Stephen A. Taller, Ph.D.

CONTACT INFORMATION

Alvin M. Weinberg Disting. Staff Fellow, R&D Associate
Nuclear Energy and Fuel Cycle Division
1 Bethel Valley Rd., P.O. Box 2008
Oak Ridge National Laboratory
Oak Ridge, TN 37830 USA

+1-574-850-3237
TallerSA@ornl.gov
Stephen Taller
Stephen Taller
ORCID: Stephen Taller

QUALIFICATIONS

Accomplished researcher with extensive experience in designing, conducting, and analyzing experiments to study radiation damage effects in neutron irradiated and ion irradiated materials, primarily using transmission electron microscopy and associated techniques. Established record of being an effective communicator with national conference presentations and publications in peer-reviewed journals. U. S. citizen with international research experience and collaborations.

EDUCATION

University of Michigan - Ann Arbor, Ann Arbor, MI 2013 to 2020
Ph.D. (2020), M.S. (2015), Nuclear Engineering,
- Graduate Advisor: Prof. Gary S. Was
- Concentration: Nuclear Materials
- Thesis Title: *The Role of Damage Rate on Cavity Nucleation with Co-Injected Helium in Dual Ion Irradiated T91 Steel*

Purdue University, West Lafayette, IN 2009 to 2013
B.S. (2013), Nuclear Engineering,
- Honors: *Distinction*
- Concentrations: Nuclear Materials and Plasmas
- Minors: Mechanical Engineering, Mathematics

RESEARCH EXPERIENCE

Alvin M. Weinberg Distingiushed Staff Fellow, R&D Associate July 2020 to present
Oak Ridge National Laboratory, Oak Ridge, Tennessee
- Performing research on radiation effects in additive and advanced manufactured alloys for advanced reactor applications.
- Examining the roles of processing and precipitates to mitigate life limiting degradation in austenitic steel, ferritic-martensitic steels, vanadium alloys and nickel alloys.
- Investigating the role of ion irradiation in advanced reactor materials qualification.
- Developing techniques for high throughput STEM characterization using machine learning.

Postdoctoral Research Fellow Jan. 2020 to June 2020
University of Michigan, Ann Arbor, Michigan
- Performed research on radiation effects in prospective structural materials for GEN IV reactors.
- Examined the role of radiation damage rate on solute segregation and precipitation in a ferritic-martensitic steel, T91, primarily using S/TEM.
- Mentored several graduate students on using ion irradiation to study radiation damage.

Graduate Student Research Assistant July 2016 to Jan. 2020
University of Michigan, Ann Arbor, Michigan
- Performed research on radiation effects in prospective structural materials for GEN IV reactors.
- Developed procedures and protocols to simulate the microstructure of fast reactor irradiated ferritic-martensitic steels with dual ion irradiations.
- Examined the roles of radiation damage rate, helium injection rate, and temperature on the evolution of the microstructure of a ferritic-martensitic steel, T91, primarily using S/TEM.

– Coordinated sample inventory and exchange for two large multi-disciplinary, multi-laboratory programs by DOE NE IRP and IAEA CRP.

Intern, Institute for Nuclear Materials Science Jan. 2018 to Feb. 2018
Studiecentrum voor Kernenergie - Centre d'Étude de l'énergie Nucléaire (SCK-CEN), Belgium
– Performed research on neutron-ion correlations through extensive literature search of SiC/SiC composites, FeCrAl alloys, and MAX phase materials.
– Produced assessments of MAX phases, SiC, SiC/SiC, and ZrC for LWR ATF applications.
– Designed ion irradiations to assess irradiation effects under LWR conditions.
– Compiled results into a milestone report.

NEUP Graduate Intern, Oak Ridge National Laboratory May 2016 to Aug. 2016
Oak Ridge National Laboratory, Oak Ridge, TN
– Examined the microstructure of fast reactor irradiated materials including alpha iron, model iron-chromium alloys, and a commercial ferritic-martensitic alloy T91 using transmission electron microscopy.

