S., SDSMT, 1990/1992.
21. "*Design of Low Activation Substituted Stainless Composites*," M. Hadji, Ph.D., SDSMT, 1985/1988.
22. "*Design of Dispersion Strengthened Multiphase Stainless Steels*," J.H. Qadri, Ph.D., SDSMT, 1985/1988.
23. "*The Structure and Mechanical Properties of Fe-Mn-Al-C and Fe-Mn-Al-C-Ti Stainless Composites*," A. Napaporn, M.S., SDSM&T, 1986/1987.

24. *"Deformation Behavior of a Fe-Cr-Ni-Ti-Nb Multiphase Stainless Steel*," S. F. Wang, M.S., SDSM&T, 1984/1985.
25. "*The Structure and Strength of a Fe-Cr-Ni-Ti Multiphase Stainless Steel*," J. C. Hill, M.S., SDSM&T, 1984/1985.
26. "*Strengthening Mechanisms in Diluted Titanium-Oxygen-Iron Alloys*," J.H. Qadri, M.S., SDSM&T, 1983/1985.
27. "*Mechanisms of Superplastic Behavior in Zinc-Aluminum Alloys*," A. Suksu-Art, M.S., SDSM&T, 1983/1985.
28. "*Control of the Mechanical Properties and Rolling Thickness of Certain Multiphase Stainless Steels*," Z. A. Mo, M.S., SDSM&T, 1983/1984.
29. "*Enhancement of Strength and Ductility of a Thermo-Mechanically Treated 316 Stainless Steel*," P. N. Fejokwu, M.S., SDSM&T, 1982/1984.
30. "*Athermal, Stress and Strain Induced Transformation Strengthening of Certain Multiphase Stainless Steels*," N.N. Thadhani, M.S., SDSM&T, 1980/1981.

8. Theses Directed in Elsewhere

Twelve PhD and Master Theses were supervised as Major Professor or Co- Major Professor in other Countries

9. Teaching Experience

Teaching experience is extensive and includes:

a) Thirty (38) years (1979-2016) as Adjunct Professor, Research Professor, Visiting Professor and Professor at the San Diego State University, Naval Postgraduate School, the University of California, San Diego, and the University of Delaware, and Professor at the South Dakota School of Mines & Technology.

b) Nine (9) years (1970-1979) as Academic Visitor at the Imperial College of Science and Technology, University of London, and Professor at the Institute Superior Tecnico, University of Lisbon, and University of Minho.

c) Two (2) years (1965-1967) as Assistant Lecturer at the University of Coimbra.

10. Courses Taught Most Recently

a) Three or four of the following courses were taught per semester at SDSM&T:

MET 432 "Thermomechanical Processing" (Senior)
MET 440 "Mechanical Metallurgy" (Senior)
MET 421 "Ceramics and Refractories" (Senior)
MET 443 "Composite Materials" (Senior)
MET 725 "Strengthening Mechanisms in Solids" (Graduate) MET
732 "Dislocation Theory" (Graduate)
MET 738 "Solid State Phase Transformation" (Graduate)
MES 721 "Theory of Behavior of Materials" (Graduate)
MET 452 "Materials Engineering Design: I, II, III and IV" Junior to Senior.

b) One course was taught by quarter at NPS.

MS 2201 "Introduction to Materials Science and Engineering" (Graduate)
MS 4312 "Characterization of Advanced Materials" (Graduate)

MS 4215 “Phase Transformations” (Graduate)
MS 4822 “The Engineering and Science of Composite Materials” SI
2015 “Fundamentals of Materials Systems”
SE 3700 “Defense Energy Systems”- **New course developed**

c) Teaching Modules Developed for Systems Engineering at NPS

Two teaching modules were recently developed designed to be part of the new curriculum within Systems Engineering. The first module deals with the ***Fundamentals of Electrical Engineering*** and consists of 256 slides distributed under six (6) lectures dealing with: Basic Laws, Application to Circuits, Mechanical Systems Analogies, Electrical Machinery, Power Generation, and. Power Transmission and Distribution. The second module deals with the ***Fundamentals of Computers and Computing*** and consists of 92 slides distributed under five (5) lectures dealing with: Operating Systems, Programming Languages, Finite Difference, Volume and Element Methods, Computer Program Pre-Processing, and Computer Program Post-Processing. In addition, a new course SE 3700 entitled “Defense Energy Systems” was developed completely new.

