**Curriculum Vitae**

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# NARRATIVE SUMMARY

**Research**

Prof. Motta is one the world’s leading experts on nuclear fuel, having contributed extensively to developing greater knowledge of the degradation mechanisms of the nuclear fuel cladding while in the reactor, both in normal operation and in accident conditions. His work has helped pave the way for the safe and economical operation of nuclear fuel (even at increasingly harsher operational duties), by increasing the mechanistic understanding of the degradation mechanisms undergone by the reactor and fuel material components during service.

Over the last 28 years. Prof. Motta and his group have performed fundamental research to the understanding of degradation mechanisms of nuclear fuel cladding, including radiation damage, corrosion and hydriding. He is a leader in developing state-of-the-art characterization techniques, pioneering the use of microbeam synchrotron radiation diffraction and fluorescence to examine oxide layers, cold neutron prompt gamma activation analysis to measure hydrogen uptake and extensive use of in-situ experiments. He also been co-responsible for developing new mechanical testing procedures, which are now widely used worldwide and for the development of analytical models to explain such phenomena. His research has resulted in over 150 publications, many of which are frequently cited, and in numerous invited talks and presentations.

**Teaching**

Prof. Motta has contributed to nuclear engineering education with teaching, advising and mentoring. He has graduated over 35 graduate students, who are now researchers in the nuclear laboratories in the US and abroad. He is currently advising four PhD students, and four MSc students as well as mentoring a postdoctoral researcher. Throughout his career he has been asked to participate in nine PhD juries internationally, in France, Sweden and Switzerland. Seven of his former students are now university professors in their own right (four in the US - at Duke University, Georgia Tech, North Carolina State University and University of Wisconsin, two in Brazil, one in Federal University of Ceará, another in Pontifical Catholic University -RS in Brazil and one in Taiwan).

In collaboration with Donald Olander, over the last decade he has written the textbook *“Light Water Reactor Materials*”, describing the broad fundamentals of this important sub-discipline of nuclear engineering. The book is devoted entirely to materials problems in the core of light-water reactors, from the pressure vessel into the fuel. The book will be published in two volumes, the first on the fundamentals (mechanical properties, crystallography, thermal performance, radiation damage, etc.) has been published and the second on applications (hardening, embrittlement, stress-corrosion cracking, creep, growth, etc.) will follow soon. He has also written several review works on corrosion, hydriding and overall cladding behavior in the reactor environment and a reference book chapter on Zr alloy, which has been widely cited.

He has taught various courses at the undergraduate and graduate levels at Penn State, including Introdction to Nuclear Engineering, Radioactive Waste Disposal, Nuclear Materials, Environmental Degradation of Materials in Nuclear Power Plants and Science Technology and Society.

**Service**

Prof. Motta has been active in the nuclear engineering profession, currently holding the position of Graduate Chair of Nuclear Engineering at Penn State. He was previously Porgram Chair of Nuclear Engineering. He was Chair of the Nuclear Engineering Department Heads Organization (NEDHO) in 2018-2019 and is a member of the Executive Committee.

He has participated in various international and national committees related to nuclear power and helped organize several international conferences and symposia. In particular he served as Chair of the “Nuclear Power: Back on the Table” Symposium in 2009 at University Park. He was the Editorial Chair for the 18th International ASTM Symposium on Zr in the Nuclear Industry, 2016, in Hilton Head South Carolina and the General Chair for the 19th International ASTM Symposium on Zr in the Nuclear Industry, Manchester, England, 2019. He served on a National Academy of Sciences Committee on “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants” from 2012-2016. He has been Associate Editor of the Journal of ASTM International and is on the Editorial Board of Journal of Nuclear Materials and Nuclear Engineering and Technology. His service at Penn State has been extensive, both to the Department of Nuclear Engineering and the College of Engineering and to the University.

**Recognition**

Prof. Motta was elected a Fellow of the American Nuclear Society in 2014, and in 2015 he received the Mishima Award for outstanding contributions in research and development work on nuclear fuel and materials. In 2016 he was awarded the ASTM William J. Kroll Medal for sustained impactful contributions to zirconium metallurgy. He has received the Outstanding Service Award from the Penn State Engineering Alumni Society in 2001, and was given the Outstanding Research Award from the Penn State Engineering Alumni Society in 2010. Several of his students have received best paper, thesis and poster awards.

# ACADEMIC RANK

Professor of Nuclear Engineering and Materials Science and Engineering.

# RESEARCH INTERESTS

Phyical processes of radiation damage and material modification under irradiation; mechanisms of corrosion and hydrogen pickup during service; transmission electron microscopy and microbeam synchrotron radiation diffraction and fluorescence; special emphasis on zirconium alloys.

# EDUCATION

B.Sc. (1980) Mechanical Engineering (with specialty in Nuclear Engineering), Federal University of Rio de Janeiro, Brazil.

M.Sc. (1983) Nuclear Engineering, COPPE/Federal University of Rio de Janeiro, Brazil, “Análise Bi-dimensional do Fenômeno do Remolhamento.” (advisor Luiz Fernando Seixas de Oliveira)

Ph.D. (1988) Nuclear Engineering, University of California, Berkeley, CA, “Crystalline-Amorphous Transformation of Intermetallic Precipitates in Zircaloy Under Irradiation.” (advisor Donald R. Olander)

# WORK EXPERIENCE

2019-present – Graduate Program Chair of Nuclear Engineering.

2010-2019 - Chair of the Nuclear Engineering Program, Penn State University.

2003 - Visiting Scientist at the Service for Applied Metallurgy Research (SRMA), CEA/Centre d’Etudes Nucleaires de Saclay, France.

2003-present – Professor of Nuclear Engineering and Materials Science and Engineering at Penn State University, University Park, PA. 1998-2003 – Associate Professor of Nuclear Engineering and Materials Science and Engineering (2002) at Penn State University, University Park, PA. 1992-1998 – Assistant Professor of Nuclear Engineering, University Park, PA.

1991-1992 - Post-Doctoral Fellow at the AECL/Reactor Materials Division Research Branch, Chalk River Nuclear Laboratory, Chalk River, Ontario, Canada.

1989-1991 - Research Fellow at the Service for Fuel Behavior Studies at the CEA/Centre d'Etudes Nucléaires de Grenoble, Grenoble, France.

1989 - Post-Doctoral Researcher at the Materials and Chemical Sciences Division at the Lawrence Berkeley Laboratory, Berkeley, CA.

1983-1988 - Research Assistant in Nuclear Engineering, Department of Nuclear Engineerting, University of California Berkeley.

# HONORS AND AWARDS

2023 Honorary Foreign Scientist Member, French Metallurgical Society <https://sf2m.fr/medailles/01-membre-dhonneur/>

2022 ASTM Schemel Award, Zirconium in the Nuclear Industry, Manchester, UK.

2019 Distinguished Technical Lecturer, Department of Nuclear Engineering, North Carolina State University. “Hydrogen in Nuclear Fuel Cladding”

2016 ASTM William J. Kroll Medal for sustained impactful contributions to zirconium metallurgy including corrosion, hydriding, mechanical properties and irradiation effects.

2016 “Leaders in Engineering Lecture.” “Corrosion and Hydrogen in Zirconium Alloy Fuel Cladding”, Rensselaer Polytechnic Institute.

2015 Mishima Award, American Nuclear Society, for outstanding contributions in research and development work on nuclear fuel and materials.

2014 Fellow of the American Nuclear Society, for sustained contributions to the mechanistic understanding of the behavior of materials in a nuclear reactor, in the areas of radiation damage, corrosion, hydriding and mechanical testing.

2012 ANS Materials Science and Technology Division Literary Award for paper “Oxidation behavior of ferritic–martensitic and ODS steels in supercritical water,” J. B. Bischoff, and A.T. Motta, Journal of Nuclear Materials. 424, (2012), 261.

2012 Outstanding Research Award, Penn State Engineering Alumni Society.

2010 Outstanding Achievement Award, Materials Science and Technology Division (MSTD) of the American Nuclear Society (ANS) for pioneering work on oxidation of zirconium alloys including the use of synchrotron x-rays.

2001 Outstanding Advising Award, Penn State Engineering Society, College of Engineering.

1999 Department Head’s Outstanding Faculty Member Award, Department of Mechanical and Nuclear Engineering, Penn State.

# SCIENTIFIC PRODUCTION SUMMARY

Advisor for 24 PhD students and 28 M.Sc Students. Seven former advisees are currently University Professors.

138 Peer Reviewed Publications, 60 Peer Reviewed Conference Papers, 3 Book Chapters, 1 Textbok (2 volumes).

Google Scholar h-index=46, i-10 index: 116, 8795citations

# TEXTBOOK

“Light Water Reactor Materials” D.R.Olander and A.T.Motta, ANS, textbook on nuclear materials published by American Nuclear Society, Vol I, 2017, vol II 2021.

# Ph.D. STUDENTS ADVISED

1. Kang, S. “ Hydrogen Migration and Mechanical Behavior of Hydrided Zirconium Alloys”, Ph.D. in Nuclear Engineering 2023, now at Oak Ridge National Laboratory.
2. Passelaigue, F. “Hydride Nucleation-Growth-Dissolution Model: Improvements and Implementation” Ph.D. in Nuclear Engineering 2021, now in France.
3. Ayanoglu, M., " Microstructural evolution of 21Cr32Ni model alloy under heavy ion irradiation as a surrogate for reactor irradiation”, Ph.D. in Nuclear Engineering 2021, now at Oak Ridge National Laboratory.
4. Simon, P.-C. (Co-Advisor), Ph.D, " Phase Field Modeling and Quantification of Hydride Morphology”, 2021, Ph.D. in Nuclear Engineering , now at Idaho National Laboratory.
5. Lacroix, E. (Advisor), Ph.D in Nuclear Engineering, "Modeling Zirconium Hydride Precipitation and Dissolution in Zirconium Alloys." 2019, now working at Oklo, Ca.
6. Alat, E. (Co-Advisor), Ph.D in Materials, "Characterization of Ceramic Coatings for Nuclear Fuel Cladding." 2018, now working at INTEL Corporation, WA.
7. Adytha Shivprasad, “The role of nickel in hydrogen pick-up during in-reactor corrosion of zirconium alloys”, Ph.D. thesis in Nuclear Engineering, Penn State University, 2017.
8. Brendan M. Ensor, “On the Nature of Breakaway Corrosion in Zirconium Alloys”, Ph.D. thesis in Nuclear Engineering, Penn State University, 2016, now at Knolls Atomic Power Laboratory, NY.
9. Mahmut N. Cinbiz, “The Effect of Stress State on Zirconium Hydride Reorientation”, Ph.D. thesis in Nuclear Engineering, Penn State University, 2015, now at Idaho National Laboratory.
10. Adrien Couet, "Hydrogen Pickup Mechanisms of Zirconium Alloys," Ph.D. thesis in Nuclear Engineering, Penn State University, 2014, Assistant Professor of Engineering Physics, University of Wisconsin-Madison, WI.
11. Cem Topbasi, "Microstructural Evolution of Ferritic-martensitic Steels Under Heavy Ion Irradiation," Ph.D. thesis in Materials Science and Engineering, Penn State University, 2014, now at Electric Power Research Institute, Palo Alto, CA.
12. Christopher J. Ulmer, “Radiation Damage in Zirconium Carbide”, PhD thesis in Nuclear Engineering, Penn State University, 2013, Post-doctoral Fellow at Penn State.
13. Kimberly Colas, "Fundamental Experiments on hydride Reorientation in Zircaloy," Ph.D. thesis in Nuclear Engineering, The Pennsylvania State University, 2012, at the Commissariat a l’Energie Atomique, Saclay, France.
14. Jeremy Bischoff, "Oxidation Behavior of Ferritic- Martensitic and ODS Steel in Supercritical Water," Ph.D. thesis in Nuclear Engineering, Penn State University, 2011, now at Framatome, Lyon, France.
15. Patrick Raynaud, "Crack Growth Through the Thickness of Thin-Sheet Hydrided Zircaloy-4," Ph.D. thesis in Materials Science, Penn State University, 2009, now at the Nuclear Regulatory Commission, Washington DC.
16. Robert S. Daum, "Hydride Induced Embrittlement of Zircaloy-4 Under Plane Strain Tension Testing," PhD thesis in Materials Science, Penn State University, 2007, now at Electric Power Research Institute, Charlotte NC.
17. Hansang Kim, "A Study for Modeling Electrochemistry in Light Water Reactors," Ph.D. thesis in Nuclear Engineering, Penn State University, 2007, at KAERI, South Korea.
18. Djamel Kaoumi, "Microstructural Evolution of Metallic Nanocrystalline Thin Films under Ion Irradiation," Ph.D. thesis in Nuclear Engineering, Penn State University, 2007, Associate Professor of Nuclear Engineering at North Carolina State University, NC.
19. Marcelo Silva, "Influence of Oxide Microstructure on Corrosion Behavior of Zirconium Based Model Alloys," Ph.D. thesis in Nuclear Engineering, Penn State, 2007, Professor of Metallurgical Engineering, Universidade Federal do Ceará, Brazil.
20. Aylin Yilmazbayhan, "Microstructural Basis of Uniform Corrosion in Zr Alloys," Ph.D. thesis in Nuclear Engineering, Penn State University, 2004, now at Electric Power Research Institute, Palo Alto, CA.
21. Stephen E. Cumblidge, "Neutron-Irradiated Model alloys and pressure-vessel steels studied using positron spectroscopy," Ph.D. thesis in Nuclear Engineering, Penn State University 2002, now at Pacific Northwest Laboratory, WA.
22. Cássio S. Moura, “Simulation of Zr-Ni Intermetallic Compounds,” PhD thesis in Physics, Federal University of Rio Grande do Sul, Brazil, 2002, Professor of Physics, at Pontificia Universidade Catolica-RS, Brazil.
23. Jun Kwon, "The Effect of Irradiation on Stress Corrosion Cracking," Ph.D. thesis in Nuclear Engineering, Penn State University, 1999, Researcher at KAERI, South Korea.
24. Tsuang-Kang Yeh, “The viability of hydrogen water chemistry for mitigating stress corrosion cracking in boiling water reactor heat transport circuits”, Ph.D. thesis in Nuclear Engineering, Penn State University,1994, Professor at National Tsing-Hua University Taiwan.

**PARTICIPATION IN INTERNATIONAL PhD THESES**

1. Member of Jury Reviewer (Rapporteur), Aaron Coldeweih, “Characterization of Delayed Hydride Cracking in Irradiated and Un irradiated Zircaloy 2 Cladding”, PhD Thesis Paul Schjerrer Institute, Switzerland, 2022.
2. President of Thesis Jury, Institut National des Sciences Appliquées (INSA) - Lyon, Thomas Jaillin, «Étude expérimentale et modélisation du comportement d’un tube de gainage lors d’un accident de réactivité enphase post-crise ébullition», Lyon, France, 2020.
3. Member of Jury Reviewer (Rapporteur), Florian Haurais, Evaluating the contribution of the oxidation phase on the hydrogen production from the reflooding during a Severe Nuclear Accident”, PhD Thesis Defense, Université Paris-Saclay, Paris, France, Nov 2016.
4. Member of Jury Habilitation pour Diriger des Recherches (HDR) at INSA-Lyon, Jean Desquines, Institut de Radioprotection et Sureté Nucléaire,. « Contribution à l’analyse de la rupture des composants mécaniques polycristallins », Cadarache France, January 2015.
5. President of the Thesis Jury, Arthur Hellouin de Menibus, "Formation de blisters d'hydrures et effet sur la rupture de gaines en Zircaloy-4 en conditions d'accident d'injection de réactivité", PhD Thesis Defense, Ecole de Mines de Paris, Paris, France, 2012.
6. Member of Jury and Main Reviewer (Rapporteur), Marie-Laure Lescoat, "Etude du comportement des nano-renforts des matériaux ODS sous irradiation", PhD Thesis Defense, Université de Lille, Paris, France, 2012.
7. Member of Jury for PhD Thesis Defense, Christian Proff, Institut National Polytechnique de Grenoble, France, “Aspects Microstructuraux de l'oxydation des alliages de Zr,” Paris, France, 2011.
8. PhD Thesis Committee, Matthew Kerr, “Mechanical Characterization of Zirconium Hydrides with High Energy X-Ray Diffraction: In the Bulk and at Stress Concentrations,” Queens’ University, Kingston, Canada, 2009.
9. Member of Jury and Main Reviewer (Rapporteur) Institut National des Sciences Appliquées (INSA) - Lyon, Vincent Busser, « Mécanismes d’endommagement de la couche d’oxyde des gaines de crayon de combustible en situation accidentelle de type RIA », Cadarache, France, 2009.
10. Member of Jury and Main Reviewer (Rapporteur), Ecole des Mines de Paris, France, Matthieu Le Saux, Ph.D.Thesis in Materials Science and Engineering, "Comportement et Rupture de Gaines en Zircaloy-4 Detendu Vierges, Hydrures ou Irradiees en Situation Accidentelle de Type RIA ", Paris, France, 2008
11. Principal Examiner (PhD Thesis opponent), Rosa Jerlerud, “Thermodynamic Database for Zr Alloys” KTH Royal Institute of Technology, Stockholm, Sweden, 2006.
12. President of the Jury for PhD Thesis, for Aude Racine, “Influence de l’Orientation des Hydrures sur les modes de deformation, endommagement et rupture dans le Zircaloy-4,” Ecole Polytechnique, Paris, France 2004.

