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ACADEMIC EXPERIENCE

Ph.D. Nuclear Engineering, 2003 – 2006. University of Illinois at Urbana Champaign, IL

Dissertation: “Study of Breakdown/Arcing for High Power Antennas on Fusion Applications”

Advisor: David N. Ruzic

M.S. Nuclear Engineering, 2000 – 2002. University of Illinois at Urbana Champaign, IL

Thesis: “Evidence of Superconductivity in the Magnetic Properties of Specially Prepared Palladium Hydride and Deuteride Samples (Pd/PdO:H_x and Pd/PdO:D_x)”

Advisor: George H. Miley

B.S. Chemical Engineering, 1990 – 1998. Universidad Nacional de Colombia, Medellín, Colombia.

Minor: Electrochemistry.

RESEARCH AREAS

- Production of nanoparticles with radiation (radiation induced chemistry)
- Materials for shielding applications.
- Simulation and validation of nuclear systems (MSTR)
- Vacuum breakdown amelioration

WORK EXPERIENCE

Associate Professor, Missouri University of Science and Technology, 2014-Present

Department of Mining and Nuclear Engineering. Missouri S&T

Assistant Professor, Missouri University of Science and Technology, 2008-2014

Department of Mining and Nuclear Engineering. Missouri S&T

Postdoctoral Research Associate – 2007

Center for Plasma Material Interactions, University of Illinois at Urbana-Champaign

Graduate Student Intern – Summer 2003, Fall 2004, Summer 2005 (1 year total)

Oak Ridge National Lab., Fusion Energy Division, Oak Ridge, TN, Dr. John B. O. Caughman.

PATENTS:

2017 Patent Pending, United States Provisional Patent Application Serial No. 62/529,907.

“Novel Explosives Identification Taggant Using Rare Elements”.

2016 Patent Pending, United States Provisional Patent Application Serial No. 62/460,927.

“Direct Synthesis of Radioactive Nanoparticles Involving Neutrons”

2016 US Patent 9299526, “Method to Fabricate Portable Electron Source Based on Nitrogen Incorporated Ultrananocrystalline Diamond (N-UNCD)”.

PEER REVIEWED PUBLICATIONS

1. *Experimental investigation on composites incorporating rice husk nanoparticles for environmental noise management.* Jeiser Rendon, Carlos H. C. Giraldo, K. Cathrine Monyake, Lana Z. Alagha, Henry A. Colorado. *Journal of Environmental Management* (**IF: 8.6**). 325 (2023) 116477.
2. *Calcium silicate phosphate cement with samarium oxide additions for neutron shielding applications in nuclear industry.* R. Florez, Alexandra Loaiza, Carlos H. Castano Giraldo, Henry A. Colorado. *Progress in Nuclear Energy* (**IF: 1.87**) 133 (2021) 103650.
3. *Looking Inside a Prototype Compact X-Ray Tube Comprising CNT-Based Cold Cathode and Transmission-Type Anode.* A.V. Avachat, W. W. Tucker, C. H. C. Giraldo, D. Pommerenke, H. K. Lee. *Radiation Research* (**IF: 2.66**) 193, 5 (2020) 497-504.
4. *Effects of Delaying Measurements of Concentration using Neutron Activation Analysis on Explosive Taggants.* James Seaman, Carlos H. C. Giraldo, Catherine Johnson. *Applied Radiation and Isotopes* (**IF: 1.12**) 156 (2020) 109007.
5. *Neutron Reflector Analysis for the Beam-Port of the Missouri S&T Reactor.* Tayfun

- Akyurek, Warren S. Vaz, Ayodeji B. Alajo, Jeffrey C. King, Shoaib Usman, Carlos H. C. Giraldo. *Journal of Radioanalytical and Nuclear Chemistry* (**IF: 1.19**) 322 (2019) 975-981.
6. *Particle-In-Cell Simulations of Electron Focusing for a Compact X-Ray Tube Comprising CNT-Based Electron Source and Transmission Type Anode*. Ashish V. Avachat, Wesley W. Tucker, Carlos H. C. Giraldo, and Hyoung K. Lee. *IEEE Transactions on Electron Devices* (**IF: 2.90**) 66. 3 (2019) 1525-1532.
 7. *Reactive not Proactive: Explosive Identification Taggant History and Introduction of the Nuclear Barcode Taggant Model*. J. Seman, C. H. C. Giraldo, C. E. Johnson. *Propellants, Explosives, Pyrotechnics* (**IF: 2.01**). 44 (2019) 1-12.
 8. *The Material Characterization and Gamma Attenuation Properties of Portland Cement-Fe₃O₄ Composites for Potential Dry Cask Applications*. Raul Florez, Henry A. Colorado, Ayodeji Alajo, Carlos H. C. Giraldo. *Progress in Nuclear Energy* (**IF: 1.71**) 111 (2019) 65-73.
 9. *Holmium and Samarium Detectability in Post-Blast Residue*. James Seman, Catherine Johnson, and Carlos H. C. Giraldo Citation: *AIP Conference Proceedings* (**IF: 0.25**) 1979 (2018) 150034-1-6.
 10. *Detectability of Rare Earth Elements in Explosive Post Blast Residues by Neutron Activation Analysis for use as Identification Taggants*. J. Seman, C. H. C. Giraldo, C. Johnson. *Journal of Forensic Research*. (**IF: 0.32**). 9, 3 (2018) 1-9.
 11. *Preparation and characterization of Portland cement pastes with Sm₂O₃ microparticle additions for neutron shielding applications*. Raul Florez, Henry A. Colorado, Carlos H.C. Giraldo, Ayodeji Alajo. *Construction and Building Materials* (**IF: 4.2**) 191 (2018) 498–506.
 12. *Radioactive Bimetallic Gold–Silver Nanoparticles Production in a Research Nuclear Reactor*. Maria Camila Garcia Toro, Joshua P. Schlegel, and Carlos H. C. Giraldo. *ChemistrySelect* (**IF: 1.48**). 3 (2018) 8936-8941 (Corresponding author).
 13. *Direct Synthesis of Radioactive Gold Nanoparticles Using a Research Nuclear Reactor*. Maria C. Garcia Toro, Joshua P. Schlegel, Carlos H. Castano Giraldo. *J Nucl Med Technol*. (**IF: 0.62**). 46 (2018) 280-284 (Corresponding author).
 14. *Preliminary Study of the Effect of Gamma Irradiation on the Vase Life of Iridaceae Hollandica*. S. Dennis, L. Fisher, C. Ware, C. H. C. Giraldo. *Radiation Physics and Chemistry* (**IF: 1.35**). 144 (2018) 138-140. (Corresponding author).