11. Selected Recent Plenary, Keynote and Invited Presentations

More than thirty (30) Plenary, Keynote and Invited Presentations have been delivered within the last twenty-five (25) years. Typical examples of the most recent are:

1. Perspectives On the Role Nanotechnology In Sustainable Development, *International Conference on Nanotechnologies (Nano Georgia 2016),* Tbilisi, Georgia, October 23-27, 2016 (Plenary)
2. Perspectives On the Role of New and Tranformative Advanced Materials In Sustainable Development, *2016 Sustainable Industrial Processing Summit & Exhibition*, November 6-10, 2016, Hainan Sanya Marriott, China (Plenary)

1. Perspectives on the Role of New and Advanced Materials in Energy and Environment, *in Materials for Energy and Environment: Materials for Low-Carbon Energy and Green Energy, The Ninth Pacific Rim International Conference on Advanced Materials and Processing*”, Kyoto, Japan, August 1-5, 2016 (Invited).
3. The Physics of Carbon Nanotube Nanofluids and Nanostructured Materials for Multifunctional Applications, *First International Conference on Advanced Materials and Technologies (Celebration of the 70th Anniversary of the Sukhumi Institute of Physics and Technology)* Tbilisi, Georgia, October 21-23, 2015 (Plenary)
4. Carbon Nanotube Nanostructured and Hybrid Materials Systems for Energy Applications, Nanjing University of Science and Technology, Herbert Gleiter Institute of Nanoscience, Nanjing 210094, China, November 27, 2015 (Invited)
5. Perspectives On the Role of New and Advanced Materials In Sustainable Development, *2015 Sustainable Industrial Processing Summit & Exhibition*, October 4-9, 2015, Antalya, Turkey (Plenary)
6. Nano and Nanostructured Hybrid Materials Systems for Multifunctional Applications, *First International Symposium. on Multifunctional and Smart Materials, Systems and Structures for Sustainability (MSMSSS),* 2015 Sustainable Industrial Processing Summit & Exhibition, October 4-9, 2015, Antalya, Turkey (Invited)
7. Materials Challenges and Opportunities in Wind Energy, *First International Symposium on Advanced Materials and Technologies for Sustainable Energy and the Environment, 2015* Sustainable Industrial Processing Summit & Exhibition, October 4-9,2015, Antalya, Turkey (Invited)

8. Fully Integrated Carbon Nanotube and Graphene Hybrid Materials Systems for Multifunctional Applications, Auditorio IF, *Instituto de Fisica, University of Brasilia*, July 28, 2014 (Keynote)
9. The Thermal Conductivity of Carbon Nanotube Nanofluids: From the Nano to the Macro Scales, *Multiscale Material Mechanics in the 21 Century: Old Ideas for New Models Across Materials, Processes and Scales, Shechtman International Symposium, 2014* Sustainable Industrial Processing Summit & Exhibition, June 29- July 04 ,2014, Cancun, Mexico (Invited)
10. Nano and Nanostructured Hybrid Materials Systems for Multifunctional Applications, *International Conference on Nanotechnologies (Nano Georgia 2014)*, Tbilisi, Georgia, October 20-24, 2014 (Plenary)
11. "Fully Integrated Carbon Nanotube Composites for Structural, Thermal and Electrical Management" *Fourth Japanese-Mediterranean Workshop on Applied Electromagnetic Engineering for Magnetic, Superconducting and Nanomaterials*, Cairo, Egypt, September 17-20, 2005 (keynote).
12. "Synthesis and Densification of Ceramic Matrix Composites by SHS", *The Prospective of Developing and Practical Applications of SHS in South Caucasus*, Tbilisi, Georgia, March 14-17, 2005 (Invited).
13. "Nanomaterials with Carbon Nanotubes: Heat Transfer Fluids and Nano Lubricants", *South West Research Institute*, San Antonio Texas, June 18, 2004 (invited).
14. "Heat Transfer Nanofluids and Nano lubricants with Carbon Nanotubes", *The Sikorsky Aircraft Corporation*, February 26, 2004 (Invited).
15. "Carbon Nanotube Composites and Hybrid Materials for Multifunctional Applications" *Third Japanese-Mediterranean Workshop on Applied Magnetic and Superconducting Materials*, NTUA, Athens, May 12-22, 2003 (Invited).
16. "Heat Transfer Nanofluids with Carbon Nanotubes" *The Boeing Company*, Philadelphia, May 5, 2003 (Invited).