# M.Sc. STUDENTS ADVISED

1. Akhtanova, G. (Advisor), M.Sc, "Nanoindentation Hardness Measurements of Ion irradiated 21Cr32Ni and 800H, Alloys"; Graduated with MSc in 2019, currently in Kazakhstan.
2. Passelaigue, F. (Advisor), M.Sc, "Hydrogen Migration and Hydride Precipitation in Zircaloy using BISON; Graduated from INP-Grenoble with Engineering Degree 2019.
3. Bowman, J. (Advisor), M.Sc, "Effect of Ion Irradiation on Corrosion of Zr Alloys." (January 15, 2017 - 2020).
4. C.Piotrowski, "Hydrogen Migration in Zirconium Alloys under a Temperature Gradient," M.Sc. thesis in Nuclear Engineering, Penn State University, 2014.
5. B. de Gabory, "TEM Examination of Oxides Formed on Zirconium Alloys," M.Sc. thesis in Nuclear Engineering, Penn State University, 2013.
6. O. Courty, "Hydrogen Distribution in Zircaloy under a Temperature Gradient: Modeling, Simulation and Experiments," M.Sc. thesis in Nuclear Engineering, Penn State University, 2013.
7. D. Spengler, "Evolution of the Oxide Microstructure and Oxide Induced residual strains during Waterside Corrosion of Zirconium Alloys " M.Sc. thesis in Nuclear Engineering, Penn State University, 2012.
8. A. Couet, "Hydrogen pick-up Behavior in Zirconium Alloys," M.Sc. thesis in Nuclear Engineering, The Pennsylvania State University, 2011.
9. A. Siwy, "Transmission Electron Microscopy of Oxides Formed on Generation IV Candidate Steel Alloys," M.Sc. thesis in Nuclear Engineering, Penn State University, 2008.
10. J. Kunkle, " Structure of Oxides Formed on Steels in Pb-Bi Environment," M.Sc. thesis in Nuclear Engineering, Penn State University, 2009.
11. K. Colas, "Kinetics of Zirconium hydride Precipitation and Reorientation Studied Using Synchrotron Radiation," M.Sc. thesis in Nuclear Eng, Penn State, 2009.
12. J. Bischoff, "Evolution of the Oxide Structure of Ferritic-Martensitic Steels Exposed to Supercritical Water," M.Sc. thesis in Nuclear Engineering, Penn State University, 2008.
13. M. E. Flanagan, "Effect of Hydrogen on Deformation Behavior of Zircaloy-4," M.Sc. thesis in Nuclear Engineering, Penn State University, 2008.
14. C.Tyree, " Study of Neutron-Irradiated Silicon Carbide Using Positron-Annihilation-Lifetime Spectroscopy," M.Sc. thesis in Nuclear Engineering, Penn State University, 2006.
15. P. Raynaud, "Fracture Toughness of Hydrided Zircaloy-4," thesis in Materials Science and Engineering, Penn State, University Park, 2005.
16. Glendening, "Influence of Hydride Blisters on the Failure of Zircaloy-4 under Equal Biaxial tension," M.Sc. thesis in Materials Science, Penn State University, 2004.
17. O. N. Pierron, "Influence of Hydride Blisters on Failure of Zircaloy-4 Sheet," M.Sc. thesis in Materials, Penn State University, University Park, 2002.
18. S. Jurgensmeier, "Rietveld Analysis of Synchrotron X-ray Diffraction of Second Phase Particles in Zr Alloys," M.Sc. thesis in Materials, Penn State University, 2002
19. O. Delaire, "Study of the Alloying element content in Zr alloys using synchrotron radiation microscopic x-ray fluorescence," M.Sc. thesis in Nuclear Engineering, Penn State University, 2001.
20. K. T. Erwin, "Study of Second Phase Particles in Zirconium Alloys using Synchrotron Radiation," M.Sc. thesis in Nuclear Engineering, Penn State University, University Park, PA, 2000.
21. D.W. Bates, "Influence of stress state and hydrogen on deformation and failure of Zircaloy-4," M. S. thesis in Department of Nuclear Engineering, The Pennsylvania State University, University Park, PA, 1998.
22. R. S. Daum, "Hydrogen-assisted failure of alloys X-750 and 625 under slow strain-rate conditions " M.Sc. thesis in Nuclear Engineering, Penn State University, 1998.
23. T. M. Link, "Failure of Zircaloy Cladding under Severe Loading Conditions," M.Sc. thesis in Materials, Penn State University, University Park, PA, 1997.
24. S. E. Cumblidge, "Examining Nuclear Reactor Pressure Vessel Embrittement Using Positron Annihilation Lifetime Spectroscopy," M.Sc. thesis in Nuclear Engineering, Penn State University, 1996.
25. L. Pagano, "Bubble Formation in Zirconium Based Alloys under Krypton Irradiation," M.Eng. thesis in Nuclear Engineering, Penn State University, 1996.
26. J. Faldowski, "the Kinetics of Irradiation Induced Amorphization of the Intermetallic Compounds ZrCr2, ZrFe2, and Zr3(FexNi1-x)," M.Sc. thesis in Nuclear Engineering, Penn State University, 1995.

Also advised 15 final Student Papers for M.Eng in Nuclear Engineering

# UNDERGRADUATE ADVISEES

1. Joshua May, « BISON Simulation of Hydrogen Redistribution», 2022
2. Caillon Frank, « Hydride Connectivity in Zircaloy », 2021
3. Aurelien Soulié, “Analyse quantitative de spectres EELs,” student from EC-Paris, 2014.
4. Marc Desormeaux, “Development of radiation damage during in-situ Kr++ irradiation of
5. FeNiCr model austenitic steels,” student from EC-Paris, 2015.
6. Kevin Cass, "Radiation Damage Calculations with SPECTER Code." Honors thesis (2015).
7. Jessica Gee, "An Investigation of the Effect of Tin on Zirconium Alloy Oxide Morphology." Honors thesis (2015).
8. Michael Pantano “Characterization of Zircaloy-4 Oxide Layers by Scanning Electron Microscopy”, Honors thesis (2012.
9. Claire Vaille, “Influence of Hydride on Accelerated Corrosion of Zircaloy 4”, EC-Paris Stage, (2008).
10. Jennifer Jarvis, “Hydride Reoprientation in Zirconium Alloy Nuclear Fuel Cladding studied using Synchrotron Radiation,” Honors thesis (2010).
11. Jake Planinsek, “Electron and Optical Microscopy of Oxide Layers in Zirconium Alloys,” Honors thesis (2011).
12. Michael Meholic, “The Influence of Hydrides on Crack Growth in Zirconium alloys for Nuclear Applications,” Honors thesis (2006) .

# JOURNAL PUBLICATIONS

**2023**

138. S. Kang, P.-H. Huang, V. Petrov, A. Manera, T. Ahn, B. Kammenzind, A.T. Motta, “Determination of the hydrogen heat of transport in Zircaloy-4”, Journal of Nuclear Materials, Volume 573 (2023) 154122, ISSN 0022-3115.

**2022**

137 X. Xu, Z. Yu, A.T. Motta, X. Wang, “Automated Analysis of Grain Growth Under in-situ Irradiation Using Convolutional Neural Network”, Microscopy and Microanalysis, 28(S1), 2036-2037. <https://doi:10.1017/S1431927622007899>.

136. J. Bowman, P. Wang, G.S. Was, M. Bachhav, A.T. Motta, “Ion irradiation induced amorphization of precipitates in Zircaloy”, Journal of Nuclear Materials, Volume 571 (2022) 153988, ISSN 0022-3115.

135. M. Ayanoglu, A.T. Motta, “Emulation of neutron-irradiated microstructure of austenitic 21Cr32Ni model alloy using dual-ion irradiation”, Journal of Nuclear Materials, Volume 570 (2022) 153944, ISSN 0022-3115.

134. F. Passelaigue, P.-C.A. Simon, A.T. Motta, “Predicting the hydride rim by improving the solubility limits in the Hydride Nucleation-Growth-Dissolution (HNGD) model”, Journal of Nuclear Materials, Volume 558 (2022) 153363, ISSN 0022-3115.

133. B. Ensor, A.T. Motta, A. Lucente, J.R. Seidensticker, J. Partezana, Z. Cai, “Investigation of breakaway corrosion observed during oxide growth in pure and low alloying element content Zr exposed in water at 360°C”, Journal of Nuclear Materials, Volume 558 (2022) 153358, ISSN 0022-3115.

132. Z. Yu, X. Xu, W.-Y. Chen, Y. Sharma, X. Wang, A. Chen, C.J. Ulmer, A.T. Motta, “In-situ irradiation-induced studies of grain growth kinetics of nanocrystalline $UO\_{2}$”, Acta Materialia, Volume 231 (2022) 117856.

131. S. Bin Seo, E. M. Duchnowski, A. T. Motta, B. F. Kammenzind, N. R. Brown, “Sensitivity analysis for characterizing the impact of HNGD model on the prediction of hydrogen redistribution in Zircaloy cladding using BISON code”, Nuclear Engineering and Design, Volume 393, 2022, 111813, ISSN 0029-5493, <https://doi.org/10.1016/j.nucengdes.2022.111813>.

**2021**

130. M. Ayanoglu, A.T. Motta, "Void shrinkage in 21Cr32Ni austenitic model alloy during in-situ ion irradiation", Journal of Nuclear Materials, Volume 543 (2021) 152636, ISSN 0022-3115.

129. Florian Passelaigue, Evrard Lacroix, Giovanni Pastore, Arthur T. Motta, "Implementation and Validation of the Hydride Nucleation-Growth-Dissolution (HNGD) model in BISON", Journal of Nuclear Materials, Volume 544 (2021) 152683, ISSN 0022-3115.

128. C.J. Ulmer, W-Y. Chen, D.E. Wolfe, A.T. Motta, "In-situ ion irradiation induced grain growth in nanocrystalline ceria", Journal of Nuclear Materials, Volume 545 (2021) 152688, ISSN 0022-3115.

127. Pierre-Clément A. Simon, Cailon Frank, Long-Qing Chen, Mark R. Daymond, Michael R. Tonks, Arthur T. Motta, "Quantifying the effect of hydride microstructure on zirconium alloys embrittlement using image analysis", Journal of Nuclear Materials, Volume 547 (2021) 152817, ISSN 0022-3115.

126. Seok Bin Seo, Edward Matthew Duchnowski, Miles O'Neal, Arthur T. Motta, Florian Passelaigue, Soyoung Kang, Giovanni Pastore, Annalisa Manera, Victor Petrov, Pei-Hsun Huang, Nicholas R. Brown, “Sensitivity analysis of BISON model for characterization of impact of experimental parameters on hydrogen migration and redistribution in zirconium-based alloys”, Journal of Nuclear Materials, Volume 550 (2021) 152941, ISSN 0022-3115.

125. M. Ayanoglu, C.J. Ulmer, A.T. Motta, ‘‘Characterization of in-situ ion irradiated Fe-21Cr-32Ni austenitic model alloy and alloy 800H at low doses’’, Journal of Nuclear Materials, Volume 555 (2021) 153149, ISSN 0022-3115.

124. E. Alat, J. Hu, D. E. Wolfe, and A. T. Motta, “Corrosion and Ion Irradiation Behavior of Ceramic-Coated Nuclear Fuel Cladding,” in *Zirconium in the Nuclear Industry: 19th International Symposium*, ASTM STP 1597 (2021), 149-171.

123. E. Lacroix, P.-C. A. Simon, A. T. Motta, and J. D. Almer, “Zirconium Hydride Precipitation and Dissolution Kinetics in Zirconium Alloys,” in *Zirconium in the Nuclear Industry: 19th International Symposium*, ASTM STP 1597 (2021), 67-91.

122. B. Ensor, G. Lucadamo, J. R. Seidensticker, R. Bajaj, Z. Cai and A. T. Motta, “Characterization of Long-Term, In-Reactor Zircaloy-4 Corrosion Coupons and the Impact of Flux, Fluence, and Temperature on Oxide Growth, Stress Development, Phase Formation, and Grain Size,” in *Zirconium in the Nuclear Industry: 19th International Symposium*, ASTM STP 1597 (2021), 588-619.

121. Peng Wang, Josh Bowman, Mukesh Bachhav, Bruce Kammenzind, Richard Smith, Jesse Carter, Arthur Motta, Evrard Lacroix, Gary Was, ‘‘Emulation of neutron damage with proton irradiation and its effects on microstructure and microchemistry of Zircaloy-4’’, Journal of Nuclear Materials, Volume 557 (2021) 153281, ISSN 0022-3115.

120. P.-C.A. Simon, Larry K. Aagesen, Andrea M. Jokisaari, Long-Qing Chen, Mark R. Daymond, Arthur T. Motta, Michael R. Tonks, ‘‘Investigation of δ zirconium hydride morphology in a single crystal using quantitative phase field simulations supported by experiments’’, Journal of Nuclear Materials, Volume 557 (2021) 153303, ISSN 0022-3115.

**2020**

119. P.C. A. Simon, L. K. Aagesen, A. T. Motta, M. R. Tonks "The effects of introducing elasticity using different interpolation schemes to the grand potential phase field model", Computational Materials Science, 183 (2020) 109790.

**2019**

118. T.W. Heo, K. B. Colas, A. T. Motta, L.-Q.Chen "A phase-field model for hydride formation in polycrystalline metals: Application to δ-hydride in zirconium alloys", Acta Materialia, 181 (2019) 262-277.

117. B.M. Ensor, D. J. Spengler, J. R. Seidensticker, R. Bajaj, Z. Cai, A. T. Motta "Microbeam synchrotron radiation diffraction and fluorescence of oxide layers formed on zirconium alloys at different corrosion temperatures", Journal of Nuclear Materials, 526 (2019) 151779.

116. A. T. Motta, L. Capolungo, L.-Q., M. Nedim Cinbiz, M. R. Daymond, D. A. Koss, E. Lacroix, G. Pastore, P.-C. A. Simon, M. R. Tonks, B. D. Wirth, Mohammed A. Zikry "Hydrogen in zirconium alloys: A review", Journal of Nuclear Materials, 518 (2019) 440-460.

115. E. Alat, M.J. Brova, I.M. Younker, A.T. Motta, M. Fratoni, D.E. Wolfe "Neutronic and mechanical evaluation of rare earth doped and undoped nitride-based coatings for accident tolerant fuels", Journal of Nuclear Materials, 518 (2019) 419-430.

**2018**

114. M. Ayanoglu, A.T. Motta "Microstructural evolution of the 21Cr32Ni model alloy under irradiation", Journal of Nuclear Materials, 510 (2018) 297-311.

113. D.G. Fobar, X. Xiao, M. Burger, S. Le Berre, A.T. Motta, I. Jovanovic "Robotic delivery of laser-induced breakdown spectroscopy for sensitive chlorine measurement in dry cask storage systems", Progress in Nuclear Energy, 109 (2018) 188–194.

112. E. Lacroix, A. T. Motta, J.D. Almer "Experimental determination of zirconium hydride precipitation and dissolution in zirconium alloy", Journal of Nuclear Materials, 509 (2018) 162-167.