15. *Preparation and enhanced thermal performance of novel (solid to gel) form-stable eutectic PCM modified by nano-graphene platelets.* R. M. Saeed, J. P. Schlegel, C. Castano, R. Sawafta. *Journal of Energy Storage* (IF: 2.79). 15 (2018) 91-102.
16. *Preparation and Thermal Performance of Methyl Palmitate and Lauric Acid Eutectic Mixture as Phase Change Material (PCM).* R. M. Saeed, J.P. Schlegel, C. Castano, R. Sawafta, V. Kuturu. *Journal of Energy Storage* (IF: 2.79). 13 (2017) 418–424.
17. *Modeling and Validation of Temperature and Void Effects on Reactivity Experiments at the Missouri S&T Research Reactor (MSTR).* B. Richardson, C. H. Castano, J. King, A. Alajo, S. Usman. *Nuclear Science and Engineering* (IF: 0.92). 187 (2017) 100-106. (Corresponding author).
18. *Weibull statistical analysis of Krouse-type bending fatigue in nuclear materials of HT9* *Journal of Nuclear Materials.* A. S. Haidyrah, J. W. Newkirk, Carlos H. Castaño. *Journal of Nuclear Materials* (IF: 2.11). 470 (2016) 244–250.
19. *Uncertainty of Thermal Characterization of Phase Change Material by Differential Scanning Calorimetry Analysis.* R. M. Saeed, J. P. Schlegel, C. Castano Giraldo, R. Sawafta. *International Journal of Engineering Research & Technology (IJERT)* (IF: 0.43). 5 #01 (2016) 405-412.
20. *Synthesis and characterization of lanthanum phosphate nanoparticles as carriers for ²²³Ra and ²²⁵Ra for targeted alpha therapy.* J. V. Rojas, J. D. Woodward, N. Chen, A. J. Rondinone, C. H. Castano, S. Mirzadeh. *Nuclear Medicine and Biology* (IF: 2.28). 42 #7 (2015) 614-620.
21. *Radiation-Assisted Synthesis of Iridium and Rhodium Nanoparticles Supported on Polyvinylpyrrolidone.* J. V. Rojas, C. H. Castano. *Journal of Radioanalytical and Nuclear Chemistry* (IF: 1.24). 302 #1 (2014) 555-561.
22. *Radiolytic Synthesis of Iridium Nanoparticles onto Carbon Nanotubes.* J. V. Rojas, C. H. Castano. *Journal of Nanoparticle Research* (IF: 1.58). 16 #8 (2014) 16:2567
23. *Nitrogen Incorporated Ultrananocrystalline Diamond Based Field Emitter Array for a Flat-Panel X-ray Source.* Chrystian M. Posada, Edwin J. Grant, Ralu Divan, Anirudha. V. Sumant, Daniel Rosenmann, Liliana Stan, Hyoung K. Lee, Carlos H. Castaño. *Journal of Applied Physics* (IF: 1.65). 115 (2014) 134506-1-9. (Corresponding author).
24. *Synthesis of Rhenium Oxide Nanoparticles (Re_xO_y) by Gamma Irradiation.* J. V. Rojas, C. H. Castano. *Radiation Physics and Chemistry* (IF: 1.35). 99 (2014)1-5. (corresponding author)
25. *Boron and lead based chemically bonded phosphates ceramics for nuclear waste and*
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- radiation shielding applications*. Colorado, H.A., Pleitt, J., Yang, J.-M., Castano, C.H. Ceramic Transactions (**IF: 0.14**). 241 (2013) 3-9.
26. *Synthesis of Nickel Nanoparticles on Multi-Walled Carbon Nanotubes by Gamma Irradiation*. Vivek M. Rao, Carlos H. Castano, Jessika Rojas, Ahlam J. Abdulghani. Radiation Physics and Chemistry (**IF: 1.35**). 89 (2013) 51-56(corresponding author).
27. *Construction of an Ultrananocrystalline Diamond Based Cold Cathode Array for a Flat-Panel X-ray Source*. E.J. Grant, C.M. Posada, R. Divan, A. V. Sumant, D. Rosenmann, L. Stan, A. Avachat, C.H. Castano and H.K. Lee. SPIE Proceedings (**IF: 0.48**). 87090U (2013) (Peer Reviewed).
28. *Characterization of the Neutron Flux Energy Spectrum at the Missouri University of Science and Technology Research Reactor (MSTR)*. Z. A. Kulage, C. H. Castano, S. Usman, G. Mueller. Nuclear Engineering and Design (**IF: 1.25**). 261 (2013) 174-180 (corresponding author).
29. *Radiation Shielding Simulation for Wollastonite-Based Chemically Bonded Phosphate Ceramics*. J. Pleitt, H.A. Colorado, C.H. Castano. Ceramic Transactions (**IF: 0.14**). 236 (2012) 113-120.
30. *A Monte Carlo Simulation Study of a Flat-Panel X-ray Source*. Edwin Grant, Hyoung Lee, Chrystian Posada and, Carlos H. Castaño. Applied Radiation and Isotopes (**IF: 1.15**). 70 #8 (2012) 1658–1666.
31. *Modeling and Validation of Approach to Criticality and Axial Flux Profile Experiments at the Missouri S&T Reactor (MSTR)*. B. Richardson, C. H. Castano, J. King, A. Alajo, S. Usman. Nuclear Engineering and Design (**IF: 1.25**). 245 (2012) 55-61 (corresponding author).
32. *Production of Palladium Nanoparticles Supported on Multi-Walled Carbon Nanotubes by Gamma Irradiation*. R. Jessika and C. H. Castano. Radiation Physics and Chemistry (**IF: 1.35**). 81 (2012) 16-21(corresponding author).
33. *Visual and Electrical Evidence Supporting a Mechanism of Vacuum Breakdown*. C. Castano, M. Aghazarian, J. Caughman, and D. Ruzic. IEEE Transactions on Plasma Science (**IF: 1.17**). 40 # 4 (2012) 1217-1222 (corresponding author).
34. *Simulation of the Electron Field Emission Characteristics of a Flat Panel X-Ray Source*. C. M. Posada, C. H. Castano, E. J. Grant, H. K. Lee. Journal of Vacuum Science and Technology B (**IF: 1.15**). 30, (2012) 022201-1-9 (corresponding author).