12. Selected Recent Contributed Presentations

More than sixty (90) presentations have been delivered within the last twenty-five (25) years. Typical examples are:

1. "Advances in Synthesis and Densification of Ceramic Matrix Composites" in "Science and Technology of Powder Materials: Composite Materials", *Materials Science and Technology*, Pittsburgh, PA, September 25-28, 2005.
2. "Shock-Wave Compaction of Boron Containing Composite Powders" in "Science and Technology of Powder Materials: Composite Materials", *Materials Science and Technology*, Pittsburgh, PA, September 25-28, 2005.
3. "Carbon Nanotube Composites for Multifunctional Applications", in "Nano and Microstructured Materials" *"Materiais 2005"*, University of Aveiro, Portugal, March 20-23, 2005.
4. "Development of Impact Resistant Ceramic Based Composites by Combustion Synthesis", in "Metals, Composites and Materials for Mechanical Application", *"Materiais 2005"*, University of Aveiro, Portugal, March 20-23, 2005.
5. "Carbon Nanotube Nanocomposites and Hybrid Materials for Mulitifunctional Applications", "Applications and Fundamentals of High Aspect Ratio Nanomaterials: Nanostructured Composites, *134th TMS Annual Meeting*, San Francisco, CA, February 13-17, 2005.

13. Selected International Session Chairman

Dr. Marquis was invited more than thirty times as International Session Chair. Examples of the most recent are:

1. *International Conference on Nanotechnologies (Nano Georgia 2016),* Tbilisi, Georgia, October 23-27, 2016
2. *2016 Sustainable Industrial Processing Summit & Exhibition*, November 6-10, 2016, Hainan Sanya Marriott, China
3. *First International Conference on Advanced Materials and Technologies (Celebration of the 70th Anniversary of the Sukhumi Institute of Physics and Technology)* Tbilisi, Georgia, October 21-23, 2015
4. *2015 Sustainable Industrial Processing Summit & Exhibition*, October 4-9, 2015, Antalya, Turkey
5. *International Conference on Nanotechnologies (Nano Georgia 2014),* Tbilisi, Georgia, October 20-24, 2014
6. Nanotechnology I", *Fourth Japanese-Mediterranean Workshop on Applied Electromagnetic Engineering for Magnetic, Superconducting and Nanomaterials,* Cairo Egypt, September 1720, 2005.
7. "Nanomaterials" Science and Technology of Powder Materials: Synthesis, Consolidation and Properties, *Materials Science and Technology,* Pittsburgh, PA, September 25-28, 2005.
8. "Powder Metallurgy Research and Development in the Transportation Industry: Sintering and Densification-P/M Processing" *134th TMS Annual Meeting,* San Francisco, CA, February 13-17, 2005.
9. "Magnetic Materials", *Third Japanese-Mediterranean Workshop on Applied Magnetic and Superconducting Materials*, NTUA, Athens, May 12-22, 2003.
10. "In Situ Reactions for Synthesis and Densification", *Powder Materials: Current Research and Industrial Practices, M S &T,* Chicago, IL November 9-12, 2003.
11. "Rapid Prototyping and Rapid Manufacturing", *Powder Materials: Current Research and Industrial Practices, M S &T,* Chicago, IL November 9-12, 2003.

14. Selected International Steering Committees and Advisory Boards

Dr. Marquis was invited to serve more than twenty times as a member of international steering committee and advisory board. Examples of the most recent are:

1. *International Conference on Nanotechnologies (Nano Georgia 2016),* Tbilisi, Georgia, October 23-27, 2016
2. *International Organizing Committee, The Ninth Pacific Rim International Conference on Advanced Materials and Processing*", Kyoto, Japan, August 1-5, 2016.
3. *2016 Sustainable Industrial Processing Summit & Exhibition*, November 6-10, 2016, Hainan Sanya Marriott, China
4. *First International Conference on Advanced Materials and Technologies (Celebration of the 70th Anniversary of the Sukhumi Institute of Physics and Technology)* Tbilisi, Georgia, October 21-23, 2015
5. *2015 Sustainable Industrial Processing Summit & Exhibition*, October 4-9, 2015, Antalya, Turkey
6. *International Conference on Nanotechnologies (Nano Georgia 2014),* Tbilisi, Georgia, October 20-24, 2014
7. *Global Congress Chair, The Eighth Pacific Rim International Conference on Advanced Materials and Processing*" Hilton Waikoloa Village • Waikoloa, Hawaii, August 4-9, 2013 •