111. X. Xiao, S. Le Berre, D.G. Fobar, M. Burger, P.J. Skrodzki, K.C. Hartig, A.T. Motta, and I. Jovanovic "Measurement of chlorine concentration on steel surfaces via fiber-optic laser-induced breakdown spectroscopy in double-pulse configuration", Spectrochimica Acta Part B 141 (2018) 44-52.

110. C. J. Ulmer, and A. T. Motta "Characterization of faulted dislocation loops and cavities in ion irradiated alloy 800H", Journal of Nuclear Materials 498 (2018) 458-467.

**2017**

109. M. Ayanoglu, A.T. Motta "In-situ study: Faulted loop and void behavior in single beam bulk irradiated Fe-21Cr-32Ni model alloy", Transactions of the American Nuclear Society, v 117, p 136-138, 2017, Transactions of the American Nuclear Society, ANS 2017.

108. I. Davis, O. Courty, M.N. Avramova, A.T. Motta "High-fidelity multi-physics coupling for determination of hydride distribution in Zr-4 cladding", Annals of Nuclear Energy, 110 (2017) 475–485.

107. M. J. Brova, E. Alat, M. A. Pauley, R. Sherbondy, A. T. Motta, D. E. Wolfe "Undoped and ytterbium-doped titanium aluminum nitride coatings for improved oxidation behavior of nuclear fuel cladding", Surface & Coatings Technology 331 (2017) 163-171.

106. B. Ensor, A.M. Lucente, M.J. Frederick, J. Sutliff, and A. T. Motta "The role of hydrogen in zirconium alloy corrosion", Journal of Nuclear Materials 496 (2017) 301-312.

105. C. J. Ulmer, and A. T. Motta "Modeling thermal spike driven reactions at low temperature and application to zirconium carbide radiation damage", Nuclear Instruments and Methods in Physics Research B 410 (2017) 200–206.

104. C.J. Lissenden, S. Choi, H. Cho, A. Motta, K. Hartig, X. Xiao, S. Le Berre, S. Brennan, K. Reichard, R. Leary, B. McNelly, and I. Jovanovic "Toward Robotic Inspection of Dry Storage Casks for Spent Nuclear Fuel", Journal of Pressure Vessel Technology, Vol 139, June 2017.

103. M. N. Cinbiz, D. A. Koss, A. T. Motta, J. -S. Park, and J. D. Almer "In situ synchrotron X-ray diffraction study of hydrides in Zircaloy-4 during thermomechanical cycling", Journal of Nuclear Materials, 487 (2017) 247-259.

102. X. Xiao, S. Le Berre, K.C. Hartig, A.T. Motta, and I. Jovanivoc "Surrogate Measurement of Chlorine Concentration on Steel Surfaces by Alkali Element Detection via Laser-Induced Breakdown Spectroscopy", Spectrochimica Acta Part B: Atomic Spectroscopy, 130 (2017) 67-74.

101. A. Couet, A. T.Motta, A. Ambard, D. Livigni, "In-situ electrochemical impedance spectroscopy measurements of zirconium alloy oxide conductivity: relationship to hydrogen pickup", Corrosion Science, 119 (2017) 1-13.

**2016**

100. M. S. Elbakhshwan, S. K. Gill, A.T. Motta, R. Weidner, T. Anderson, and L. E. Ecker, “Sample environment for in situ synchrotron corrosion studies of materials in extreme environments”, Review of Scientific Instruments, 2016, vol 87, 1-8.

99. Y.Dong, A. T. Motta, and E. A. Marquis, "Multi-scale Characterization of Oxidized Zirconium Alloys", Microsc. Microanal., 22 (Suppl 3), 2016.

98. E. Alat, A.T. Motta, R.J. Comstock, J.M. Partezana, and D.E. Wolfe "Multilayer (TiN, TiAlN) ceramic coatings for nuclear fuel cladding," Journal of Nuclear Materials, 478, (2016) 236-244.

97. M.N. Cinbiz, D.A. Koss, and A.T. Motta "The influence of stress state on the reorientation of hydrides in a zirconium alloy," Journal of Nuclear Materials, 477, (2016) 157-164.

96. M. Desormeaux, B. Rouxel, A.T. Motta, M. Kirk, C. Bisor, Y. de Carlan, and A. Legris "Development of radiation damage during in-situ Kr++ irradiation of Fe-Ni-Cr model austenitic steels," Journal of Nuclear Materials, 475, (2016) 156-167.

**2015**

95. A. Couet, A.T. Motta, and A. Ambard "The coupled current charge compensation model for zirconium alloy fuel cladding oxidation: I. Parabolic oxidation of zirconium alloys," Corrosion Science, 100, (2015) 73-84.

94. J-Y. Park, I-H. Kim, A.T. Motta, C.J. Ulmer, M.A. Kirk Jr., E.A. Ryan, and P.M. Baldo "Irradiation-induced disordering and amorphization of Al3Ti-based intermetallic compounds," Journal of Nuclear Materials, 467, (2015) 601-606.

93. E. Alat, A.T. Motta, R.J. Comstock, J.M. Partezana, and D.E. Wolfe, "Ceramic Coating for Corrosion (C3) Resistance of Nuclear Fuel Cladding," Surface & Coatings Technology, 281, (2015) 133-143.

92. C.J. Ulmer, A.T. Motta, and M.A. Kirk, "In situ ion irradiation of zirconium carbide," Journal of Nuclear Materials, 466, (2015) 606-614.

91. C. Topbasi, D. Kaoumi, A.T. Motta, and M.A. Kirk, “Microstructural Evolution in NF616 (P92) and Fe-9Cr-0.1C-model Alloy under Heavy Ion Irradiation”, Journal of Nuclear Materials, 466, (2015) 179-186.

90. A.T. Motta, A. Couet, and R. J. Comstock, “Corrosion of Zirconium Alloys for Nuclear Fuel Cladding”, Annual Review of Materials Research, 45, (2015) 311-343.

89. Y. Liu, I. Bhamji, P.J. Withers, D.E. Wolfe, A.T. Motta, and M. Preuss, "Evaluation of the interfacial shear strength and residual stress of TiAlN coating on ZIRLOTM fuel cladding using a modified shear-lag model approach," Journal of Nuclear Materials, 466, (2015), 718-727.

88. D.J. Spengler, A. T. Motta, R. Bajaj, J.R. Seidensticker and Z. Cai, "Characterization of Zircaloy-4 corrosion films using microbeam synchrotron radiation," Journal of Nuclear Materials, 464, (2015) 107-118.

87. B. de Gabory, Y. Dong, A.T. Motta, and E.A. Marquis, "EELS and atom probe tomography study of the evolution of the metal/oxide interface during zirconium alloy oxidation," Journal of Nuclear Materials, 462, (2015) 304-309.

86. T.R. Allen, D. Kaoumi, J.P. Wharry, Z. Jiao, C. Topbasi, A. Kohnert, L. Barnard, A. Certain, K.G. Field, G.S. Was, D.L. Morgan, A.T. Motta, B.D. Wirth, and Y. Yang, "Characterization of microstructure and property evolution in advanced cladding and duct: Materials exposed to high dose and elevated temperature," Journal of Materials Research, 30, (2015) 1246-1274.

85. O. Courty, A. T. Motta, C. J. Piotrowski, and J. D. Almer, "Hydride precipitation kinetics in Zircaloy-4 studied using synchrotron X-ray diffraction," Journal of Nuclear Materials, 461, (2015) 180-185.

84. B. de Gabory, A. T. Motta, and K. Wang, "Transmission electron microscopy characterization of Zircaloy-4 and ZIRLO oxide layers." Journal of Nuclear Materials, 456, (2015) 272-280.

**2014**

83. A. Couet, A. T. Motta, and R. J. Comstock, “Effect of Alloying Elements on Hydrogen Pickup in Zirconium Alloys,” Zirconium in the Nuclear Industry: 17th International Symposium, STP 1543, Robert Comstock and Pierre Barberis, Eds., ASTM International, West Conshohocken, PA 2014, pp. 479–509,

82. K. Colas, A. T. Motta, M. R. Daymond, and J. Almer, “Mechanisms of Hydride Reorientation in Zircaloy-4 Studied in Situ,” Zirconium in the Nuclear Industry: 17th International Symposium, STP 1543, Robert Comstock and Pierre Barberis, Eds., pp. 1107–1137, ASTM International, West Conshohocken, PA 2014.

81. A. Couet, A. T. Motta, B. de Gabory, and Z. Cai, "Microbeam X-ray Absorption Near-Edge Spectroscopy study of the oxidation of Fe and Nb in zirconium alloy oxide layers," Journal of Nuclear Materials, 452, (2014) 614-627.

80. A. Couet, A. T. Motta, and R. J. Comstock, "Hydrogen Pickup Measurements in Zirconium Alloys: Relation to Oxidation Kinetics," Journal of Nuclear Materials, 451, (2014) 1-13.

79. O. Courty, A. T. Motta, and J. D. Hales, "Modeling and simulation of hydrogen behavior in Zircaloy-4 fuel cladding," Journal of Nuclear Materials, 452, (2014) 311-320.

**2013**

78. J. Bischoff, A. T. Motta, C. Eichfeld, R. J. Comstock, G. Cao, and T. R. Allen, "Corrosion of ferritic-martensitic steels in steam and supercritical water," Journal of Nuclear Materials, 2013, 441, Issues 1–3, October 2013, 604-611.

77. Y. Dong, A. T. Motta, E. A. Marquis, "Atom probe tomography study of alloying element distributions in Zr alloys and their oxides", Journal of Nuclear Materials, 442, Issues 1–3, November 2013, Pages 270-281.

76. K. B. Colas, A. T. Motta, M. R. Daymond, J. D. Almer, “Effect of thermo-mechanical cycling on zirconium hydride reorientation studied in situ with synchrotron X-ray diffraction,” Journal of Nuclear Materials 440 (2013) 586-595.

**2012**

**75.** Motta, A. T. and Chen, L.-Q. "Hydride Formation in Zirconium Alloys," The Journal of The Minerals, Metals & Materials Society, 64, (2012) 1403-1408.

74. Bischoff, J. and A. T. Motta, "Oxidation behavior of ferritic-martensitic and ODS steels in supercritical water," Journal of Nuclear Materials 424, (2012) 261-276.

73. Raynaud, P. A., D. A. Koss, and A. T. Motta, "Crack growth in the through-thickness direction of hydrided thin-wall Zircaloy sheet," Journal of Nuclear Materials 420 (2012) 69-82.

72. Bischoff, J. and A. T. Motta, "EFTEM and EELS analysis of the oxide layer formed on HCM12A exposed to SCW," Journal of Nuclear Materials 430 (2012) 171-180.

71. Couet, A., A. T. Motta, R. J. Comstock, and R. L. Paul, "Cold neutron prompt gamma activation analysis, a non-destructive technique for hydrogen level assessment in zirconium alloys," Journal of Nuclear Materials 425 (2012) 211-217.

70. Topbasi, C., A. T. Motta, and M. Kirk, "In Situ Study of Heavy Ion Induced Radiation Damage in NF616 (P92) Alloy," Journal of Nuclear Materials 425 (2012) 48-53.

**2011**

69. Desquines, J., D. A. Koss, A. T. Motta, B. Cazalis, and M. Petit, "The issue of stress state during mechanical tests to assess cladding performance during a reactivity-initiated accident (RIA)," Journal of Nuclear Materials 412 (2011) 250-267.

68. Motta, A. T., “Waterside Corrosion in Zirconium Alloys,” Journal of Metals 63 (2011) 59-63.

67. Bisor-Melloul, C., M. Tupin, P. Bossis, J. Chene, J. L. Bechade, and A. Motta, “Understanding of Hydriding Mechanisms during Corrosion in PWR Simulated Conditions and Influence of Zirconium Hydrides on Corrosion,” Revue Génerale Nucléaire, 2011 (2) March-April, 111-116.

66. Colas, K. B., A. T. Motta, M. R. Daymond, M. Kerr, and J. D. Almer, “Hydride Platelet Reorientation in Zircaloy Studied with Synchrotron Radiation Diffraction,” Journal of ASTM International, Vol. 8, No. 1 (2011) paper ID JAI103033.

**2010**

65. Bischoff, J., A. T. Motta, X. Ren, and T. R. Allen, "Comparison of the oxide structure formed on 9CrODS and NF616 in Supercritical water," 14th International Conference on Environmental Degradation of Materials in Nuclear Power Systems-Water Reactors, Virginia Beach, 2009.

64. Colas, K. B., A. T. Motta, J. D. Almer, M. R. Daymond, M. Kerr, A. D. Banchik, P. Vizcaino, and J. R. Santisteban, "In situ study of hydride precipitation kinetics and re-orientation in Zircaloy using synchrotron radiation," Acta Materialia 58 (2010) 6575-6583.

**2009**

63. Bentley, J., D. T. Hoelzer, J. T. Busby, A. G. Certain, T. R. Allen, D. Kaoumi, A. T. Motta, amd M. A. Kirk, "TEM Characterization of Crept and Irradiated Nano-structured Ferritic Alloys," Microscopy and Microanalysis, Vol. 15, Issue S2 (2009) 1350.

62. Kirk, M. A., P. M. Baldo, A. C. Y. Liu, E. A. Ryan, R. C. Birtcher, Z. Yao, S. Xu, M. L. Jenkins, M. Hernandez-Mayoral, D. Kaoumi, and A. T. Motta, "In situ transmission

electron microscopy and ion irradiation of ferritic materials," Microscopy Research and Technique 72 (2009) 182-186.

61. Daum, R. S., Y. S. Chu, and A. T. Motta, “Identification and Quantification of hydride phases in Zircaloy-4 cladding using Synchrotron radiation Diffraction,” Journal of Nuclear Materials, 392 (3) (2009) 453-463.

60. Siwy, A. D., T. E. Clark, and A. T. Motta, “Transmission Electron Microscopy of oxide development on 9Cr ODS in Supercritical water,” Journal of Nuclear Materials, 392 (2009) 280–285.

59. Bischoff, J., A. T. Motta, and R. J. Comstock, “Evolution of the Oxide Structure of 9CrODS Exposed to Supercritical Water,” Journal of Nuclear Materials, 392 (2009) 272–279.

**2008**

58. Kaoumi, D., A. T. Motta, R. C. Birtcher, M. Kirk, and P. Baldo, "In Situ Studies of Phase Stability and Microstructure Evolution in Metal Alloys Under Ion Irradiation in the IVEM at ANL," In-Situ TEM-Ion Accelerator Techniques in the Study of Radiation Damage in Solids Workshop at the University of Salford, 2008.

57. Motta, A.T. and André Pineau, “Sommaire sur le RIA et Evaluation de la Strategie IRSN,” rapport, rédigé pour la Commission des Essais Globaux, le 4 février 2008.

56. Bischoff, J., A. T. Motta, L. Tan, and T. R. Allen, “Influence of Alloy Microstructure on Oxide Growth in HCM12A in Supercritical Water,” Materials Research Society (MRS) Proceedings Symposium R: Materials for Future Fusion and Fission Technologies, 2008, paper ID R # 519941.

55. Kaoumi, D., A. T. Motta, and R. C. Birtcher, “A Thermal Spike Model of Grain Growth under Irradiation,” Journal of Applied Physics, 104 (2008) 073525 (also October 20, 2008 issue of Virtual Journal of Nanoscale Science & Technology).

54. Kaoumi, D., A. T. Motta, and R. C. Birtcher, “Influence of alloying elements on grain-growth in Zr(Fe), and Cu(Fe) thin-films under in situ ion irradiation,” Journal of Nuclear Materials, 382, n 2-3, Dec 1, 2008, 184-189.

53. Motta, A. T., M. J. Gomes da Silva, A. Yilmazbayhan, R. J. Comstock, J. Ilavsky, Z. Cai, and B. Lai, “Microstructural Characterization of Oxides Formed on Model Zr Alloys Using Synchrotron Radiation,” Journal of ASTM International, 2008, vol. 5 no. 2, paper ID# JAI101257.

52. Raynaud, P. A., D. A. Koss, A. T. Motta, and K. S. Chan, “Fracture Toughness of Hydrided Zircaloy-4 Sheet Under Through-Thickness Crack Growth Conditions,” Journal of ASTM International, vol. 5 no. 1 (2008) paper ID# JAI101183.