35. *Wollastonite-based Chemical Bonded Phosphate Ceramic with lead oxide contents under gamma irradiation.* H. A. Colorado, C. Hiel and H. T. Hahn, J. M. Yang, J. Pleitt, C. H. Castano. *Journal of Nuclear Materials* (**IF: 2.11**). 425 (**2012**) 197-204.
36. *Internet Accessible Hot Cell with Gamma Spectroscopy at the Missouri S&T Nuclear Reactor.* E. Grant, G. Mueller, C. Castaño, S. Usman, A. Kumar. *Nuclear Engineering and Design* (**IF: 1.25**). 241 (**2011**) 3306-3316.
37. *Electron Field Emission Particle in Cell (PIC) Coupled with MCNPX Simulation of a CNT-Based Flat-Panel-X-ray Source.* E.J. Grant, C.M. Posada, C.H. Castano and H.K. Lee. *SPIE Proceedings* (**IF: 0.48**). 796108-1-11 (**2011**) (Peer Reviewed).
38. *Ionic Debris Measurement of Three Extreme Ultraviolet Sources.* J. Sporre, C. H. Castano, and D. N. Ruzic. *Journal of Applied Physics* (**IF: 1.65**). 106 #4 (**2009**) 043304-043304-7.
39. *Preliminary Evidence of Field Induced Rhenium Etching by XeF₂ at High Vacuum.* C. H. Castano, M. Aghazarian, and D. N. Ruzic. *Journal of Applied Physics* (**IF: 1.65**). 103 (**2008**) 044901.
40. *Physical and Chemical Erosion of Li Treated ATJ Graphite for NSTX.* M.Z. Racic, D.N. Ruzic, R. Raju, C. Struck, C.H. Castano. 2007 IEEE 22nd Symposium on Fusion Engineering Proceedings - SOFE (**IF: 0.12**) 22 (**2007**) 4337924, 1-4.
41. *Study of RF Breakdown Mechanisms Relevant to an ICH Antenna Environment.* J.B.O. Caughman, C. Castano-Giraldo, M. Aghazarian, F.W. Baity, D.A. Rasmussen, and D.N. Ruzic. *AIP Conference Proceedings* (**IF:0.41**) 933 (**2007**) 195-202
42. *Magnetic characterization of a hydrogen phase trapped inside deep dislocation cores in a hydrogen-cycled PdH_x ($x \sim 4.5 \times 10^{-4}$) single crystal.* Lipson, A.G.; Heuser, B.J.; Castano, C.H.; Lyakhov, B.F.; Tsivadze, A.Yu. *Journal of Experimental and Theoretical Physics* (**IF: 1.13**). 103 #3 (**2006**) 385-397.
43. *Transport and Magnetic Anomalies below 70 K in a Hydrogen-cycled Pd Foil with a Thermally Grown Oxide.* A. Lipson, B. Heuser, C. Castaño, G. Miley, B. Lyakhov, and A. Mitin. *Physical Review B* (**IF: 3.18**). 72 (**2005**) 212507-1-4.
44. *Observation of a low-field diamagnetic contribution to the magnetic susceptibility of deformed single crystal PdH_x ($x \sim 4 \times 10^{-4}$).* Andrei G. Lipson, Brent J. Heuser, Carlos H. Castaño, Ayten Celik-Aktas. *Physics Letters A* (**IF: 1.74**). 339 (**2005**) 414-423.

BOOKS

- **Book Chapter:** Kazuma Kobayashi, Shoaib Usman, Carlos Castano, Ayodeji Alajo, Dinesh Kumar, Susmita Naskar, Syed Alam. Data-Driven Multiscale Modeling and Robust Optimization of Composite Structure with Uncertainty Quantification. In: Fathi, M., Zio, E., Pardalos, P.M. (eds) Handbook of Smart Energy Systems. Springer, Cham. https://doi.org/10.1007/978-3-030-72322-4_207-1. **2023**.
- **Book Chapter:** Kobayashi, K., Usman, S., Castano, C., Alajo, A., Kumar, D., Alam, S. Surrogate Modeling-Driven Physics-Informed Multi-fidelity Kriging: Path forward to Digital Twin Enabling Simulation for Accident Tolerant Fuel. In: Fathi, M., Zio, E., Pardalos, P.M. (eds) Handbook of Smart Energy Systems. Springer, Cham. https://doi.org/10.1007/978-3-030-72322-4_204-1. **2023**.
- **Book Chapter:** Kazuma Kobayashi, Brandon Bloss, Alexander Foutch, Brenden Kelly, Ayodeji Alajo, Carlos H. C. Giraldo, Dinesh Kumar, Syed Alam. Digital Twin for Multi-criteria Decision-Making Framework to Accelerate Fuel Qualification for Accident-Tolerant Fuel Concepts. In: Fathi, M., Zio, E., Pardalos, P.M. (eds) Handbook of Smart Energy Systems. Springer, Cham. https://doi.org/10.1007/978-3-030-72322-4_160-1. **2022**.
- **Invited Book Chapter:** Energy Science and Technology Vol. 4: Nuclear Energy (Editors: R. Prasad, S. Sivakumar and U. C. Sharma). ISBN: 978-1-626990-65-4. Chapter Name: “Progress in Inorganic Phosphate Cements for the Neutralization, Stabilization and Disposal of Radioactive Wastes”. Henry A. Colorado, Jose Gaviria, Carlos H. Castano. Studium Press LLC. **2015**.
- **Invited Book Chapter:** Radiation Synthesis of Materials and Compounds (Editors: B. I. Kharisov, O. V. Kharissova, U. O. Mendez). ISBN: 978-1-466-50522-3. Chapter Name: “Production of Metal Nanoparticles on Carbon Nanotubes by Gamma Irradiation”. Jessika Rojas, and C. H. Castaño. CRC Press. **2013**.
- **Invited Book Chapter:** Nuclear Energy Encyclopedia: Science, Technology, and Applications (Editors: S. B. Krivit, T. B. Kingery, J. H. Lehr). ISBN: 978-0-470-89439-2. Part II. Chapter 14. Nuclear Fuel Reprocessing. C. H. Castaño. Wiley Series on Energy. **2011**.