8. *The Seventh Pacific Rim International Conference on Advanced Materials and Processing*", Jeju Island, Korea, August 1-5, 2010.
9. "*The Sixth Pacific Rim International Conference on Advanced Materials and Processing*", Jeju Island, Korea, November 6-9, 2007.
10. "*Nanocomposites-Their Science, Technology and Applications*", Materials Science & Technology, Cincinnati, Ohio, October15-19, 2006.
11. "*Fourth Japanese-Mediterranean Workshop on Applied Electromagnetic Engineering for Magnetic, Superconducting and Nanomaterials*", Cairo, Egypt, September 17-20, 2005.
12. "*Third Japanese-Mediterranean Workshop on Applied Electromagnetic Engineering for Magnetic, Superconducting and Nanomaterials*", Athens, Greece, May 19-21, 2003.

15. Synopsis of Research Contributions

Professor Marquis professional career has involved research and development, education, curriculum development, research training of undergraduate and graduate students, consulting and service to the profession. He has made significant technical contributions in many areas of materials Science and Engineering and through his dedication he has inspired and impacted the life of many students". His first refereed publication was entitled "Thermophysical Properties of MnTe", J. Chem. Thermodynamics, 4 (1972). These contributions and their impact have been recognized in the prestigious award of Fellow of the American Society for Metals (FASM) to Prof. Marquis, in 2006. The citation reads: *"For significant technical contributions in many areas of materials Science and engineering and for his dedication to inspiring and impacting the life of many students".* Later on his research contributions expanded into the following areas:

1. Nanomaterials and Nanotechnology
2. Shock Synthesis, Combustion Synthesis and Densification of Ceramics, Composites and Intermetallics.
3. Microstructural Design for Strength, Toughness and Fatigue Resistance of Aluminum Based Alloys: 2024, 2124, 5454, 7050, 7150.
4. Development of High Strength Zirconium and Titanium Based Alloys, with focus on Phase Transformations.
5. Development of High Strength Multiphase Stainless Steels and Stainless Composites, with focus on Phase Transformations.
6. High-Strain, High-Strain Rate Deformation Behavior of Ta and Ta-W Based Alloys.
7. Failure Analysis and Mechanisms in Structural Components.
8. Solid State Ionics and Solid State Energy Devices 9. Corrosion of Zirconium, Copper and Cobalt Based Alloys.
10. Forensics.
11. Airplane and Aerospace Materials and Structures.
12. Creep Behavior of Nickel Based Super Alloys and High Temperature Materials
13. Renewable and Alternative Energy Systems.

Some of the contributions of Professor Marquis in each of these areas are captioned below:

1. Nanomaterials and Nanotechnology

Dr. Marquis most recent research and curriculum development interests are on the synthesis, performance and practical effectiveness on nanomaterials and nanosystems for multifunctional applications. Some of this work focuses on the fully integration of carbon nanotubes in liquids, polymers and ceramics in order to achieve the appropriate and tailored combination of multi-properties such as strength, toughness, lubricity, thermal and electrical conductivity. Various

types of materials have been developed and tested such as: (1) Heat transfer nanofluids or nanocoolants based on various base fluids such as water, water/ethylene glycol mixtures and water/prestone mixtures, (2) Nanolubricant fluids based on fluids such as: commercial oils, BP Amoco DS-166 durecene oil, and military and DOD specification based fluids, (3) Nanolubricant greases based on fluids and greases such as BP DS-166 oil and military specifications based fluids, (4) Fully integrated polymer matrix nanocompoosites, (5) Fully integrated ceramic matrix nanocomposites, and Nano hydraulic fluids. Dr. Marquis holds various patents in this area and have various patent applications pending.