**2007**

51. Kaoumi, D., A. T. Motta, and R. C. Birtcher, “Grain Growth in Nanocrystalline Metal Thin Films under In Situ Ion-Beam Irradiation,” Journal of ASTM International, vol 4 (8) 2007, paper ID # JAI100743.

50. Peng, Q., E. Gartner, J. T. Busby, A. T. Motta, and G. S. Was, “Corrosion Behavior of Model Zirconium Alloys in Deaerated Supercritical Water at 500ºC,” Corrosion, 63(6) (2007) 577-590.

49. A.T.Motta, A. Yilmazbayhan, M. Gomes da Silva, R. J. Comstock, G. S.Was, J. T. Busby, E. Gartner, Q. Peng, Y. H. Jeong, and J. Y. Park, “Zirconium Alloys for Supercritical Water Reactor Applications: Challenges and Possibilities,” Journal of Nuclear Materials, vol. 371 (1-3) (2007) 61-75.

**2006**

48. Yilmazbayhan, A., E. Breval, A. T. Motta, and R.J. Comstock, "Transmission Electron Microscopy Examination of Oxide Layers Formed in Zr Alloys," Journal of Nuclear Materials, vol. 349 (2006) 265-281.

**2005**

47. Kaoumi, D., A.T. Motta, and R. C. Birtcher, "Grain growth in Zr-Fe thin films during in situ ion irradiation in a TEM," Nuclear Instruments and Methods in Physics Research B, vol. 242 (2005) 490-493.

46. Olander, D. R. and A. T. Motta, "A New Book: Light Water Reactor Materials," Nuclear Engineering and Technology, vol. 37 (2005) 309-3316.

45. Motta, A. T., A. Yilmazbayhan, R. J. Comstock, J. Partezana, S. G.P., Z. Cai., and B. Lai, "Microstructure and Growth Mechanism of Oxide Layers Formed in Zr Alloys Studied with Micro Beam Synchrotron Radiation," Journal of ASTM International, vol. 2 (2005) Paper # JAI 12375.

44. Glendening, A., D. A. Koss, O. N. Pierron, A. T. Motta, and R. S. Daum, "Failure of Hydrided Zircaloy-4 Under Equal-Biaxial and Plane-Strain Tensile Deformation," Journal of ASTM International, vol. 2 (2005) Paper ID 12441.

**2004**

43. Yilmazbayhan, A., A. T. Motta, R. J. Comstock, G. P. Sabol, B. Lai, and Z. Cai, "Structure of Zirconium Alloy Oxides formed in pure water studied with Synchrotron radiation and optical microscopy: relation to corrosion rate," Journal of Nuclear Materials, vol. 324 (2004) 6-22.

**2003**

42. Pierron, O. N., D. A. Koss, A. T. Motta, and K. S. Chan, "The Influence of Hydride Blisters on Fracture of Zircaloy 4," Journal of Nuclear Materials, vol. 322 (2003) 21-35.

41. Yilmazbayhan, A., O. Delaire, A. T. Motta, R. C. Birtcher, J. M. Maser, and B. Lai, "Determination of the Alloying Content in the Matrix of Zr Alloys Using Synchrotron Radiation Microprobe X-Ray Fluorescence," Journal of Nuclear Materials, vol. 321 (2003) 221-232.

40. Cumblidge, S. E., A. T. Motta, G. L. Catchen, G. Brauer, and J. Bohmert, “Evidence for neutron irradiation-induced metallic precipitates in model alloys and pressure-vessel weld steel,” Journal of Nuclear Materials, vol. 320 (2003) 245-257.

39. Pierron, O. N., D. A. Koss, and A. T. Motta, “Tensile Specimen Geometry and the Constitutive Behavior of Zircaloy 4,” Journal of Nuclear Materials 312 (2003) 257-261.

38. Daum, R. S., D. W. Bates, D. A. Koss, and A. T. Motta, "The influence of a hydrided layer on the fracture of Zircaloy-4 cladding tubes," International Conference on Hydrogen Effects on Material Behavior and Corrosion Deformation Interactions, Sep 22-26, 2002, Moran, WY, United States (2003) Minerals, Metals and Materials Society, Warrendale, PA 15086, United States, 249-258.

**2002**

37. Poynor, N., S. E. Cumblidge, R. L. Rasera, G. L. Catchen, and A. T. Motta, “Hyperfine Interactions of 181Ta in Zr2Ni Observed Using PAC Spectroscopy,” Hyperfine Interactions, 136(3) (2002) 549-553.

36. Motta, A. T., K. T. Erwin, O. Delaire, R. C. Birtcher, Y. Chu, J. Maser, D. Mancini, and B. Lai, “Synchrotron Radiation Study of Second Phase Particles and Alloying Elements in Zircaloy-4,” 13th International Symposium on Zirconium in the Nuclear Industry, ASTM STP 1423 (2002) 59-76.

35. Daum, R. S., S. Majumdar, M. C. Billone, D. W. Bates, D. A. Koss, and A. T. Motta, “On the Embrittlement of Zircaloy-4 under RIA Relevant Conditions,” 13th International Symposium on Zirconium in the Nuclear Industry, ASTM STP 1423 (2002) 696-713.

34. Daum, R. S., S. Majumdar, H. Tsai, T. S. Bray, D. A. Koss, A. T. Motta, and M. C. Billone, “Mechanical Property Testing of Irradiated Zircaloy Cladding under Reactor Transient Conditions,” Small Specimen Test Techniques: Fourth Volume, ASTM STP 1418, M. A. Sokolov, J. D. Landes, and G. E. Lucas, Eds., American Society for Testing and Materials, West Conshohocken, PA (2002) 195-210.

**2001**

33. Kwon, J. and A. T. Motta, “Role of Radiation in BWR Core Shroud Cracking,” Reactor Dosimetry, ASTM STP 1398, John G. Williams, David W. Vehar, Frank H. Ruddy, and David M. Gilliam, Eds., American Society for Testing and Materials, West Conshohocken, PA (2001) 607-616.

32. Cumblidge, S. E., G. L. Catchen, A. T. Motta, G. Brauer, and J. Böhmert, "Effects of Neutron Irradiation and Thermal Annealing on Model Alloys using Positron Annihilation Techniques," Effects of Radiation on Materials: 20th International Symposium ASTM STP 1405, S. T. Rosinski, M. L. Grossbeck, T. R. Allen, and A. S. Kumar, Eds., American Society for Testing and Materials, West Conshohocken, PA (2001) 247-261.

31. Motta, A. T., A. Paesano, R. C. Birtcher, and L. Amaral, “Grain Growth in Zr-Fe Multilayers Under In-Situ Ion Irradiation,” Nuclear Instruments and Methods in Physics Research B, 175-177 (2001) 521-525.

30. Erwin, K. T., O. Delaire, A. T. Motta, R. C. Birtcher, Y. Chu, and D. Mancini, “Observation of Second Phase Particles in bulk Zirconium Alloys Using Synchrotron Radiation,” Journal of Nuclear Materials 294 (2001) 299-304.

29. Moura, C. S., A. T. Motta, N. Q. Lam, and L. Amaral, “Point Defect Energetics in the ZrNi and Zr2Ni Intermetallics,” Nuclear Instruments and Methods in Physics Research B, 175-177 (2001) 526-530.

28. Motta, A. T., S. E. Cumblidge, G. L. Catchen, S. B. Legoas, A. Paesano, Jr., and L. Amaral, “Electric-field gradients at the Zr-sites in Zr3Fe: measured using perturbed-angular-correlation spectroscopy and calculated using band theory,” Physical Review B (2001), B 65 (2001) 14115.

27. Moura, C. S., A. T. Motta, N. Q. Lam, and L. Amaral, “Atomistic Simulations of Point Defects in Zr-Ni Intermetallic Compounds,” Nuclear Instruments and Methods in Physics Research B, 180 (2001) 257-264.

**2000**

26. Kwon, J. and A. T. Motta, “Gamma Displacement Cross Sections in Various Materials,” Annals of Nuclear Energy, 27 (2000) 1627-1642.

25. Link, T. M., D. A. Koss, and A. T. Motta, "Strain Localization in Sheets Containing a Geometric Defect," Metallurgical Transactions A Letters, 31A (2000) 1883-1886.

**1999**

24. Motta, A. T., L. M. Howe, and P. R. Okamoto, "Amorphization of Zr3Fe under Electron Irradiation," Journal of Nuclear Materials, 270 (1999) 174.

23. Motta, A. T., S. E. Cumblidge, G. L. Catchen, R. L. Rasera, A. Paesano, Jr., and L. Amaral, "Defects and Magnetic Hyperfine Fields in ZrFe2 Studied Using Perturbed Angular Correlation Spectroscopy," Physical Review B (1999) 60 (2), 1188-1196.

22. Motta, A. T., A. Paesano, Jr., R. C. Birtcher, M. E. Bruckmann, S. R. Teixeira, and L. Amaral, "Phase Formation in Zr-Fe Multilayers: Effect of Irradiation," Journal of Applied Physics, vol. 85 (10), (1999) 7146.

**1998**

21. Weber, W. J., R. C. Ewing, C. R. A. Catlow, T. Diaz de la Rubia, L. W. Hobbs, C. Kinoshita, Hj. Matzke, A. T. Motta, M. A. Nastasi, E. H. K. Salje, E. R. Vance, and S. J. Zinkle, “Radiation Effect in Crystalline Ceramic Phases Relevant to the Immobilization and disposition of Nuclear Waste and Weapons Plutonium,” Journal of Materials Research, 13(6) (1998), 1434-1484.

20. Link, T. M., D. A. Koss, and A. T. Motta, “Failure of Zircaloy Cladding Under Severe Loading Conditions,” Nuclear Engineering and Design, 186 (1998) 379-394.

**1997**

19. Motta, A. T., "Amorphization of Intermetallic Compounds under Irradiation: a Review," Journal of Nuclear Materials, 244 (1997) 227-250.

18. Pagano Jr., L., A. T. Motta, and R. C. Birtcher, “Formation of Kr Bubbles in Zirconium Alloys,” Journal of Nuclear Materials, 244 (1997) 295-304.

**1996**

17. Howe, L. M., D. Philips, H. Zou, J. Forster, R. Siegele, J. A. Davies, A. T. Motta, J. A. Faldowski, and P. R. Okamoto, “Application of Ion Beam Techniques to the Study of Irradiation Damage in Zirconium Alloys,” Nuclear Instruments and Methods in Physics Research B 118 (1996) 663-669.

16. Faldowski, J. A., A. T. Motta, L. M. Howe, and P. R. Okamoto, “Effect of Electron Energy on Amorphization of ZrCr2,” Journal of Applied Physics, 80 (2) (1996) 729-733.

15. Motta, A. T., L. M. Howe, and P. R. Okamoto, “In-Situ Studies of Phase Transformations in Zr Alloys and Compounds under Irradiation,” 11th ASTM Symposium on Zr in the Nuclear Industry, ASTM STP 1295 (1996) 557-579.

**1995**

14. Yeh, T. K., D. D. Macdonald, and A. T. Motta, “Modeling Water Chemistry, ECP and Crack Rate in the BWR Heat Transport Circuits. Part I: The Damage-PREDICTOR Algorithm,” Nuclear Science and Engineering 121 (1995) 468-482.

**1994**

13. Howe, L. M., D. Phillips, A. T. Motta, and P. R. Okamoto, “Irradiation Induced Phase Transformations in Zr Alloys,” Surface & Coatings Technology, 66 (1994) 411-418.

12. Pêcheur, D., F. Lefebvre, A. T. Motta, C. Lemaignan, and D. Charquet, “Oxidation of Intermetallic Precipitates in Zircaloy-4: Impact of Irradiation,” 10th International Symposium on Zirconium in the Nuclear Industry, ASTM STP 1245 (1994) 687-705.

**1993**

11. Motta, A. T., L. M. Howe, and P. R. Okamoto, “Amorphization Kinetics of Zr(Cr,Fe)2 Under Ion Irradiation,” Materials Research Society Symposium Proceedings, 279 (1993) 517-522.

10. Pêcheur, D., F. Lefebvre, A. T. Motta, C. Lemaignan and D. Charquet, "Effect of Irradiation on the Precipitate Stability in Zr Alloys," Journal of Nuclear Materials, 205 (1993) 445-451.

9. Motta, A. T., L. M. Howe, and P. R. Okamoto, “Amorphization Kinetics of Zr3Fe under Electron Irradiation,” Journal of Nuclear Materials, 205 (1993) 258-266.

**1992**

8. Pêcheur, D., F. Lefebvre, A. T. Motta, C. Lemaignan, and J. F. Wadier, “Precipitate Evolution in the Zircaloy-4 Oxide Layer,” Journal of Nuclear Materials, 189 (1992) 2318-332.

7. Motta, A. T., C. Lemaignan, and D. R. Olander, “Segregation of Tin in Zircaloy-2 under Proton Irradiation,” 15th International Symposium on the Effects of Irradiation on Materials, Nashville, TN, ASTM STP 1125, (1992) 689-702.

6. Pêcheur, D., A. T. Motta, and C. Lemaignan, “Amorphization During Sample Preparation by Ion Milling,” Journal of Nuclear Materials, 195 (1992) 221-227.

5. Motta, A. T. and C. Lemaignan, “A Ballistic Mixing Model for Neutron Irradiation Induced Amorphization of Precipitates in Zircaloy,” Journal of Nuclear Materials, 195 (1992) 277-285.

4. Motta, A. T. and Lemaignan, C., “Mechanisms of Radiation Induced Amorphization,” Ordering and Disordering in Alloys (1992) ed. A.R. Yavari, Elsevier Applied Science, London, NY, 255-276.

**1990**

3. Motta, A. T. and D. R. Olander, “Theory of Amorphization under Electron Irradiation,” Acta Metallurgica et Materialia, Vol. 38 (11) (1990) 2175-2185.

2. Motta, A. T., F. Lefebvre, and C. Lemaignan, “Amorphization of Precipitates in Zircaloy with Neutron and Charged-Particle Irradiation,” 9th International Symposium on Zirconium in the Nuclear Industry, Kobe, Japan, November 1990, ASTM STP 1132, 718-739.

**1988**

1. Motta, A. T., D. R. Olander, and A. J. Machiels, “Electron-Irradiation-Induced Amorphization of Precipitates in Zircaloy,” 14th International Symposium on the Effects of Irradiation on Materials, Andover, MA, June 1988, ASTM STP 1046, 457-469.

# BEST PAPER AWARDS

2022 John Schemel Award — for best paper at the 19th International Symposium on Zirconium in the Nuclear Industry, Hilton Head, SC, for paper " “Zirconium Hydride Precipitation and Dissolution Kinetics in Zirconium Alloys,” E. Lacroix, P.-C. A. Simon, A. T. Motta, and J. D. Almer.

2019 Best Poster in Nuclear Research and Experiment, Intern Expo, Idaho National Laboratory. (August 2019). F. Passelaigue, G. Pastore, A. T. Motta, “ Implementation of a New Model for the Cladding Hydrogen Behavior in BISON”.

2018 Best Technical Presentation Award and Best Informational Graphics Award, Intern Expo, Idaho National Laboratory. Pierre-Clement Simon

2018 2nd Place Award for Excellence in Graduate Research at the Materials Science and Engineering Graduate Research Competition, E. Alat with the poster titled as “Advanced Accident-Tolerant Ceramic Coatings for Nuclear Fuel Cladding”, Department of Materials Science and Engineering, Penn State.

2018 Pierre Clement Simon, Best Video Award, Graduate research Exhibition, Penn State.

2015 Penn State Materials Day Best Group Poster Award, Ece Alat for her poster on the work done in the Materials for Nuclear Power group.

2014 Best Poster Award for Nuclear Fuels and Structural Materials American Nuclear Society, A. Couet, A. Ambard, A. T. Motta “Oxide Electrical Conductivity and Hydrogen Pickup Fraction in Zirconium Alloys: an EIS Study”.

2011 Outstanding Talk Award — "In-situ Investigation of Microstructure Evolution in NF616 and HCM 12A Alloys under Heavy Ion Irradiation," Cem Topbasi, A.T. Motta and M.Kirk, Microstructural Processes in Irradiated Materials (MPIM) Symposium, The Minerals, Metals & Materials Society 2011 Annual Meeting and Exhibition.