INVITED PRESENTATIONS

- **Invited Talk:** Direct Prompt Synthesis of Radioactive Nanoparticles (Prompt Nano Radioisotopes). C. H. C. Giraldo. TMS 2021 Virtual Annual Meeting & Exhibition. Frontiers of Materials Award. Radiation Processing of Materials. **2021**.
- **Invited Talk:** How to Publish a Scientific Paper. Word of Caution on Predatory Publishing. Missouri S&T. C. H. C. Giraldo. **2018**.
- **Invited Talk:** Talk during the CNM Plenary Session of the Advanced Photon Source/Center for Nanomaterials/Electron Microscopy Center (APS/CNM/EMC) 2014 Users Meeting. “Development of a N-UNCD Based Field Emitter Array for a Flat Panel X-Ray Source”. C. H. C. Giraldo. May 12-15, **2014**.
- **Invited Panel Expert:** Transforming Traditional Energy Technologies. *Nuclear Food for Thought – Energy, Safety, Security*. C. H. Castaño. Laufer Energy Symposium. Secure Energy for the Future. April 3-5, **2013**.
- **Invited Talk:** *Breakdown at High Vacuum – Unipolar Arcs*. C. H. Castaño. Workshop on Unipolar Arcs. Argonne National Lab. January 29, **2010**.
- **Invited Graduate Seminar:** Internet Accessible Hot Cell with Gamma Spectroscopy at the Missouri S&T Nuclear Reactor. S. Usman, C. H. Castaño. University of Illinois at Urbana Champaign. Sept. 27, **2011**.

PROCEEDINGS

- International Congress EXPO Ingeniería 2022 (IC-EXPOI 2022). Insights and Research in Materials used to Decrease Noise Pollution: Developments for Colombia. Jeiser Rendon, Carlos H. C. Giraldo, Henry A. Colorado. 2781. 27-29 Oct **2022**. Universidad de Antioquia. Colombia.
- *The Nuclear Barcode: A Novel Identification Taggant for Explosives*. J. Seman, C. Johnson, C. Giraldo. 20th American Physical Society Topical Conference on Shock Compression of Condensed Matter. St Louis. July 9-14 (**2017**).
- *Direct Synthesis of Radioactive Nanoparticles using a Nuclear Reactor*. M. C. García Toro, C. H. C. Giraldo. Cancer Nanotechnology. Gordon Research Conference. West Dover, VT. June 18-23 (**2017**).
- *Facility Integration for the Synthesis and testing of Radio-Nano-Isotopes at Missouri S&T*. Carlos Henry Castano Giraldo. Casting Calling at Missouri S&T. Wednesday, April 5, and Friday, April 7 (**2017**).

- *Microstructure Evolution and Thermal Property Change in Heavy Ion Irradiated Zirconium Diboride.* J. T. Graham, C. H. Castaño. NuMat 2016 (The Nuclear Materials Conference). 7-10 November (2016). Montpellier, France.
- *Synthesis of Radioactive Gold Nanoparticle by Radiolysis Using a Research Nuclear Reactor.* M. C. García Toro, C. H. C. Giraldo. 2016 ANS Student Conference. University of Wisconsin-Madison. Madison WI. March 31-April 3, (2016).
- *Synthesis of Radioactive Gold Nanoparticle by Radiolysis Using a Research Nuclear Reactor.* María Camila García Toro, Carlos Henry Castaño Giraldo. Ozark Biomedical Initiative Symposium. April 11 (2016) Rolla, MO.
- *Characterization of a Bending Fatigue Mini-Specimen Technique (Krouse-type) of Nuclear Materials.* TMS Supplemental Proceedings. Materials and Fuels for the Current and Advanced Nuclear Reactors IV (2015) 1225-1232.
- *An Experimental Study on Bending Fatigue Test with a Krouse-type Fatigue Specimen.* Transactions of the American Nuclear Society 111 #1 (2014) 620-623.
- *Active heat removal system for continuous operation of the Missouri S&T reactor.* Castano, C., Kumar, A., Liu, X., Alajo, A. Transactions of the American Nuclear Society. Volume 109, issue 1 (2013) 1055 – 1057.
- *CFD modeling of a coolant channel for Missouri S&T Reactor.* Sipaun, S., O'Bryant, K., Yousaf, M., Yigit, C., Castano, C.H., Alajo, A., Usman, S. Transactions of the American Nuclear Society Volume 108(2013) 1005 – 1007.
- *Determination of Hot Channel of Missouri S&T Nuclear Reactor.* O'Bryant, K., Sipaun, S., Usman, S., Castano, C.H., Alajo, A. 2012. Transactions of the American Nuclear Society 106, pp. 817-818.
- *Neutron flux characterization at the Missouri S&T nuclear reactor.* Kulage, Z.A., Castaño, C., Mueller, G.E., Usman, S. Transactions of the American Nuclear Society. 104 (2011) 918-919.
- *Production and Characterization of Supported Transition Metal Nano-Particles on Multi-Walled Carbon Nanotubes Functionalized by Gamma Irradiation and Chemical Processes.* J. Rojas, C. H. Castano. Supplemental Proceedings: Volume 1: Materials Processing and Energy Materials TMS (The Minerals, Metals & Materials Society), 2011
- *Model benchmarking for Missouri S&T reactor part 1: Approach to criticality and axial flux profile.* Richardson, B., Castano, C.H., King, J., Alajo, A., Usman, S. Transactions of the American Nuclear Society 105 (2011) 842-843.