2. Shock Synthesis, Combustion Synthesis and Densification of Ceramics, Composites and Intermetallics

Another current research and curriculum development area is the design, manufacture and mechanical behavior of advanced materials: composites, ceramics and intermetallic. The focus of this research include the establishment of quantitative relationships between the microstructure, processing parameters and the mechanical behavior of powder mixtures, through the development of physical based constitutive equations. He developed equations for the calculation of the components of the stress tensor under symmetric shock wave compression. In one of the areas he has contributed to the understanding of the mechanics and mechanisms of the dynamic deformation and consolidation behaviors of powder mixtures. Contributions were made toward the understanding of the mechanisms of in situ reaction syntheses. This includes Self Propagating High Temperature Synthesis (SHS), Shock Induced Synthesis (SIS) and Shock Assisted Synthesis (SAS) of intermetallic, ceramics and composites. In these three areas he has identified unique microstructures and established the mechanisms by which these microstructures are generated.

Dr. Marquis and his co-workers established the use of low intensity shock waves, combined with coated powders and elevated temperatures in order to control and optimize the microstructures of densified powder mixtures. He has published considerably in these areas, has organized five international symposia on Advanced Powder Materials, Nanomaterials, and InSitu Reaction Synthesis, and served as section chair, keynote speaker, and invited speaker in these areas. He has been the Chair of the Powder Materials Committee of the Minerals, Metals and Materials Society (TMS) and an Executive Member of the Materials Design and Manufacturing Division of TMS. For this work he has received various awards for outstanding service to the Profession.

3. Microstructural Design for Strength, Toughness and Fatigue Resistance of Aluminum Based Alloys

Dr. Marquis carried out a systematic study of the factors that influence the strength, toughness and fatigue resistance of these alloys, studied the evolution of the microstructure of these alloys, during primary, secondary and final thermo-mechanical processing and established relationships between microstructure and mechanical properties of these alloys. In particular, he studied and characterized the occurrence of primary, secondary and tertiary forms of hydrogen porosity in these alloys, studied their evolution during primary, secondary and tertiary processing. As a result of this study he established the effect of hydrogen porosity of the fatigue crack initiation and fatigue crack propagation of 2024/2124 and 7050/7150 aluminum alloys.

4. Development of High Strength Zirconium and Titanium Based Alloys, with focus on Phase Transformations

He observed and studied the occurrence of athermal, stress assisted, and strain induced martensitic phase transformations in tailored Zirconium and Titanium based alloys and showed how the strength of these alloys could be controlled by the design of controlled volume

fractions and morphologies of these microstructural constituents. He studied both the transitions in the martensite morphology and the martensite substructure in these alloys and showed that these transitions could be independently controlled, instead of occurring simultaneously. In addition, he observed the occurrence of dynamic strain aging in these martensitic alloys and distinguished between the contributions of substitutional and interstitial solutes to the observed dynamic strain aging effects. In addition, he studied the effect of oxygen and iron on the strength and corrosion resistance of Titanium based alloys.

13. **Development of High Strength Multiphase Stainless Steels and Stainless Composites, with focus on Phase Transformations**
    The focus of this research was to design, manufacture and evaluate the performance of double matrix stainless composites with an optimized combination of low activation, high resistance to void swelling and hydrogen embitterment, high resistance to dislocation motion, high formability and fracture toughness and oxidation resistance at elevated temperatures. These materials have low Cr and Ni, considerable amounts of Mn, Al and Si, significant amounts of Ti, V and Mo and controlled amounts of C, N, P and B. These materials achieved considerable improvements over stainless steels and duplex alloys and exhibit super plasticity in certain microstructural and deformation conditions.
14. **High-Strain, High-Strain Rate Deformation Behavior of Ta and Ta-W Based Alloys** The focus of most his current research includes the establishment of quantitative relationships between the microstructure, processing parameters and the mechanical behavior of Tantalum and Tantalum-Tungsten based alloys, through the development of physical based constitutive equations. This includes the understanding of the evolution of the microstructure and strength under high-strain and high-strain rate conditions. He established for the first time the occurrence of dynamic recover and dynamic recrystallization in these materials, within the regions of shear band formation.
15. **Failure Analysis and Failure Mechanisms in Structural Components**
    Professor Marquis has been very active in the field of Failure Analysis, as a researcher, an educator, in service to the profession and has a consultant. He has authored over 25 reports and publications on failure analysis. He teaches every year and Advanced Laboratory to seniors and graduate students in this area. In addition, he has written and reviewed many failure analysis examination questions for the Professional Registration in Metallurgical Engineering, Administered by the National Council of Examiners for Engineers and Surveyors (NCEES). Under the umbrella of the Professional Registration Committee he has written many questions for the PE Exam under the areas of Mechanical Metallurgy, fabrication and Mechanical Processing and alloy selection. He has done consulting for many Industrial Corporations in order to resolve the occurrence of a considerable number of service failures.
16. **Solid State Ionics**
    Contributions were made on the electrochemical insertion of Lithium into niobium pentoxide and on the use of these materials in the development of polymer electrolyte lithium cells. In addition, contributions were made on the understanding of high temperatures solid state reactions and the mechanisms of conductivity and the mechanisms of corrosion resistance of vanadium pentoxide melt mixtures.
17. **Corrosion of Zirconium, Copper and Cobalt Based Alloys**
    Contributions were made on the understanding of the corrosion behavior of zircalloy and zirconium based alloys in environments simulating those observed in nuclear reactors. Relationships between thermo-mechanical processing and the autoclave environment were established.