2008 Best Poster for American Nuclear Society Meeting — among 100 posters, for A. D. Siwy, T. E. Clark, and A. T. Motta, "Transmission Electron Microscopy of Oxide Development on 9Cr ODS in Supercritical Water", Embedded Topical Meeting on Nuclear Fuels and Structural Materials for the Next Generation Nuclear Reactors, ANS Meeting, Anaheim.

2005 Best Poster for Gordon Research Conference on High Temperature Corrosion, New London NH, — among 60 posters, main author Aylin Yilmazbayhan, for poster "High Temperature Oxides Formed on Model Zirconium Alloys Studied Using Synchrotron Radiation Diffraction".

1998 Xerox Research Award for “Best M.Sc. Thesis in Materials at Penn State,” — T.M.Link., "Failure of Zircaloy Cladding under Severe Loading Conditions".

1995 John Schemel Award — for best paper at the 10th International Symposium on Zirconium in the Nuclear Industry, Baltimore for paper "Oxidation of Intermetallic Precipitates in Zircaloy", principal author D. Pêcheur.

# SERVICE TO THE PROFESSION

Chair of Nuclear Engineering Department Heads Organization (NEDHO), 2018-2019. Current member of Executive Committee.

Idaho National Laboratory Nuclear Science & Technology (NS&T) Directorate Strategic Advisory Committee (SAC). (October 2018 - Present).

Board Member University of Tennessee Department of Nuclear Engineering. (October 2018 - Present).

National Academy of Sciences Committee on “Lessons Learned from the Fukushima Accident and Implications for US Nuclear Power Plants” August 2012 - June 2016

Special Member of CEA/Direction of Nuclear Energy Scientific Committee for External Review of LWR Research and Related Experimental Facilities, Saclay, France, 2013.

NEEDS-Materiaux. Scientific Committee for Evaluation of Proposals, CEA and ANDRA, France, 2012 – 2013.

French National Academy of Sciences Committee External Review Committee, for Electricite de France Laboratories, Moret-sur-Loing, France, 2011.

American Nuclear Society Special Committee on Fukushima, Sub-Committee on Safety Implications, Member, 2011 – 2012.

Chair of Nuclear Power Symposium, “Nuclear Power: Back on the Table”, at Penn Stater, 2009. with over 30 invited speakers and a keynote address by Tom Ridge.

Comission Essais Globaux, Paris, France Invited International Expert for commission to advise the French government on the quality and usefulness of their large scale experimental nuclear facilities November 2007 – May 2008.

Chair of Nuclear Regulatory Commission Expert Panel on High Burn-up Fuel Phenomena Identification, 1999-2002. Tasked with evaluating the susceptibility of nuclear fuel to design basis accidents at high burnup.

Department of Energy Experts Panel on “Research Needs for Radiation Effects on Ceramic Waste Forms Relevant for Waste Disposal, 1997.

Nuclear Proposal Review Panel at Amarillo National Resource Center for Plutonium, 1995.

# OUTREACH

“A Remembrance of Don Olander, and of UC Berkeley in the 1980s… and of writing the book”, keynote presentation at the University of California Berkeley Commemoration of Don Olander, December 3, 2022.

Presentation at Schlow Library, State College PA: “Know Nukes, The Future of Nuclear Energy” (November 2019). Invited Panel Participant, Organized by Citizens Climate Lobby; https://statecollegeccl.org/2020/02/02/the-future-of-nuclear-energy/

March on Capitol Hill, organized by Nuclear Energy Institute. (March 2019).

Speak with Elected Representatives and Senators on Nuclear Power

South Carolina State University, Orangeburg, SC. (October 2019).

“Graduate Study in Nuclear Engineering at Penn State” presentation.

Op-Ed Article (2018): Here's why nuclear energy is a cleaner source of energy than natural gas. Harrisburg Patriot News/PennLive.

The Campus Energy Debate, Panelist discussing Coal, Solar and Nuclear Power, organized by Alpha Nu Sigma, October 2016.

Article on “The Conversation”, “Nuclear Energy Deserves a Level Playingh Field”, August 2016, republished by the Centre Daily Times, the ANS Nuclear Café, the Energy Post and the Energy Collective, both in Europe.

Panel: A Chain Reaction: The Role of Nuclear Energy in PJM’s Energy Mix, (September 30, 2015). Member of Panel Organized by Bloomberg BNA for Nuclear Matters, Pittsburgh PA, Media event also broadcast on Web.

Scientific Panel Webinar at the ANS meeting, "Success Strategies for NEUP Applications and Proposals" Washington DC, 2011.

Presenter and Panelist in "Know Nukes"- A student-organized community forum at Penn State; Invited talk "A short discussion of the technical issues related to nuclear power as an electricity source", 2009.

Nuclear Engineering Department Heads Organization (NEDHO) Meeting, Capitol Hill , Washington DC., March 2011.

Invited Talk: Don Olander: a (roast) tribute, University of California, Berkeley, September 2008.

Ecole Centrale de Lyon to promote Penn State "Engineering Graduate Education at Penn State University" (with G.Lesieutre), November 2007.

# SELECTED INVITED PRESENTATIONS (SINCE 2010)

2022, “A Brief History of Zirconium Alloys in Nuclear Applications”, Arthur T. Motta, Bruce F. Kammenzind and Robert J. Comstock, Keynote presentation at the 20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems: Water Reactors, Aspen CO, July 2022

2020, “Hydrogen in Zirconium Alloy Nuclear Fuel Cladding”, presentation in Seminar series of Department of Engineering Science and Mechanics, Penn State University.

2018 Current Issues in LWR Core Design and Reactor Engineering Support, American Nuclear Society Annual Meeting, Orlando, Florida, "Multisensor Inspection and Robotic Systems for Dry Cask Storage,".

2018, University of Pittsburgh. "Effects of Reactor Exposure on LWR Nuclear Fuel Cladding: The Hydrogen Problem".

2016 “Zirconium Alloy Corrosion and Hydrogen Pickup.” Invited talk, Nuclear Fuels and Structural Material Embedded Topical Meeting, American Nuclear Society Annual Meeting, New Orleans, LA,

2015 “Effects of Reactor Exposure on Nuclear Fuel Cladding.” LWR Fuel Reliability Panel, American Nuclear Society Annual Meeting, San Antonio, TX.

2014 “Ceramic Coatings for Cladding (the C3 project)”, Workshop on Zirconium for Nuclear Applications, Oxford, England.

2014 "Recent Advances on Understanding of Corrosion and Hydrogen Pickup in Zirconium Alloys," Invited presentation, MRS Fall Meeting Symposium DD: Materials for Advanced Nuclear Technologies, Boston, MA.

2014 "Hydrogen and Hydrides in Zirconium Alloys." Invited Presentation at Workshop on Zirconium for Nuclear Applications, Oxford, England.

2014 "Effect of Alloying Elements on Corrosion and Hydrogen Pickup of Zr alloys", Presentation at University of Florida.

2014 “Effect of Alloying Elements on Corrosion and Hydrogen Pickup in Zr Alloys” and “Hydrogen and hydrides in Zircaloy,” Bettis Laboratories, Pittsburgh, PA.

2013 "A Stable Future for the Intermediate Voltage Electron Microscope (IVEM) Facility at Argonne", Presentation at DOE-Nuclear Energy, Germantown, MD.

2013, "Using synchrotron radiation to study materials for nuclear power", Presentation at Nuclear Fuel Industry Research Meeting, Wilmington NC.

2013, "A Trip to the Fukushima Reactors in Japan", Special MNE Seminar, Penn State.

2013, "Effect of Alloying Elements on Corrosion and Hydrogen Pickup of Zr alloys", Invited Presentation at the Symposium on Materials for Energy, Materials Science and Technology Conference and Exhibition, Montreal Canada.

2012, "Evolution of Nuclear Fuel Material," A.T. Motta and L. Hallstadius, TopFuel Invited presentation, Manchester UK.

2012 "Research in Nuclear Engineering at Penn State University" , Invited Presentation at the II Semana de Engenharia Nuclear (2nd Nuclear Engineering Week), Federal University of Rio de Janeiro, Brazil.

2012 "Hydrogen pick-up in zirconium alloys", A. Couet, A.Motta and R.Comstock, at the Service de Recherches de Metallurgie Physique, CEA-Saclay.

2012, "Effects of Reactor Exposure on Nuclear Fuel Cladding", Presentation at Nuclear Engineering Program, Virginia Tech.

2012 "Hydride Formation and Testing using in-situ Synchrotron Radiation". Invited Online Presentation at the Reorientation Modeling for Used Fuel disposition Extended Fuel Storage Analysis, Albuquerque NM.

2012, "XANES IN Zirconium Alloys: Study of oxidation states of alloying elements in solid solution and in precipitates," A. Couet, B. Gabory, A. Motta, R. Comstock, Nuclear Fuel Industry Research Meeting, Baden, Germany.

2012 "Hydride Formation and Testing using in-situ Synchrotron Radiation". Invited Online Presentation at the Reorientation Modeling for Used Fuel disposition Extended Fuel Storage Analysis, Albuquerque NM.

2012, "XANES IN Zirconium Alloys: Study of oxidation states of alloying elements in solid solution and in precipitates," A. Couet, B. Gabory, A. Motta, R. Comstock, Nuclear Fuel Industry Research Meeting, Baden-Baden Germany.

2012, "Effect of Thermo-Mechanical Cycling on Zirconium Hydride Reorientation Studied In-Situ with Synchrotron X-Ray Diffraction", K.B.Colas, A.T. Motta, and M.R. Daymond, NuMAT Conference, Osaka, Japan.

2012, "Effects of Reactor Exposure on Nuclear Fuel Cladding”, Invited Presentation at the II Semana de Engenharia Nuclear (2nd Nuclear Engineering Week), Federal University of Rio de Janeiro, Brazil.

2011, “Hydride precipitation and reorientation in Zirconium Alloy Nuclear Fuel Cladding,” Invited Talk, Seminar Series Advanced Photon Source, Argonne National Laboratory, Argonne, IL.

2011, “Hydrogen Pickup Mechanism: Hypothesis,” Presentation at MUZIC-2 Workshop, Imperial College, London, England.

2011, “Zirconium Alloy Oxide Structure studied using Microbeam Synchrotron Radiation Diffraction and Fluorescence,” Invited talk at TMS meeting Symposium on Characterization of Nuclear Materials using Synchrotron Radiation, San Diego, CA.

2011, “Corrosion and Hydriding in Nuclear Fuel Cladding,” Invited Presentation at Department of Materials Science, Hacettepe University, Ankara, Turkey.

2011, “Materials for the Extreme Environment Found in Nuclear Reactors,” Invited Presentation at Department of Materials Science, Middle Eastern Technical University, Ankara, Turkey.

2010 “Effects of Reactor Exposure on Nuclear Fuel Cladding,” Keynote Lecture, Department of Energy IMIR-1 "Innovative Materials Immune to Irradiation", Vail, CO.

2010 “Materials Needs for Nuclear Fuel Cladding”, Invited Panel talk, Nuclear Energy Emerging Technologies, DOE, Washington, DC.

2010 “Effects of Reactor Exposure on Zr Alloy Nuclear Fuel Cladding”, Invited plenary talk at 2nd International Workshop on Degradation in Metallic Materials, COPPE, Rio de Janeiro, Brazil.

2010 “Materials for the Extreme Environments Found in Nuclear Power Reactors", Invited talk at 2nd DEMAT: International Workshop on Degradation in Metallic Materials, COPPE, Rio de Janeiro, Brazil, November 2010.

2010 "Hydrogen Pickup in Zirconium Alloys", Invited presentation at the Westinghouse/Manchester University Sponsored Workshop: Mechanistic understanding of hydrogen pickup in Zr", Manchester, UK.

2010 "Materials for the Extreme Environments Found in Nuclear Power Reactors", Plenary Talk, Penn State University Materials Day.

2010 "Vingt Ans Aprés: Evolution de la Recherche sur le Zirconium", Invited presentation at Clement Lemaignan Retirement Commemoration, Saclay, France.

# SYMPOSIA ORGANIZED

Symposium Chair, 19th ASTM International Symposium on Zirconium in the Nuclear Industry, Manchester England, 2019.

Editorial Chair, 18th ASTM International Symposium on Zirconium in the Nuclear Industry, Holitopn Head, Soucth Carolina, 2016.

Chair of Track 2 “Structural Materials,” NuMat Conference, Elsevier, Montpellier, France, November 2016.

Organizing Committee, 18th International Symposium on Zirconium in the Nuclear Industry, Hilton Head, SC, 2016.

Organizing Committee Microscopy and MicroAnalysis Conference, 2015.

Organizing Committee, Materials Research Society Fall meeting, Symposium on Radiation Effects on Insulators, Boston, MA, 2010

Scientific Committee, ANS TopFuel Conference, Orlando Florida, September 2010.

Scientific Committee International Light Water Reactor Fuel Performance Meeting, Member, South Korea 2008,

Scientific Committee for 12th ASTM International Symposium on Reactor Dosimetry, Gatlinburg, TN 2005**.**

Organizing Committee for the Fifth International Conference on Computer Simulation of Radiation Effects in Solids, COSIRES, July 2000.

# REVIEWING AND EDITORIAL

Principal Editor for ASTM Special Technical Publication with the archival papers of the 18th International Symposium on Zirconium in the Nuclear Industry, 2016.

Associate Editor for Nuclear Technology, Journal of ASTM International, 2006-2012.

Editorial Board of Journal of Nuclear Materials, 2001-present.

Editorial Board for Nuclear Engineering and Technology, 2006-present

Guest Editor of Journal of Nuclear Materials special issue in honor of Prof. Don Olander, vol. 270, 1999, containing 27 peer-reviewed papers, and a foreword. Solicited papers, organized reviews, wrote foreword.

# BOOK CHAPTERS AND REVIEWS

Lemaignan, C. and A.T. Motta, "Zirconium Alloys in Nuclear Applications," book chapter in Vol. 10 (Nuclear Materials) ed. B.R.T. Frost, of "Materials Science and Technology" series, R.W. Cahn, P. Haasen, E.J. Kramer, eds., VCH 1994, 1-51.

T. R. Allen, R. J. M. Konings, and A. T. Motta, "Corrosion of Zirconium Alloys," Book Chapter in Comprehensive Nuclear Materials, R. Konings, Ed.: Elsevier, 2012, vol 5, 49-68.

A.T.Motta, A. Couet, and R. J. Comstock, “Corrosion of Zirconium Alloys for Nuclear Fuel Cladding”, Annual Review of Materials Research, 45 (2015) 311-343.

K.Crowley, N.Neureiter et.al., “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of Nuclear Power Plants”, National Academies Press, Washington, D.C., 2014.

K. Crowley, J.Shepherd et. al., “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2,” National Academies Press, Washington, D.C., 2016.

# PROFESSIONAL ACTIVITIES (selected, last five years)

Idaho National Laboratory Nuclear Science & Technology (NS&T) Directorate Strategic Advisory Committee (SAC). (October 2018 - July 2022).

University of Tennessee Department of Nuclear Engineering. (October 2018 - July 2022).

Member of ASTM B-10 Committee on Refractory and Reactive Metals August 1998 – Present

American Nuclear Society, Member of Materials Science and Technology Division Executive Committee, November 2004 – 2021

Workshop on Characterization of Radiation Damage Using Transmission Electron Microscopy, Argonne National Laboratory, Main Organizer - September 2014.

External Advisory Board, University of Michigan, Department of Nuclear Engineering and Radiological Sciences, 2009-present.

External Advisory Board, University of New Mexico, Department of Nuclear Engineering, 2015-present.

Chair, External Advisory Board, Intermediate Voltage Electron Microscope Facility, Argonne national Laboratory, 2014-present.

External Board Member XMAT (Extreme Materials Beamline at APS) Initiative Argonne National Laboratory, 2013 – Present.

# PAPERS PRESENTED IN TECHNICAL MEETINGS (2013-2023)

Motta, A. T., ZIRAT 26, ZIRAT, Idaho Falls, Idaho, USA, "Corrosion of Zr Alloys and Hydrogen Pickup," 60 in attendance, Invited. (March 16, 2022 - March 17, 2022). International.