- *Model benchmarking for Missouri S&T reactor part 2: Moderator temperature and void coefficients of reactivity.* Richardson, B., Castano, C.H., King, J., Alajo, A., Usman, S. Transactions of the American Nuclear Society. 105 (2011)844-845.
- *Particle in cell simulation of the electron source for a distributed flat-panel X-ray source.* Posada, C.M., Grant, E.J., Lee, H.K., Castaño, C.H. Transactions of the American Nuclear Society 105 (2011)15-16.
- *Monte Carlo simulation study of a flat-panel x-ray source.* Lee, H.K., Grant, E.J., Posada, C.M., Castaño, C.H. Transactions of the American Nuclear Society. 105 (2011) 355-356.
- *Internet Accessible Hot Cell with Gamma Spectroscopy at the Missouri S&T Nuclear Reactor.* Grant, E. J., Mueller, G. E. Castaño, C., Kumar, A. S., Usman, S., American Nuclear Society Transactions, 103 (2010) 122.
- *Ionic debris assessment of various EUVL systems.* Castano, C.H., Ruzic, D.N., Srivastava, S.N., Thompson, K.C., Sporre, J. 2008 Proceedings of SPIE - The International Society for Optical Engineering 6921, (2008) art. no. 692137.

TECHNICAL PRESENTATIONS

- **Oral Presentation:** Insights and Research in Materials Used to Decrease Noise Pollution: Developments for Colombia. : Jeiser Rendon, Carlos H. C. Giraldo, Henry A. Colorado. II Congreso Internacional de Ingeniería – IC EXPOI 2022. Oct 27-29 2022. Medellín, Colombia.
- **Poster:** Bending Fatigue Mini-Specimens (Krouse Type) for Nuclear Materials. A. S. Haidyrah and C. H. Castaño. Third OECN Nuclear Energy Agency International Workshop on Structural Materials for Innovative Nuclear Systems. Idaho Falls, ID, USA. 7-10, October 2013.
- **Oral Presentation:** Monte Carlo Simulation Study of a Flat-Panel X-Ray Source. H. K. Lee, E. J. Grant, C. M. Posada, and C. H. Castaño. 2011 ANS Winter Meeting and Nuclear Technology Expo. Oct. 30-Nov 3, 2011, Washington, DC.
- **Oral Presentation:** Particle in Cell Simulation of the Electron Source for a Distributed Flat-Panel X-Ray Source, Chrystian M. Posada, Edwin J. Grant, Hyoungh K. Lee, Carlos H. Castaño (Missouri S&T). 2011 ANS Winter Meeting and Nuclear Technology Expo. Oct. 30-Nov 3, 2011, Washington, DC.
- **Oral Presentation:** Model Benchmarking for Missouri S&T Reactor Part 1: Approach to Criticality and Axial Flux Profile. B. Richardson, C. H. Castano, J. King, A. Alajo, S.

Usman. **2011** ANS Winter Meeting and Nuclear Technology Expo. Oct. 30-Nov 3, **2011**, Washington, DC.

- **Oral Presentation:** Model Benchmarking for Missouri S&T Reactor Part 2: Moderator Temperature and Void Coefficients of Reactivity. B. Richardson, C. H. Castano, J. King, A. Alajo, S. Usman. **2011** ANS Winter Meeting and Nuclear Technology Expo. Oct. 30-Nov 3, **2011**, Washington, DC.
- **Poster:** Synthesis of Palladium, Nickel and Vanadium Nanoparticles supported on Multi-Walled Carbon Nanotubes by Gamma Irradiation. Jessika V. Rojas, Vivek M. Rao, Ahlam J. Abdulghani, Muthanna Al-Dahhan, Stoyan Toshkov, Carlos H. Castano. Nanofrontiers, Missouri State University, October 26, **2011**. (**5th Place Prize**).
- **Poster:** Synthesis of Nickel Vanadium and Palladium Nanoparticles supported on Multi-Walled Carbon Nanotubes by Gamma Irradiation. Ahlam J. Abdulghani, Jessika V. Rojas, Vivek M. Rao, Muthanna Al-Dahhan, Stoyan Toshkov, Carlos H. Castano. Materials Science & Technology MS&T **2011** Conference & Exhibition. Oct. 16-20, **2011**. Columbus, OH.
- **Oral Presentation:** Radiation Shielding Simulation for Wollastonite-Based Chemically Bonded Phosphate Ceramics. J. Pleitt, H. A. Colorado, C. H. Castano. Materials Science & Technology MS&T **2011** Conference & Exhibition. Oct. 16-20, **2011**. Columbus, OH.
- **Oral Presentation:** Electron field emission particle in cell (PIC) coupled with MCNPX simulation of a CNT-based flat-panel-x-ray source. E.J. Grant, C.M. Posada, C.H. Castano and H.K. Lee. SPIE Proceedings 7961-7 (**2011**)
- **Oral Presentation:** Electron Field Emission and X-Ray Generation Simulation Studies of a CNT-based Flat-Panel X-Ray Source. Grant, E. J., Posada, C. M., Lee, H. K. and Castaño, C. H. Memphis Bioimaging Symposium 11-04-**2010**, TN.
- **Oral Presentation:** Production and Characterization of Supported Transition Metal Nanoparticles on Multi-Walled Carbon Nanotubes Functionalized by Gamma Irradiation and Chemical Process. J. V. Rojas, C. H. Castano. The Minerals, Metals & Materials Society (TMS) 2011-140th Annual Meeting & Exhibition, San Diego-CA, USA. Abstract published (CD only). February 27 - March 3, **2011**.
- **Poster:** Wollastonite-based Chemical Bonded Phosphate Ceramic with lead oxide contents under gamma irradiation. H. A. Colorado, C. Hiel and H. T. Hahn, J. M. Yang, J. Pleitt, C. H. Castano. The Minerals, Metals & Materials Society (TMS) **2011**-140th Annual Meeting