18. Forensics

Significant contributions were made in the field of forensic, through the use of state of the art materials analysis and characterization equipment. The author was the first or one of the first expert witnesses to use electron energy dispersive spectroscopy analysis for the forensic identification and characterization of glass. This was done in the earlier 80's at a time when this was done through measurements of the index of refraction and of the density. Today this method is widely used. Similar procedures were used for the forensic identification and characterization of other materials. In addition, Professor Marquis has frequently applied fracture mechanics to the forensic identification and characterization of materials process and sequences of events both on ductile materials (metals and alloys) and on brittle solids (glasses and ceramics). He frequently presented his results during court testimony and cross examination.

19. Airplane and Aerospace Materials and Structures

Contributions were made towards the understanding of the evolution of aerospace materials and structures, with focus on design, manufacturing, cost and performance. Various book chapters were written covering a wide range of structural components and structural materials

20. Creep Behavior of Nickel Based Super Alloys and High Temperature Materials

Contributions were made on the effects of the grain boundary morphology and of the dislocation substructure on the creep behavior of nickel based super alloys. The understanding of these effects and the appropriate micro-structural design were used to retard the coalescence and growth of cracks and to enhance the fracture resistance of these alloys.

15. Renewable and Alternative Energy Systems

In order to address current global energy challenges focus should be placed on achieving higher energy efficiency and increasing supplies from all forma of renewable energy. The work of professor Marquis focus on address both challenges through the application on nano and nanostructure materials systems into energy technologies and energy systems dealing with expeditionary energy, energy efficiencies and direct energy harvesting (wind and solar) and energy storage.

16. Recent Reviewer for International Journals and Panels

1. NSF Proposal Panel Review 2.
CRDF Proposal Review
3. Journal of Material Research
4. Journal of Material Science and Engineering A
5. Materials Research Forum
6. Metallurgical Transactions
7. Royal Society of Chemistry
8. Advanced Materials Forum

17. ABET Program Evaluator for three Engineering Disciplines

1. Metallurgical Engineering
2. Materials Engineering and Science
3. Polymer Engineering

18. Memberships (Past and Present) in Scientific, Professional and Service Societies, Committees and Councils

Executive Council of the Materials Design and Manufacturing Division (TMS); Treasurer

Materials Design and Manufacturing Division (TMS); University Materials Council; CampusWide Assessment Committee (SDSMT); ABET Program Evaluator for Materials Engineering, Metallurgical Engineering; and Polymer Engineering, American Society for Metals (ASM);
American Institute of Mining, Metallurgical and Petroleum Engineers; Sigma Xi; Materials Research Society; American Society for Testing of Materials; Mechanical Behavior Committee (ASM/TMS), American Society for Metals; Past Chair Powder Materials Committee (TMS);
Past member Societe Francaise de Metallurgie; Professional Engineers (Chemical/Industrial and Metallurgical), Portugal; Past member National Center for Metallurgical Research, Madrid, Spain; Institute of Metals (Metals Society and Institution of Metallurgists), United Kingdom; Professional Registration Committee; Item Writers for Professional Registration Certification (PE); American Society for Engineering Education, (ASEE); American Association for the Advancement of Science; Global Innovations Committee (TMS), Composites Materials Committee (TMS); Mechanical Behavior Committee (ASM/TMS), Board of Trustees, Alpha Sigma Mu.