Motta, A. T., ZIRAT 26, ZIRAT, Idaho Falls, Idaho, USA, "Effect of Hydrides on Mechanical Properties," 60 in attendance, Invited. (March 16, 2022 - March 17, 2022). International.

Motta, A. T., ZIRAT 26, ZIRAT, Idaho Falls. Idaho, USA, "Hydrogen and Hydrides in Zirconium Alloys," 60 in attendance, Invited. (March 16, 2022 - March 17, 2022). International.

Motta, A. T., Invited Presentation to KyungHee University, South Korea, "Modeling hydride Behavior in Zr alloys during Dry Storage." (November 10, 2021).

Wang, P. (Univ Michigan), Was, G. S. (University of Michigan), Bowman, J. S. (Penn State), Motta, A. T. (Author Only, Penn State), Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "Microstructure Characterization of Proton Irradiated Zircaloy-4," (October 2019).

Simon, P.-C. (Penn State), Motta, A. T., Tonks, M. R. (University of Florida), Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "Study of the effect of zirconium grain boundaries on hydride precipitation using phase field model" peer-reviewed/refereed. (October 2019).

Ayanoglu, M. (Penn State), Motta, A. T., Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "The Effect of Helium co-injection on the Cavity Evolution in Ion Irradiated 21Cr32Ni Model Alloy,". (October 2019).

Alat, E. P., Hu, J. (Argonne National Laboratory), Wolfe, D. E. (Penn State), Motta, A. T. (Presenter & Author), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Ceramic coating for nuclear fuel cladding to enhance accident tolerance," (May 2019).

Ensor, B. (Penn State), Lucadamo, G. (Naval Nuclear Laboratories), Seidensticker, J. E. (Naval Nuclear Laboratories), Motta, A. T. (Author Only), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Characterization of long-term, in-reactor Zircaloy-4 corrosion coupons and the impact of flux, fluence, and temperature on oxide growth, precipitate oxidation, stress development, phase formation, and grain size” (May 2019).

Ensor, B. M., Motta, A. T. Partezana, J. (Westinghouse Electric Company), Lucente, A. (Naval Nuclear Laboratories), Seidensticker, J. (Naval Nuclear Laboratories), Cai, Z. (Argonne National Laboratory), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "On the Nature of the Breakaway Corrosion Phenomenon during Zr and Zr Alloy Oxide Growth. (May 2019).

Lacroix, E., Motta, A. T. Simon, P.-C. (Penn State), Almer, J. (Argonne National Laboratory), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Zirconium hydride precipitation and dissolution kinetics in zirconium alloys," (May 2019).

Simon, P.-C. (Penn State), Tonks, M. R. (University of Florida), Motta, A. T., MRS Spring Meeting - Interfacial Science and Engineering - Mechanics, Thermodynamics, Kinetics and Chemistry, Materials Research Society (MRS) Spring 2019, Phoenix AZ, "Development of an experimental method to define the kinetic parameters of a phase field model – Application to zirconium hydride precipitation.," (April 2019).

Simon, P.-C., Tonks, M. R. (University of Florida), Motta, A. T. (Author Only), Jokisaari, A. M. (INL), Aagesen, L. K. (INL), NuMat 2018, Elsevier, Seattle, WA, "Phase field modeling of zirconium hydride microstructure." (October 2018).

Lacroix, E., Motta, A. T., Almer, J. (Argonne National Laboratory), NuMat 2018, Elsevier, Seattle, WA, "Zirconium hydride nucleation and growth kinetics studied using differential scanning calorimetry and synchrotron radiation diffraction." (October, 2018).

Motta, A. T. Advanced Materials Program Review, DOE Office of Advanced Reactor Technologies, Germantown MD, "High Fidelity Simulation of High Dose Neutron Irradiation," 25 in attendance. (June 2018).

Couet, A., Motta, A.T. MRS Spring Meeting Symposium EN17: Fundamental Materials Science to Enable the Performance and Safety of Nuclear Technologies, Materials Research Society, Boston, MA, "Fundamental and Holistic Approach to Nuclear Fuel Cladding Corrosion and Hydrogen Pickup under Irradiation in Normal and Accidental Conditions," Invited. (March 2018).

M. Ayanoglu, A.T. Motta "Swelling behavior of Fe-21Cr-32Ni model alloy", Transactions of the American Nuclear Society, v 119, p 523-525, ANS 2018.

E. Lacroix, A. T. Motta "Hydrogen Precipitation Kinetics Measurement in Zircaloy-4 Using Synchrotron Irradiation X-Ray Diffraction", Transactions of the American Nuclear Society, Vol. 118, Philadelphia, Pennsylvania, June, 2018.

C. J. Lissenden, I. Jovanovic, A. T. Motta, X. Xiao, S. Le Berre, D. Fobar, H. Cho, S. Choi "Remote detection of stress corrosion cracking: Surface composition and crack detection", AIP Conference Proceedings 1949, 110003 (2018); doi: 10.1063/1.5031582.

B.M. Ensor, M. Moorehead, J. R. Seidensticker, A. Couet, and A. T. Motta "XANES Study of Fe and Nb Oxidation in Zr-2.5Nb Oxide Layers", Winter ANS meeting, 2017.

A. Couet and A.T. Motta, “Oxidation kinetics and hydrogen pickup mechanism in zirconium alloys”, NuMat Conference, Montpellier, France 2016.

C.J. Ulmer, J.J.H. Lim, E.R. Anderson, E. Marquis, M.G. Burke, K.G. Field, A.T. Motta, “Characterization of alloy 800H irradiated by neutrons and ions to 16.6 dpa,” NuMat Conference, Montpellier, France 2016.

E. Alat, A.T. Motta, R.J. Comstock, J.M. Partezana, D.E. Wolfe, “Effect of substrate surface preparation on corrosion performance of multilayer (TiN, TiAlN) coatings”, poster presentation NuMat Conference, Montpellier, France 2016.

I. Bhamji, D. Wolfe, A. Motta, P. Withers, M. Preuss, “Mechanical properties of TiN and TiAlN type coatings proposed for accident tolerant fuels,” NuMat Conference, Montpellier, France 2016.

B.M. Ensor, A.T. Motta, D.J. Spengler, J.R. Seidensticker, R. Bajaj, W. Liu, R. Barabash, “Use of 3D laue spectroscopy to study oxide induced strains and stresses in zircaloy-4,” poster presentation NuMat Conference, Montpellier, France 2016.

B. Ensor, A. Lucente, M. Frederick, A. Motta, “Hydride accelerated corrosion in Zircaloy-4,” NuMat Conference, Montpellier, France 2016.

C.J. Lissenden, A.T. Motta, Sean Brennan, Karl Reichard, I. Jovanovic, T. Knight, J. Popovics, “Development of Robotic Multisensor Inspection System for Used Nuclear Fuel Canisters,” ANS Annual Meeting, Symposium on Used Nuclear Fuel Dry Storage Inspection, Las Vegas, NV, 2016.

X. Xiao, K. C. Hartig, S. Le Berre, A. T. Motta , I. Jovanovic , “Quantitative Determination of Chlorine Concentration by Measurement of Sodium Deposited on Steel via Laser-Induced Breakdown Spectroscopy,” ANS Annual Meeting, Symposium on Used Nuclear Fuel Dry Storage Inspection, Las Vegas, NV, 2016.

E. Alat, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, “Multilayer ceramic coating for corrosion (C3) resistance of nuclear fuel cladding,” Materials Science& Technology (MS&T16), October 23-27, 2016, Salt Lake City, UT, oral presentation.

P-C. Simon, M. Tonks, A. T. Motta, “Development of a Phase Field Model in MARMOT to Describe Hydride Precipitation in Zirconium Alloy.” IMECE (ASME), November 11-17, 2016, Phoenix, AZ, oral presentation.

E. Lacroix and A.T. Motta "Validation of BISON Calculation of Hydrogen Distribution by Comparison to Experiment", TMS2016 Annual Meeting, The Minerals, Metals & Materials Society, Feb 14-18, 2016, Nashville, Tennessee, USA, oral presentation.

B. Ensor, A. T. Motta, R. Bajaj, J.R. Seidensticker, and Z. Cai, "XANES Analysis of Iron in Zircaloy-4 Oxides Formed at Different Temperatures Studied with Microbeam Synchrotron Radiation", Guest Speaker, APS User Science Seminar, February 5, 2016, Argonne, IL, oral presentation.

B. Ensor, A. T. Motta, R. Bajaj, J. Seidensticker, A. Lucente, Z. Cai, and J.Partezana, "Fundamental Study of Breakaway Corrosion and Transition in Zirconium Alloys", 18th Int. Symposium on Zirconium in the Nuclear Industry, May 2016, Hilton Head, SC, poster.

B. Ensor, A. Lucente, M. Frederick, J. Sutliff, and A.T. Motta, "The Role of Hydrogen in Zirconium Alloy Corrosion", NuMat Conference 2016, November 9, 2016, Montpellier, France, oral presentation.

B. Ensor, A. T. Motta, D.J. Spengler, J.R. Seidensticker, R. Bajaj, and W. Liu, "Use of 3D Laue Spectroscopy to Study Oxide Induced Strains and Stresses in Zircaloy-4", NuMat Conference 2016, November 7-10, 2016, Montpellier, France, poster.

Shivprasad, A.P. Motta, A.T. Kucuk, A. Yagnik, S. Cai, Z. “Microbeam X-ray absorption near-edge spectroscopy of oxide layers in irradiated Zircaloy-2.” 18th International Symposium on Zirconium in the Nuclear Industry, Hilton Head, SC, May 17, 2016, oral presentation .

E. Alat, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, “Effect of substrate surface preparation on corrosion performance of multilayer (TiN, TiAlN) coatings,” NuMat Conference 2016, November 7-10, 2016, Montpellier, France, poster.

C.J. Ulmer, J.J.H. Lim, E.R. Anderson, E. Marquis, M.G. Burke, K.G. Field, A.T. Motta, “Characterization of alloy 800H irradiated by neutrons and ions to 16.6 dpa,” accepted for oral presentation in the topic of Structural and Functional Materials for Fission and Fusion Reactors, The Nuclear Materials Conference, Nov. 2016, Montpellier, France, oral presentation .

E. Alat, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, “Ceramic coating for corrosion (c3) resistance of nuclear fuel cladding,” the Materials Day, The Pennsylvania State University, Department of Materials Science and Engineering, September 2015, University Park, PA, poster.

Ayanoglu, M.; Ulmer, C.J.; Motta, A.T.; 21Cr32Ni Irradiation Experiments at IVEM. IRP Semi-Annual Meeting, Ann Arbor, Michigan. October 26, 2015 oral presentation .

B. Ensor, A. T. Motta, R. Bajaj, J.R. Seidensticker, and Z. Cai, "XANES Analysis of Iron in Zircaloy-4 Oxides Formed at Different Temperatures Studied with Microbeam Synchrotron Radiation", ANS LWR Fuel Performance Meeting, TopFuel 2015, September 15, 2015, Zurich, Switzerland oral presentation.

Ulmer, C.J. Ayanoglu, M. Motta, A.T.; “IVEM Irradiation experiment results of Fe21Cr32Ni with 1 MeV Kr++ at 440C.” IRP Semi-Annual Meeting, State College, PA. June 15, 2015, oral presentation.

Shivprasad, A.P. Motta, A.T. Synchrotron radiation examinations of high- and low-hydrogen pick-up irradiated Zircaloy-2 water rods. Final report to EPRI – Nuclear Fuel Industry Research. March 4, 2015, oral presentation.

Shivprasad, A.P. Motta, A.T., “Microbeam X-ray absorption near-edge spectroscopic studies of high-burnup Zircaloy-2 oxide layers.” EPRI – Nuclear Fuel Industry Research group. Halden, Norway. October 9, 2015 oral presentation.

Shivprasad, A.P. Motta, A.T. , “Microbeam synchrotron radiation studies of irradiated Zircaloy-2 oxide layers. EPRI” – HYDRanZeA Workshop. Charlotte, NC. February 24, 2015 oral presentation.

C.J. Ulmer, A.T. Motta and M.A. Kirk, “Irradiation damage development in zirconium carbide,” TMS Annual Meeting and Exhibition, Symposium on Accelerated Materials Evaluation for Nuclear Application Utilizing Test Reactors, Ion Beam Facilities and Modeling, Feb. 2014, San Diego, CA oral presentation .

C.J. Ulmer, A.T. Motta, M.J. Zheng, I. Szlufarska and D. Morgan, “Understanding radiation damage in zirconium carbide,” International Conference and Expo on Advanced Ceramics and Composites, Symposium on Advanced Ceramics and Composites for Sustainable Nuclear Energy and Fusion Energy, Jan. 2014, Daytona Beach, FL, oral presentation.

B. Ensor, A. T. Motta, R. Bajaj, J.R. Seidensticker, D. Spengler, and Z. Cai, "Study of Thin Oxide Layers on Zircaloy-4 Autoclave Corrosion Coupons Corroded at 274°C and 360°C using Synchrotron X-ray Diffraction", NuMat Conference 2014, October 29, 2014, Clearwater Beach, FL, oral presentation.

Shivprasad, A.P.; Motta, A.T., “ X-ray diffraction studies of irradiated Zircaloy-2 oxide layers.” Presentation to EPRI – Nuclear Fuel Industry Research group. Richland, WA. October 9, 2014, oral presentation .

E.Marquis, Y.Chen, Y.Dong, K.Fisher, A.T.Motta, S.Teyssere, "Insights into Atomic Scale Microstructures of Alloys Under Corrosive Environments", Symposium on Materials for the Current and Advanced Nuclear Reactors, TMS Annual Meeting, San Diego, CA, February 2014, oral presentation.

M. Nedim Cinbiz, A. T. Motta, and D. A. Koss, “The Effect of Stress Biaxiality on Hydride Reorientation Threshold Stress,” Topical Meeting on Nuclear Fuels and Structural materials, American Nuclear Society Annual Meeting Reno NV, June 2014, oral presentation.

A. Couet, A. T. Motta, R. J. Comstock, A. Ambard, "Oxide Electronic Conductivity and Hydrogen Pickup Fraction in Zr alloys," Topical Meeting on Nuclear Fuels and Structural Materials, American Nuclear Society Annual Meeting Reno NV, June 2014, poster presentation.

M. Nedim Cinbiz, D. A. Koss, A.T. Motta, M.Billone, “Effect of Stress State on Hydride Reorientation in Zr Alloys,” 2nd ASTM International Zirconium Alloy Cladding/Hydride Workshop, Jackson Hole, WY, June 10-12, 2014, oral presentation.

O. Courty, I. Davis, C.Piotrowski, M. Avramova, A.T. Motta, K.N. Ivanov, R. Williamson, J. Hales, "Modeling and Simulation of Hydrogen Transport in Zircaloy-4 Fuel Cladding under Temperature and Concentration Gradients," 2nd ASTM International Zirconium Alloy Cladding/Hydride Workshop Jackson Hole, WY, June 10-12, 2014, oral presentation.

Shivprasad, A.P.; Motta, A.T., “X-ray absorption near-edge spectroscopy of Ni in irradiated Zircaloy-2 oxide layers.” Presentation to EPRI – Nuclear Fuel Industry Research group. Zurich, Switzerland. May 13, 2014., oral presentation.

Shivprasad, A.P.; Motta, A.T. , “Analysis of synchrotron radiation examination of irradiated Zircaloy-2 oxide layer using XANES and micro diffraction.” Presentation to EPRI – HYDRanZeA expert team. February 3, 2014 oral presentation.

Shivprasad, A.P.; Motta, A.T. “Characterization of irradiated Zr-based alloys and alloy oxides using synchrotron radiation.” EPRI – HYDRanZeA Workshop. Wilmington, NC. April 15, 2013.

Cinbiz, M. N., A.T. Motta, Koss, D. A., Top Fuel Conference, ENS and ANS, Zurich, Switzerland, “Effect of Stress Biaxiality on Hydride Reorientation,”, 2015 oral presentation.

Heo, T.-W. (Penn State), A.T.Motta, Chen, L.-Q., MRS Spring Meeting, Materials Research Society, San Francisco, CA, “Phase Field Modeling of Hydride formation in Single and Polycrystalline Zirconium Alloys,” 2015 oral presentation.