& Exhibition, San Diego-CA, USA. Abstract published (CD only). February 27 - March 3, **2011**.

- **Oral Presentation:** Internet Accessible Hot Cell with Gamma Spectroscopy at the Missouri S&T Nuclear Reactor. E. J. Grant, G. Mueller, C. H. Castaño, S. Usman, and A. Kumar. **2010** ANS Winter Meeting and Nuclear Technology Expo. Nov. 7-11, Las Vegas, Nevada, **2011**.
- **Poster:** *Missouri S&T Research Initiatives*. C. H. Castaño, J. Rojas, C. Posada. Workshop on the Role of Synchrotron Radiation in Solving Scientific Challenges in Advanced Nuclear Energy Systems. Advanced Photon Source. Argonne National Lab. January 27-28, **2010**.
- **Oral Presentation:** Breakdown Issues in Antenna Structures used in Fusion Research John Caughman, Wally Baity, David Rasmussen, Maro Aghazarian, Carlos H. Castano, David Ruzic, Nicholas Roe. Workshop on Unipolar Arcs. Argonne National Lab. January 29, **2010**.
- **Poster:** *Irradiated Materials – Missouri S&T*. C. H. Castano, C. Posada. Users Week **2009**. Advanced Test Reactor. National Scientific User Facility. Idaho National Lab. June 1-5, **2009**.
- **Poster:** *Heavily Shielded Hot Cell at Missouri S&T*. Carlos H. Castaño, Edwin J. Grant, Jeffrey C. King, Arvind S. Kumar, Gary E. Mueller, and Shoaib Usman. Poster University of Missouri Energy Summit. April 22-28, **2009**.
- **Poster:** *Hydrogen Accumulation Inside Single-Walled Carbon Nanotubes Encapsulated in a Pd Matrix*. Carlos H. Castaño G., A.G. Lipson, B.F. Lyakhov, E.I. Saunin, and A.Yu. Tsvivadze. Poster APS March Meeting, New Orleans, LA. March **2008**.
- **Poster:** *Ionic Debris Assessment of Various EUVL Systems*. C. H. Castano, D. N. Ruzic, S. N. Srivastava, K. C. Thompson, J. Sporre. Conference Proceedings Paper. Emerging Lithographic Technologies XII. SPIE V. 6921. March **2008**.
- **Poster:** Progress in development of a low energy reaction cell for distributed power applications Miley, G.H.; Castano, C.; Lipson, A.; Kim, S.O.; Luo, N. Tenth International Conference on Nuclear Engineering, **2002**, p 7
- **Poster:** Progress in development of a low energy reaction cell for distributed power applications. Miley, G.H.; Castano, C.; Lipson, A.; Kim, S.O.; Luo, N. International Conference on Nuclear Engineering, Proceedings, ICONE, v 4, **2002**, p 31-37.

- **Poster:** Advances in thin-film proton-reaction cell experiments. Miley, G.H.; Selvaggi, G.; Tate, A.; Castano, C. Source: Transactions of the American Nuclear Society, v 83, **2000**, p 378

RESEARCH GRANTS (PI, CoPI)

- Facility Integration for the Synthesis and testing of Radio-Nano-Isotopes At Missouri S&T. Innovation at Missouri S&T (<http://innovate.mst.edu>). Oct 7, **2016-2017**. \$19,000.
- GAANN – CFDA 84.200a. Interdisciplinary Program in Graduate Engineering Education for Advancing Emerging Technologies Toward US Energy Security. As Co-Pi (15%). Pi: Samuel Frimpong. August 1, **2015** – July 31, **2018**. \$922,744.
- Missouri Research Board. Development of a Nuclear Barcode for Tagging Explosives. PI Dr. Catherine Johnson. \$55,793. **2015-2017**.
- Nuclear Regulatory Commission. Faculty Development Grant. NRC-HQ-13-G-38-0008. Start Date: 8/1/**2013-2016**. Grant funding one junior faculty in nuclear engineering. Total Funding: \$345,559. CoPI.
- NRC Grant NRC-HQ-12-G-38-0075. Laboratory on Corrosion of Nuclear Materials towards Understanding Ageing Mitigation in Light Water Reactors. August 31, **2012** – August 31, **2014**. \$194,447. PI (70%).
- NRC Grant NRC-38-10-966. Creation of a Radiochemistry Teaching Program in Nuclear Engineering at Missouri S&T. July 1, **2010** – June 30, **2012**. \$125,000. PI (50%).
- DOE NEUP General Scientific Infrastructure Support. Nuclear Infrastructure Upgrade to Enhance Research & Teaching Capabilities at Missouri S&T. CoPI (15%). PI – Dr. Usman. \$300,000.
- Nanotubes Adorned with Transition Metals. Missouri Research Board. **2010**. \$30,000
- A Simulation Study of a New Flat-Panel X-Ray Source. University of Missouri Research Board. **2010**. \$33,000. Granted. CoPI (40%). PI: Dr. Lee.
- DoE-GNEP Readiness, Internet-Accessible Spectroscopy of Irradiated Specimens in a Heavily Shielded Cell at the UMR Reactor. \$99,987. Granted. (PI - Dr. Kumar)
- NRC Faculty Development Grant. Arvind Kumar (for Hyoung Lee and Carlos H. Castano). \$449,605. Granted. (PI - Dr. Kumar)
- NRC Faculty Development Grant. Arvind Kumar (for Ayodeji Alajo). \$412,230. Granted. (PI - Dr. Kumar)
- NRC Faculty Development Grant. Arvind Kumar (for Xin Liu). \$450,000. Granted. (PI - Dr. Kumar)
- NRC Faculty Development Grant. Arvind Kumar (for New Faculty Member). \$337,000.

Granted. (PI - Dr. Kumar)

- DOE - Active Heat Removal System for Continuous Operation of the Missouri S&T Reactor. A. Kumar, et al. U.S. Department of Energy. Idaho Operations Office. Reactor Upgrade. CFDA: 81.121. DE-FOA-0000322. \$314,260. Granted.(PI - Dr. Kumar)

COURSES TAUGHT

- NE 1105 – Nuclear Technology Applications
- NE 2105 – Introduction to Nuclear Engineering
- NE 3205 – Fundamentals of Nuclear Engineering
- NE 3377 – Radiochemistry and Nuclear Forensics
- NE-4000 – Special Problems
- NE 4099 – Undergraduate Research
- NE 4241 – Nuclear Materials I
- NE 4428 – Reactor Laboratory I
- NE 4438 – Reactor Laboratory II
- NE-4496 – Senior Design I
- NE-4497 – Senior Design II
- NE 4577 – Nuclear Forensics and Radiochemistry
- NE 5577 – Advanced Nuclear Forensics and Radiochemistry

TEACHING DEVELOPMENTAL ACTIVITIES

- Teaching and Learning Technology Conference. April 25, 2008. Havener Center.
- 2008 Freshman Faculty Program. Ron Bienek.
- 2008-2009 - New Faculty Teaching Scholars (NFTS) Program. Ron Bienek.
- 5th Annual Missouri S&T Undergraduate Research Conference. April 8, 2009.
- Since 2009 LEAD Sessions for all courses.
- 2008-2015 Regular use of Clicker (assessment of understanding).
- 2015 to present – Use of Socrative as an inexpensive better alternative to clickers.
- 2009 & 2010 Accent Modification Program. Vicki Hopgood, MA-CCC. Speech Pathologist (Including class observation 02-03-09).
- Missouri S&T Symposium on Service Learning. September 29, 2015.
- 2015 Curators’ Teaching Summit: “Using Student Feedback to Enhance Teaching”
Center for Educational Research and Teaching Innovation (CERTI). Missouri S&T. Oct.
Castaño Giraldo CV-14

14, 2015.

- 2018. Landing and visit to the John C Stennis CVN74 Nimitz Class Nuclear Aircraft Carrier.
- 2020 CAFE Academic Dishonesty seminar. Missouri S&T
- 2020 CINR Webinar. NEUP Idaho National Lab.
- 2020 Working with Industry Seminar. Missouri S&T

DEPARTMENTAL, UNIVERSITY, AND SERVICE

- 2020-Present Department Mental Well-Being Champions for the Nuclear Engineering and Radiation Science Department.
- 2018-Present Serve in the **Tuition and Residence Committee** in charge of reviewing student petitions for being considered a resident in the State of Missouri, at S&T.
- 2012-Present Habitat for Humanity **Faculty Advisor**. Missouri S&T.
- 2014-2015 Chair of the Selection Committee for the Nuclear Position Best in Class for the Materials under Extreme Environments. Selecting the 8th Faculty Member for Nuclear Engineering.
- 2009-Present Serve as **Radiation Health and Safety** Committee Member.
- 2008-Present Serve in the Faculty Recruitment and Retention Committee (previously known as FUMFRR).
- 2008-Present Help with recurring **recruitment activities** (prospective students, miner days, open houses, Jackling, miner days, summer camp coordination, tours to visitors, visiting families, etc).
- 2008-Present **Newstron** Contribution (Internal Newspaper)
- 2008-Present Active participation in the **Development Boards** for the Nuclear Engineering program.
- 2008-Present Serve in the **thesis committee** for Aaron Craft, Melissa Teague, Vaibhav Khane, Amol Patil, Edwin Grant, Jing Hu, Warner Meeks, Avaachat Aashiesh, Aaron Peterson, Vaibhav Sinha, Frank Strantz, Lifeng Wang, Susan Sipaun, Brandon Lahman, Ryan Pahl, Warner Meeks, Lucas Tucker, Bradley Richardson, Jason Pleitt, Jing Hu, Kelly Obrien, Lifeng Wang, Vivek Rao, Warner Meeks, Aashiesh Avaachat, Aaron Peterson, Lauren Garrison, Maria Camila Garcia Toro, Ryan

Pahl, Ahmed Haidyrah, Athanas Mutiso, Kirby Compton, Raul Florez, Safwan Jaradat, Shannon Stacy, Ben Prewit, James Nicholas, James Seaman, Lucas Tucker, Matt Paliwoda, Neven Ali, Rami Saaed, Matt Glascock, Chandler Mills, and Meshari Alqahtani.