Ensor, B. M., A.T.Motta, Seidensticker, J. (Bettis Laboratories), Bajaj, R. (Bettis Laboratories), Top Fuel Conference, ENS and ANS, Zurich, Switzerland, "XANES Analysis of Iron in Zircaloy-4 Oxides Formed at Different Temperatures Studied with Microbeam Synchrotron Radiation," oral presentation.

A. Couet, A. T. Motta, R. J. Comstock, Antoine Ambard, "Oxide Electronic Conductivity and Hydrogen Pickup Fraction in Zr alloys," Topical Meeting on Nuclear Fuels and Structural Materials, American Nuclear Society Annual Meeting Reno NV, June 2014.

# PEER REVIEWED PROCEEDINGS PUBLICATIONS

Ulmer, C. J. (Penn State), Ulmer, C. J. (Penn State), Motta, A. T. (Author, Penn State), TMS Annual Meeting -Radiation Effects in Metals and Ceramics Symposium, TMS, San Diego, "Comparison of Irradiated Microstructure formed in 800 H after neutron irradiation and dual beam ion irradiation," 20 in attendance, peer-reviewed/refereed, Contributed. (February 2020). International.

Ayanoglu, M. (Penn State), Ulmer, C. J. (Penn State), Motta, A. T. (Author, Penn State), TMS Annual Meeting – Symposium on Radiation Effects in Metals and Ceramics, TMS, San Diego, "Influence of alloying elements on microstructure evolution in 21Cr32Ni model alloy microstructure after in-situ ion irradiation," 20 in attendance, peer-reviewed/refereed, Contributed. (February 2020). International.

Wang, P. (Univ Michigan), Was, G. S. (University of Michigan), Bowman, J. S. (Penn State), Motta, A. T. (Author Only, Penn State), Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "Microstructure Characterization of Proton Irradiated Zircaloy-4," peer-reviewed/refereed. (October 2019). International.

Simon, P.-C. (Penn State), Motta, A. T., Tonks, M. R. (University of Florida), Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "Study of the effect of zirconium grain boundaries on hydride precipitation using phase field model" peer-reviewed/refereed. (October 2019). International.

Ayanoglu, M. (Penn State), Motta, A. T., Materials in Nuclear Energy Systems (MiNES), ANS and TMS, Baltimore MD, "The Effect of Helium co-injection on the Cavity Evolution in Ion Irradiated 21Cr32Ni Model Alloy," peer-reviewed/refereed. (October 2019). International.

Motta, Arthur M. T. January 1, 2019 - December 31, 2019

Alat, E. P., Hu, J. (Argonne National Laboratory), Wolfe, D. E. (Penn State), Motta, A. T. (Presenter & Author), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Ceramic coating for nuclear fuel cladding to enhance accident tolerance," peer-reviewed/refereed, Accepted. (May 2019). International.

Ensor, B. (Penn State), Lucadamo, G. (Naval Nuclear Laboratories), Seidensticker, J. E. (Naval Nuclear Laboratories), Motta, A. T. (Author Only), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Characterization of long-term, in-reactor Zircaloy-4 corrosion coupons and the impact of flux, fluence, and temperature on oxide growth, precipitate oxidation, stress development, phase formation, and grain size," peer-reviewed/refereed, Accepted. (May 2019). International.

Ensor, B. M., Motta, A. T. (Presenter & Author), Partezana, J. (Westinghouse Electric Company), Lucente, A. (Naval Nuclear Laboratories), Seidensticker, J. (Naval Nuclear Laboratories), Cai, Z. (Argonne National Laboratory), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "On the Nature of the Breakaway Corrosion Phenomenon during Zr and Zr Alloy Oxide Growth," peer-reviewed/refereed, Accepted. (May 2019). International.

Lacroix, E., Motta, A. T. (Author Only), Simon, P.-C. (Penn State), Almer, J. (Argonne National Laboratory), 19th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Manchester, UK, "Zirconium hydride precipitation and dissolution kinetics in zirconium alloys," peer-reviewed/refereed, Accepted. (May 2019). International.

Simon, P.-C. (Penn State), Tonks, M. R. (University of Florida), Motta, A. T., MRS Spring Meeting - Interfacial Science and Engineering - Mechanics, Thermodynamics, Kinetics and Chemistry, Materials Research Society (MRS) Spring 2019, Phoenix AZ, "Development of an experimental method to define the kinetic parameters of a phase field model – Application to zirconium hydride precipitation.," peer-reviewed/refereed. (April 2019). International.

Simon, P.-C., Tonks, M. R. (University of Florida), Motta, A. T. (Author Only), Jokisaari, A. M. (INL), Aagesen, L. K. (INL), NuMat 2018, Elsevier, Seattle, WA, "Phase field modeling of zirconium hydride microstructure." (October 1, 2018 - October 2, 2018). International.

Lacroix, E., Motta, A. T. (Author Only), Almer, J. (Argonne National Laboratory), NuMat 2018, Elsevier, Seattle, WA, "Zirconium hydride nucleation and growth kinetics studied using differential scanning calorimetry and synchrotron radiation diffraction." (October 1, 2018 - October 2, 2018). International.

Motta, A. T. (Presenter Only), Advanced Materials Program Review, DOE Office of Advanced Reactor Technologies, Germantown MD, "High Fidelity Simulation of High Dose Neutron Irradiation," 25 in attendance. (June 15, 2018 - June 16, 2018). International.

Couet, A., Motta, A. (Author Only), MRS Spring Meeting Symposium EN17: Fundamental Materials Science to Enable the Performance and Safety of Nuclear Technologies, Materials Research Society, Boston, MA, "Fundamental and Holistic Approach to Nuclear Fuel Cladding Corrosion and Hydrogen Pickup under Irradiation in Normal and Accidental Conditions," Invited. (March 1, 2018). International.

Field, K. (Oak Ridge), Taller, S. (Univ Michigan), Ulmer, C. (Penn STate), Jiao, G. (University of Michigan), Motta, A. T., Saleh, T. (LANL), Was, G. S. (Univ Michigan), American Nuclear Society (ANS) Annual Meeting, ANS, San Francisco, CA, "Emulation of High Dose Neutron Irradiations with Ion Beams," 25 in attendance, peer-reviewed/refereed, published in proceedings, Accepted. (June 2017 - Present). International.

Hu, J. (Argonne National Lab), Wolfe, D. E., Motta, A. T., Kirk, M. (Argonne National Laboratory), Wang, J. (Argonne), American Nuclear Society (ANS) Winter Meeting, ANS, Washington DC, "Radiation tolerance of multilayer (TiN, TiAlN) ceramic ATF coatings," 30 in attendance, peer-reviewed/refereed, published in proceedings, Accepted. (October 31, 2017). International.

Ensor\*, B. (Penn State), Couet, A. (Univ Wisconsin), Motta, A. T. (Author Only), Moorehead, M. (Bettis), Seidensticker, J. (Bettis), American Nuclear Society (ANS) Winter Meeting, ANS, Washington DC, "XANES Study of Fe and Nb Oxidation in Zr-2.5Nb Oxide Layers," 25 in attendance, peer-reviewed/refereed, published in proceedings, Accepted. (October 31, 2017). International.

Ayanoglu\*, M. (Penn State), Motta, A. T., American Nuclear Society (ANS) Winter Meeting, ANS, Washington DC, "In-Situ Study: Faulted Loop and Void Behavior in Single Beam Bulk Irradiated Fe-21Cr-32Ni Model," 25 in attendance, peer-reviewed/refereed, published in proceedings, Accepted. (October 30, 2017). International.

Motta, A. T., Fuel and Material Components, CASL (Consortium for Advanced Simulation of Light Water Reactors), Raleigh NC, "Benchmarking Fuel Performance Codes," 35 in attendance, Invited. (May 2017).

Motta, A. T., Effect of Irradiation on Oxidation and Hydrogen Pickup Mechanisms in Zirconium Alloys, EPRI, Oxford, UK, "MUZIC-3 Research Projects at PSU and UM," 60 in attendance, Invited. (January 2017).

Lacroix, E. (Penn State), Motta, A. T., The Minerals, Metals & Materials Society Annual Meeting, TMS, Nashville TN, "Validation of BISON Calculation of Hydrogen Distribution by Comparison to Experiment." (February 2016).

# Oral Presentations

54. Motta, A. T. (Author Only), Dong, Y. (Univ Michigan), Marquis, E. (University of Michigan), Microscopy and Microanalysis, Microscopy Society of America, Portland OR, "Multi-scale Characterization of Oxidized Zirconium Alloys," published in proceedings, Accepted. (2016).

53. Ulmer, C. J., Motta, A. T. (Author Only), Burke, M. E. (University of Manchester), Lim, J. (University of Manchester), Anderson, E. (University of Michigan), Marquis, E. (University of Michigan), Field, K. G. (Oak Ridge), NuMat 2016, Elsevier, Montpellier, France, "Characterization of alloy 800H irradiated by neutrons and ions to 16.6 dpa," accepted. (November 1, 2016). International.

52. Ensor, B. M., Motta, A. T. (Author Only), Lucente, A. E. (KAPL), Frederick, M. (KAPL), Sutcliff, J. (KAPL), NuMat 2016, Elsevier, Montpellier, France, "Hydride accelerated corrosion in Zircaloy-4 accepted,. (November 1, 2016). International.

51. Bhamji, I. (University of Manchester), Motta, A. T. (Author Only), Wolfe, D. E., Lim, J. (University of Manchester), Withers, P. (University of Manchester), Preuss, M. (University of Manchester), NuMat 2016, Elsevier, Montpellier, France, "Mechanical properties of TiN and TiAlN type coatings proposed for accident tolerant fuels," accepted (November 1, 2016). International.

50. Motta, A. T., Alat, E., Wolfe, D. E., Partezana, J. (Westinghouse), Comstock, R. J., TopFuel CARAT meeting, by telecon, "Ceramic Coating Architectures to Increase Accident Tolerance of ZIRLO." (September 9, 2016).

49. Was, G. S. (University of Michigan), Motta, A. T., Wirth, B. D. (University of Tennessee), Structural Materials for Innovative Nuclear Systems (SMINS-4), Nuclear Energy Agency (NEA), Manchester, UK, "Accelerated Irradiation for Emulation of in-Reactor Radiation Damage." (July 14, 2016).

48. Motta, A. T., Was, G. S. (University of Michigan), Wirth, B. D. (University of Tennessee), ANS Annual Meeting, Nuclear Fuels and Structural Materials, ANS, New Orleans LA, "Accelerated Ion Irradiation for Emulation of In-reactor Radiation Damage," 50 in attendance, Invited. (June 15, 2016).

47. Motta, A. T., ANS Annual Meeting, Nuclear Fuels and Structural Materials, ANS, New Orleans LA, "Zirconium Alloy Corrosion and Hydrogen Pickup," 50 in attendance, Invited. (June 15, 2016).

46. Cinbiz, M. N., Motta, A. T. (Author Only), Koss, D. A. (Penn State), Billone, M. (Argonne National Laboratory), 18th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Hilton Head SC, "Hydride Reorientation in Zircaloy-4 under Different States of Stress as Studied with In Situ X-ray diffraction," peer-reviewed/refereed, (May 18, 2016). International.

45. Shivprasad, A. P., Motta, A. T. (Author Only), Kucuk, A. (EPRI), Yagnik, S. (EPRI), Cai, Z. (Argonne national Lab), 18th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Hilton Head SC, "Microbeam X-ray Absorption Near-edge Spectroscopy of Alloying Elements in the Oxide Layers of Irradiated Zircaloy-2," peer-reviewed/refereed, (May 18, 2016). International.

44. Couet, A. (University of Wisconsin), Motta, A. T. (Author Only), Comstock, R. J. (Westinghouse), Ambard, A. (EDF), 18th ASTM International Symposium on Zirconium in the Nuclear Industry, ASTM, Hilton Head SC, "Hydrogen pick-up mechanism in zirconium alloys," peer-reviewed/refereed, (May 1, 2016). International.

43. C.J. Lissenden, S. Choi, H. Cho, A. Motta, K. Hartig, X. Xiao, S. Le Berre, S. Brennan, K. Reichard, R. Leary, B. McNelly, and I. Jovanovic "Robotic Inspection of Dry Storage Casks for Spent Nuclear Fuel" ASME 2016 Pressure Vessels & Piping Conference, July 17-21, 2016.

42. J. Romero, J. Partezana, R.J. Comstock, L. Hallstadius, A. Motta, A. Couet "Evolution of Hydrogen Pickup Fraction with Oxidation Rate on Zirconium Alloys", Westinghouse Electric Company LLC, (2015).

41. M.G.Mankosa, C.J.Piotrowski, M.N.Avramova, A.T. Motta, and K.N.Ivanov,S.Stafford, and R.L.Williamson "Anisotropic Azimuthal Power and Temperature Distribution as a Driving

Force for Hydrogen Redistribution", NURETH-16, Chicago, IL, August 30-September 4, 2015.

40. X. Xiao, K.C. Hartig, S. Le Berre, A. T. Motta, I. Jovanovic “Quantitative Determination of Chlorine Concentration by Measurement of Sodium Deposited on Steel via Laser-Induced Breakdown Spectroscopy”, Transactions of the American Nuclear Society, Vol. 115, Las Vegas, NV, November 6–10, 2016.

39. E. Lacroix and A.T. Motta "Validation of BISON Calculation of Hydrogen Distribution by Comparison to Experiment", TMS2016 Annual Meeting Supplemental Proceedings, The Minerals, Metals & Materials Society, (2016) 263-272.

38. M.N. Cinbiz, D.A. Koss, and A.T. Motta, “The Effect of Stress Biaxiality on Hydride Reorientation Threshold Stress”, ANS LWR Fuel Performance Meeting, TopFuel 2015, September 13-17, 2015, Zurich, Switzerland, paper A0151.

37. B.M. Ensor, A. T. Motta, R. Bajaj, J.R. Seidensticker, and Z. Cai, “XANES Analysis of Iron in Zircaloy-4 Oxides Formed at Different Temperatures Studied with Microbeam Synchrotron Radiation”, ANS LWR Fuel Performance Meeting, TopFuel 2015, September 13-17, 2015, Zurich, Switzerland, paper A0191.

36. C. Dances, C. Piotrowski, M. Mankosa, A. Motta, M. Avramova, and K. Ivanov, “Anisotropic Azimuthal Power and Temperature Distribution Impact on Hydride Distribution”, 2014 ANS Winter Meeting and Nuclear Technology Expo, November 9-13, 2014, Anaheim, CA.

35. A.Couet, A. T. Motta, R. J. Comstock, and A. Ambard, "Oxide electronic conductivity and hydrogen pickup fraction in Zr alloys," in 2014 Annual Meeting on Transactions of the American Nuclear Society and Embedded Topical Meeting: Nuclear Fuels and Structural Materials for the Next Generation Nuclear Reactors, NSFM 2014, June 15, 2014 - June 19, 2014, Reno, NV, United states, 2014, pp. 845-848.

34. I.J. Davis, O. F. Courty, M. N. Avramova, A. T. Motta, and K. N. Ivanov, “High-Fidelity Multi-Physics Coupling for Prediction of Anisotropic Power and Temperature Distributions in Fuel Rod: Impact on Hydride Distribution.” The 15th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, NURETH-15, 491, May 2013, Pisa, Italy.

33. B. de Gabory and A. T. Motta, “Structure of Zircaloy 4 Oxides Formed during Autoclave Corrosion”, ANS LWR Fuel Performance Meeting, TopFuel 2013, September 2013, Charlotte, NC, paper #8584.

32. J. R. M.-L. Lescoat, A. Gentils, O. Kaitasov, E. Marquis, A. T. Motta, M. Kirk, and Y. de Carlan, "Stability of 18 Chromium ODS Steels Under Ion-Irradiation," Proceedings of International Congress on the Advances in Nuclear Power Plants, (ICAPP 12).

31. T. W. Heo, K. B. Colas, A. T. Motta, and L.-Q. Chen, "Phase-field Simulation and Experimental Measurements of Delta-Hydride Precipitation in Zr-Alloys," 2012 Annual TMS Meeting.

30. Kaoumi, D., A. Motta, and M. Kirk, "Microstructure Evolution of Fe-9Cr-0.1C and Fe-12Cr-0.1C Model Martensitic Steels Ion-Irradiated In-Situ in a TEM," 138th Annual Meeting and Exhibition of the Minerals, Metals and Materials Society (TMS 2009), Symposium on Microstructural Processes in Irradiated Materials. Moscone West Convention Center, San Francisco, California (USA), 15-19 Feb 2009.

29. Kaoumi, D., A. T. Motta, M. Kirk, T. Faney, and B. Wirth, "Microstructure Evolution of a Model F/M Steel Irradiated with Ions In-Situ in a TEM and Modeling," EMMM09 (Electron Microscopy and Multiscale Modeling), Zurich, Switzerland, 27-30th October 2009.

28. Bischoff, J., A. T. Motta, Y. Chen, and T. R. Allen, "Oxidation of 9CrODS Exposed to Supercritical Water," Proceedings of the NACE 2009 Corrosion Conference, Atlanta, Ga, paper #09248.

27. Colas, K., A. Motta, M. Daymond, J. Santisteban, P. Vizcaino, D. Banchik, and Y. Chu, "Kinetics of Hydride Precipitation in Zr alloys Using Synchrotron Radiation," CIAM Workshop in the VII Meeting of the Brazilian Society for Research in Materials (SBPMat), Guarujá, Brazil, 2008.

26. Motta, A. T., J. Bischoff, A. Siwy, M. J. Gomes da Silva, R. J. Comstock, Z. Cai, and B. Lai, “Characterization of Oxide Layers Formed During Corrosion in Supercritical Water,” Proceedings of the 17th NACE International Corrosion Congress, Las Vegas, October 2008, paper #4868.

25. Flanagan, M. E., D. A. Koss, and A. T. Motta, “The Influence of Hydrogen on the Deformation Behavior of Zircaloy-4”, Proceedings of the 2008 Water Reactor Fuel Performance Meeting, October 19-23, 2008, Seoul, Korea.

24. Kaoumi, D., A. T.Motta, and M. Kirk, “Characterization and In-Situ Ion-Irradiation of MA957 ODS Steel,” Transactions of the American Nuclear Society, v 98, Embedded Topical Meetings: Nuclear Fuels and Structural Materials for the Next Generation Nuclear Reactors, NFSM, 2008, 1113-1114.

23. Kunkle, J., A. T. Motta, R. J. Comstock, and P. Hosemann, “Characterization of HT-9 Ferritic-Martensitic Steels Oxidized in Lead Bismuth Eutectic,” Transactions of the American Nuclear Society, v 98, Embedded Topical Meetings: Nuclear Fuels and Structural Materials for the Next Generation Nuclear Reactors, NFSM, 2008, 1115-1116.

22. Raynaud, P. A., D. A. Koss, A. T. Motta, and K. S. Chan, “Fracture of Hydrided Zircaloy-4 Sheet under Through-Thickness Crack Growth Conditions,” Proceedings of the 2007 International LWR Fuel Performance Meeting, San Francisco, California, September 30–October 3, 2007, Paper 1032.

21. Raynaud, P. A., M. J. Meholic, D. A. Koss, A. T. Motta, and K. S. Chan. “Influence of Hydride Microstructure on Through-Thickness Crack Growth in Zircaloy-4 Sheet,” Proceedings of the 13th International Conference on Environmental Degradation of Materials in Nuclear Systems-Water Reactors, Whistler, Canada (2007) TMS.

20. Motta, A. T., A. D. Siwy, J. M. Kunkle, J. B. Bischoff, R. J. Comstock, Y. Chen, and T. R. Allen, “Microbeam Synchrotron radiation Diffraction and Fluorescence Study of Oxide Layers formed on 9CrODS steel in Supercritical Water,” Proceedings of the 13th International Conference on Environmental Degradation of Materials in Nuclear Systems-Water Reactors, Whistler, Canada (2007) TMS.

19. Kaoumi, D., A. T. Motta, and R. C. Birtcher, "Irradiation-Enhanced Second-Phase Precipitation in Zr-Fe Nanocrystalline Thin Films," MRS Symposium Proceedings, Boston, MA (2005) vol. 908E.

18. Yilmazbayhan, A., M. G. da Silva, A. T. Motta, H.-G. Kim, Y. H. Jeong, J.-Y. Park, R. Comstock, B. Lai, and Z. Cai, "Characterization of Oxides Formed on Zirconium Alloys in 360 C Water Using Microbeam Synchrotron Radiation," 12th International Conference on Environmental Degradation of Materials in Nuclear Systems-Water Reactors, Snowbird, UT (2005) TMS 201-210.

17. Jeong, Y. H., J. Y. Park, H. G. Kim, J. T. Busby, E. L. Gartner, M. Atzmon, G. S. Was, R. Comstock, M. Silva, and A. T. Motta, "Corrosion of zirconium based fuel cladding alloys in supercritical water," 12th International Conference on Environmental Degradation of Materials in Nuclear Power Systems- Water Reactors, Snowbird, UT (2005) TMS 1369-1377.

16. Motta, A. T., A. Yilmazbayhan, R. J. Comstock, B. Lai, and Z. Cai, "Using small x-ray beams to understand corrosion in nuclear fuel cladding," Proceedings of IMECE04, ASME Annual Conference, Anaheim, CA (2004) Paper Number 62475.

15. Motta, A. T., R. A. Holt, and U. Colak, "Irradiation growth in Zirconium Alloys at Low Temperatures by Direct Athermal Deposition of vacancies at Extended Sinks," in Proceedings of the 11th International Symposium on Reactor Dosimetry, Brussels, Belgium (2002) 278.

14. Pierron, O. N., D. A. Koss, A. T. Motta, R. S. Daum, K. S. Chan, “Failure of Zircaloy-4 Sheet Containing Hydride Blisters,” Proceedings of the Nuclear Safety Research Conference, Nuclear Regulatory Commission, November 2002.

13. Erwin, K. T., O. Delaire, A. T. Motta, R. C. Birtcher, Y. Chu, and D. Mancini, “Study of Second Phase Particles in Zr alloys using the Advanced Photon Source at Argonne National Laboratory,” Proceedings of ICONE-8, 8th International Conference on Nuclear Engineering, ASME (2000) Baltimore, Paper # 8319.

12. Delaire, O., K. T. Erwin, A. T. Motta, R. C. Birtcher, J. Maser, and B. Lai, “Study of Alloying Elements in the Matrix of Zr alloys using the Advanced Photon Source at Argonne National Laboratory,” Proceedings of ICONE-8, 8th International Conference on Nuclear Engineering, ASME (2000) Baltimore, Paper # 8320.

11. Bates, D. W., D. A. Koss, A. T. Motta, and S. Majumdar, "Influence of Specimen Design on the Zircaloy Ductility," Proceedings of the ANS International Topical Meeting on Fuel Performance, Park City, Utah (2000) American Nuclear Society, LaGrange Park, IL, pp.296-305.

10 . Daum, R. S., A. T. Motta, D. D. Macdonald, and D. A. Koss, “Hydrogen Assisted failure of Alloys X-750 and 625 under Slow Strain Rate Conditions,” Proceedings of the 9th NACE International Symposium on Environmental Degradation of Materials in Nuclear Power Systems, TMS (1999) Newport Beach, pp. 179-187.

9. Paesano, Jr., A., A. T. Motta, R. C. Birtcher, E. A. Ryan, S. R. Teixeira, and L. Amaral, “Ion-Beam Mixing and Solid State reaction in Zr-Fe Multilayers,” Materials Research Society Symposium Proceedings, vol. 439 (1997) 419-424.

8. Cumblidge, S. E., A. T. Motta, and G. L. Catchen, “Neutron Damage in Reactor Pressure-Vessel Steel Examined using Positron Annihilation Lifetime Spectroscopy,” Materials Research Society Symposium Proceedings, vol.439 (1997) 483-488.

7. Link, T. M., A. T. Motta, and D. A. Koss, “On the Influence of an Embrittled Rim on the Ductility of Zircaloy Cladding,” Proceedings of the 1997 ANS International Topical Meeting on Light Water Reactor Fuel Performance, (1997) 634-642.

6. Link, T. M., A. T. Motta, and D. A. Koss, “On the Issue of Zircaloy Ductility during a Reactivity Initiated Accident,” Proceedings of the 24th Water Reactor Safety Meeting, Washington, NUREG/CP-0157 (1996) 141-149.

5. Faldowski, J. A., A. T. Motta, L. M. Howe, and P. R. Okamoto, “Influence of Stacking Faults and Alloy Composition on Irradiation-Induced-Amorphization of ZrCr2, ZrFe2 and Zr3 (Fex,Ni 1-x),” Materials Research Society Symposium Proceedings, vol. 398 (1996) 183-188.

4. Pagano Jr., L., A. T. Motta, and R. C. Birtcher, “Bubble Formation in Zr and Zr Alloys under Heavy Ion Irradiation,” Materials Research Society Symposium Proceedings, vol. 398 (1996) 201-206.

3. Motta, A. T., L. M. Howe, and P. R. Okamoto, “Crystalline-to-Amorphous Transformation of Intermetallic Compounds in the Zr-Fe-M System Induced By Irradiation,” Materials Research Society Symposium Proceedings, vol. 373 (1995) 183-188.

2. Macdonald, D. D., T. K. Yeh, and A. T. Motta, “Simultaneous Radiolysis, ECP and Crack Growth Modeling of Components in BWR Coolant Systems,” Corrosion 95 Conference, NACE International, Houston, TX, Paper # 403.

1. Motta, A. T., L. M. Howe, and P. R. Okamoto, “Electron Energy Dependence of Amorphization in Zr3Fe,” Materials Research Society Symposium Proceedings, vol. 316 (1994) 265-270.

# CURRENT AND RECENT RESEARCH PROJECTS

“Understanding of ATF Cladding Performance under Radiation using MITR”, Department of Energy NEUP, co-PI (2022-2026).

" Hydride Precipitation in Zirconium Alloys Under Stress ", (2022-2025), Fluor Maribe Propulsion LLC, Principal Investigator.

“Estimation of low temperature cladding failures during RIA transient,” (2020-2023), Department of Energy NEUP. PI

“NEUP: High Fidelity Simulation of High Dose Neutron Irradiation", (2018-2023), The Regents of the University of Michigan.

"Oxidation State of Alloying Elements and Their Role on Hydrogen Pickup", Westinghouse Electric Sweden AB (2019-2022)- Principal Investigator

"The Influence of Ion Irradiation on the Corrosion of Kinetics of Zirconium Alloys", Battelle - Idaho National Laboratory (2018-2020), - Principal Investigator

"IRP: Development of a Mechanistic Hydride Behavior Model for Spent Fuel Cladding Storage and Transportation", (2017-2021) U.S. Department of Energy NEUP, Principal Investigator .

"In-Situ Ion Irradiation to Add Irradiation Assisted Grain Growth to the MARMOT Tool", U.S. Department of Energy NEUP(2017-2021)- Co-Principal Investigator.

“Three-dimensional fuel pin model validation by prediction of hydrogen distribution in cladding and comparison with experiment”, 2014- 2017, DOE-NEUP Co-PI

“Multi-Sensor Inspection and Robotic Systems for Dry Storage Casks”, 2014- 2017 DOE-Nuclear Energy University Programs Integrated Research program, co-PI.

"High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation”, 2014- 2017, DOE- Nuclear Energy University Programs Integrated Research Program, led by University of Michigan, Co-PI

"Analysis of Oxide Layers in Zircaloy-4 by using Synchrotron Radiation," Bettis Laboratories, 2013- 2017

"Advanced Accident-Tolerant Ceramic Coatings for Zr-alloy Cladding: The C^3 Project," DOE-Nuclear Energy University Programs Integrated Research program, 2013- 2016, led by UT-Knoxville, co-PI.

"In-situ Studies of Interfaces Under Extreme Environments," LDRD Brookhaven National Laboratory, January 2013-January 2015

"Microbeam Synchrotron Radiation Examination of Oxide Layers in Irradiated Zircaloy," 2012- 2015, EPRI-NFIR.

"Hydrogen Pickup Mechanism in Zirconium-Based Alloys A Collaborative University Study," EPRI and Westinghouse, 2011- 2014,

"In-Situ Study of Hydride Reorientation and Fracture Behavior of Zirconium Alloys," NRC, in collaboration with Argonne National Laboratory, 2010-2014, Nuclear Regulatory Commission.

“Fundamental Studies of the Role of Grain Boundaries on Uniform Corrosion of Advanced Nuclear Reactor Materials”, in collaboration with University of Michigan and Drexel University, 2011-2014, DOE-Nuclear Energy University Programs.

“Anisotropic Azimuthal Power and Temperature Distribution on Fuel rod: impact on hydride distribution,” in collaboration with K. Ivanov and M. Avramova, 2011-2014, DOE-Nuclear Energy University Programs.

“Understanding the Irradiation Behavior of Zirconium Carbide”, in collaboration with the University of Wisconsin, Madison, 2010-2013, DOE-Nuclear Energy University Programs.

“Microstructure and Property Evolution in Advanced Cladding and Duct Materials Under Long-Term and Elevated Temperature Irradiation: Modeling and Simulation” in collaboration with the University of Tennessee Knoxville, 2010-2013, DOE-Nuclear Energy University Programs.

# PENN STATE SERVICE (selected over 30 years)

*Department*

2019-2023- Faculty Search Committees in Nuclear Engineering

2019-2023 – Graduate Chair of Nuclear Engineering, Department of Nuclear Engineering

2019-present – Chair of Promotion and Tenure Committee, Department of Nuclear Engineering

2010-2019 , Chair of Nuclear Engineering Program. Member of Executive Committee of Mechanical and Nuclear Engineering.

2019 – Transition Committee for Separation nof Mechanical and Nuclear Engineering

NucE Dept Head Search Committee, Member. (2018 –2019).

Graduate Coordinator for NucE. (August 2015 - 2019).

NucE Candidacy Exam Committee, Chairperson. (August 2015 - Present).

NucE Distinguished Speaker Series Commmittee, Member. (July 2010 - 2019).

MNE Promotion and Tenure Committee, Member, Elected. (August 2017 - June 2019).2014-present , Chair of NucE Candidacy Exam Committee

2015 Committee to Review George Guillet Chair in MNE.

2010-present, Chair of NucE Seminar and Distinguished Speaker Series.

2012-2017 - NucE ABET coordinator.

2016-present Global Nuclear Power Safety Center, Task Leader.

2010-2012 MNE Promotion and Tenure Committee.

1997-2002, NucE Graduate Program Coordinator.

1997-1999, Mechanical-Nuclear Eng. Departments Merger Transition Committee and Merger Faculty Issues Implementation Committee.. Helped develop department bylaws and worked on merger issues to ensure a smooth transition while preserving independence of NucE.

*College of Engineering*

2021: Search Committee for new Associate Dean of Engineering.

2016 - AD-14 Committee to evaluate Nuclear Reactor Director Kenan Unlu.

2014-2015, Faculty Search Committee for Associate Dean for Undergraduate and Graduate Education (ADUGE).

1995-2011 College of Engineering Faculty Associate to the Engineering and Applied Sciences Interest (EASI) House. Faculty advisor to Special Living Option in Beaver Hall aimed at Engineering, organized talks, supervised governance, provided liaison with COE.

2007 – 2008 Committee Chair Review of Distinguished/Named Professors in the College of Engineering.

2001-2005 One of two College of Engineering Faculty Advisors to the Society of Women Engineers.

2000 Member of COE Faculty Taskforce on Ethical/Global/Societal Aspects of Engineering.

1999-2006 Women In Engineering Faculty Advisory Board.

1998 Member of AD 14 Review Committee for Dean David Wormley.

1995-2000, Engineering Faculty Council, Council Chair in 1998. Chaired Task force on Revising the Engineering Core Curriculum, 1995-1997.

1997-2005 Member of Faculty Advisory Board for Leonhard Center.

1995-2001 NucE Honors Advisor, Scholars Program.

*University*

2010 -2012 and 2001- 2002 Faculty Search Committees in Materials Science Department.

Petrobrás Task Force, June 2012 - Present

2001-2008 Member, Transmission Electron Microscopy Advisory Board.

2001-2005 Intercollege Program in Materials Curriculum Taskforce.

2004 Member of Committee to develop Bylaws for Intercollege Graduate Degree Program (IGDP) in Materials.