- 2008-Present **Recommendation letters** for undergraduate and graduate students for internships, developmental activities, and job opportunities.
- 2008-Present **Advising of graduate students** (Chrystian Posada, PhD; Jessika Rojas, PhD; Brad Richardson, MS; Jason Pleitt, MS; Ahmed Haidyrah, PhD, Maria Camila Garcia Toro, MS, Lewis Rauschelbach, PhD).
- 2015-Present Serve in the Chancellor Committee for Diversity and Inclusion.
- 2009-Present **Mentoring** of junior faculty.
- 2017 Serve in committee to hire 2 new faculty members as part of the BIC program Materials under Extreme Environments for the Materials Department.
- 2015-2016 Serve in the College Faculty Workload Ad Hoc Committee, to determine unified workload rules in the College of Engineering and Computing.
- 2015 Chair committee to hire Dr. Joseph Graham as part of the BIC program Materials under Extreme Environments at S&T.
- 2015 Help moderate “Religious Freedom”—1st “Let’s Talk” of the year, and open forum on diversity and inclusion. October 19th. St Pat’s A. Havener Center.
- 2013-2015 **Board of Directors** for Habitat for Humanity, Phelps County Chapter.
- 2008-2015 ANS – American Nuclear Society **Faculty Advisor**. Missouri S&T.
- 2014 Invited contribution to Energy Today. Local NPR Radio Station. Commentaries on the public fear to nuclear spent fuel and nuclear waste.
- 2014 Served in **Panel** for Pandora’s Promise a Missouri S&T Screening and Panel Discussion. Oct 23, 2014. Leach Theater.
- 2008, 2014 **ABET Self-Study Report** Preparation. Nuclear Engineering Program Missouri S&T.
- 2009-2013 Serve in **faculty search committees** that hired Dr. Hyung Lee, Dr. Ayodeji Alajo, Dr. Xin Liu, and currently hiring a replacement position for Dr. Arvind Kumar.

- 2011 **Session Chair TMS-2011 (replacement):** Challenges in Mechanical Performances of Materials in Next Generation Nuclear Power Plants: Session II. Thursday March 3, 2011. Room 5A. San Diego Convention Center (Co-Chair: Laura Carroll, Idaho National Laboratory).
- 2009-2011 Serve in the **Scholarship Grant Committee** to assign NRC scholarships.
- 2008-2011 WiN– Women in Nuclear **Faculty Advisor**. Missouri S&T.
- 2008-2011 **Space Survey Representative** for Nuclear Engineering Department. Missouri S&T. FAST (Facilities and Space Tracking) is used to gather “A-21” data to report Indirect Cost codes, Space Function codes, or Room Utilization codes.
- 2009 Served in the workshop: consensus for the creation of “**Plan D for Spent Nuclear Fuel**”. Workshop March 16, 2009 at the University of Illinois Urbana Champaign.
- 2009 Transfer Advisor.
- 2009 **Advise OURE** candidates Ryan Wohldmann, Mitchell Smith, Dan Watson, Steven Wessels, Monica Gehrig, and Eric Carlson.
- 2009 Serve as **NRC Scholarship and fellowship evaluator** (National)
- 2008 **Judge:** 4th Annual Undergraduate Research Conference. April 9, 2008. Missouri S&T. Havener Center.
- 2008 **Judge:** Graduate Research Showcase. Council of Graduate Students, Campus.04-14-2008. Missouri S&T. Havener Center.
- 2008 Design and Creation of **Coursework Flow Diagram** for the Nuclear Engineering Program.

PROFESSIONAL SOCIETY INVOLVEMENT

- Faculty Advisor, Habitat for Humanity (HFH), Rolla Chapter.
- Alpha Nu Sigma, Nuclear Engineering Honor Society
- Neutron Scattering Society of America, NSSA.

OTHER DEVELOPMENTAL ACTIVITIES

- **Maneuver Support Science and Technology Conference and Exhibition.** Fort Leonard Wood, MO. 28 – 30 July **2008**.
- **ANS Winter Meeting.** November 9-13, **2008**. Reno, NV.

- **US-NRC Grant Workshop.** September 24, **2009** Dallas, TX.
- **National Science Foundation (NSF) Day Workshop.** Southeast Missouri State University, Cape Girardeau. October 20, **2009**.
- **Spallation Neutron Source (SNS) at Oak Ridge National Laboratory (ORNL).** Visit with Alumni, and Nuclear Engineering Faculty at the Nuclear Engineering Department at the University of Tennessee Knoxville. S. Usman, H. Lee, C. H. Castaño. May 29 – June 6, **2010**.
- **DOE 2011 NEUP Workshop.** July 27-28, **2010**. Rockville, MD
- **Innovative Materials Immune to Radiation (by Invitation).** August 22-26, **2010**. Vail, Colorado, USA.
- **Argonne National Laboratory (ANL) Center for Nanoscale Materials.** Visit in support of joint ANL – Missouri S&T proposal on a new X-Ray Source. C. H. Castano, H. Lee, C. Posada, E. Grant. Feb. 3-4, **2011**. Host: Dr. Daniel Lopez, Group Leader of the Nanofabrication and Devices Group.
- **Curators' Teaching Summit: Enhancing Teaching through Student Feedback.** Center for Educational Research and Teaching Innovation (CERTI). Date: Oct. 14, **2015**.
Contact Hours: 1.5

POSTER/PAPER AWARDS

- 2011 Best Poster Award. 5th place.** Nanofrontiers, Missouri State University, October 26, **2011**.
- 2012 Top 25 Hottest Articles Radiation Physics and Chemistry October to December 2011.**
“13. Production of palladium nanoparticles supported on multiwalled carbon nanotubes by gamma irradiation Radiation Physics and Chemistry, Volume 81, Issue 1, January **2012**, Pages 16-21. Rojas, J.V.; Castano, C.H”. Top 25 is a free service which provides lists of most read articles - counted by article downloads on SciVerseScienceDirect.
- 2012 Best Poster Award. 2nd Place.** Graduate Research Showcase (Chrystian Posada). Council of Graduate Students (CGS). Missouri University of Science and Technology. Simulation and prototype fabrication of the electron source for a flat panel X-ray source. April 12, **2012**.

2012 Best Poster Award. 3rd Place. Graduate Research Showcase (Edwin Grant). Council of Graduate Students (CGS). Missouri University of Science and Technology. Monte Carlo Simulations of a Flat-Panel Micro X-ray Source. April 12, **2012**.

2014 Best Poster Award. 1st Place. Graduate Research Showcase (Jessika Rojas). Council of Graduate Students (CGS). Missouri University of Science and Technology. Nanoparticle Production with Radiation. April 22, **2014**.