NEUP Graduate Fellow, University of Michigan July 2013 to July 2016
University of Michigan, Ann Arbor, Michigan
– Performed research on irradiation effects in prospective structural materials for GEN IV reactors.
– Designed and performed the first dual ion irradiation experiments at the Michigan Ion Beam Laboratory.
– Examined the effects of helium on cavity formation with pre-implantation and co-injection of helium in the ferritic-martensitic alloy T91.

Undergraduate Research Associate, Radiation Surface Science and Engineering Laboratory Oct. 2012 to May 2013
Purdue University, West Lafayette, Indiana
– Performed molecular dynamics simulations to model ion bombardment and surface structure changes in silicon for surface patterning applications.

Modeling and Simulation SULI Intern, Idaho National Laboratory May 2012 to July 2012
Idaho National Laboratory, Idaho Falls, Idaho
– Performed molecular statics and dynamics simulations to investigate point defect binding energies in uranium oxide for several interatomic potentials.

GRANTS

Awarded

[1] **Co-Principal Investigator**, *The Role of Helium on Microstructure Evolution in A709*, Nuclear Science User Facilities - Super Rapid Turnaround Experiment (NSUF Super RTE), Project 24-5012, PI: Claeb Massey, Co-PIs: Stephen Taller, Grace Burke, Timothy Lach, Steven Frankowski, U. S. Department of Energy, Office of Nucl;ear Energy, 2024-2025. The project will provide a quantitative analysis of the irradiation microstructure of HFIR irradiated alloy 709 or dual ion irradiated alloy 709, with an emphasis on the cavity/He bubble distribution at low displacement damage levels (2 dpa) anticipated for A709s structural use case.

[2] **Co-Principal Investigator**, *Irradiation Damage Rate Effect on the Dislocation Cell Structure of Additively Manufactured 316L*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 24-4964, PI: Wei-Ying Chen, Co-PIs: Stephen Taller, Andrea Jokisaari, Yiren Chen, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2024. The objective of this study is to examine how dislocation cell walls evolve under irradiation at multiple damage rates to separate the

contributions of thermal diffusion and irradiation enhanced diffusion.

[3] **Principal Investigator**, *The Role of Dislocation Cell Walls on Cavity Nucleation in Additively Manufactured 316H Steel*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 24-4838, Co-PIs: Caleb Massey, Steven Zinkle, Maegan Lenertz, Kai Sun, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2024. The objective of this work is to evaluate the effectiveness of thermal processing on swelling resistance of additively manufactured 316H steel.

[4] **Co-Principal Investigator**, *Co-Location of Solute Clusters and Dislocations in Additively Manufactured 316L Stainless Steels*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 24-4841, PI: Timothy Lach, Co-PIs: Stephen Taller, Caleb Massey, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2024. The objective of this work is to evaluate the effectiveness of thermal processing on the co-location of solute clusters and dislocations in neutron irradiated additively manufactured 316L stainless steel.

[5] **Co-Principal Investigator**, *Evolution of Heterogeneous 316LSS Microstructures Under Neutron Irradiation*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 24-4862, PI: Geeta Kumari, Co-PIs: Timothy Lach, Stephen Taller, Caleb Massey, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2024. This project aims to quantify the impact of as-printed heterogeneity in laser powder bed fusion (LPBF) 316LSS on spatially dependent post-irradiation segregation and precipitation behavior.

[6] **Co-Principal Investigator**, *Swelling Resistance of Additively Manufactured Grade 91 Steel Produced with Integrated Thermal Processing*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 23-4743, PI: Daniel Codd, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Evaluate the effectiveness of integrated thermal processing on swelling resistance of Wire-Arc AM DED produced Grade 91 steel.

[7] **Co-Principal Investigator**, *High Performance Nuclear Materials Additive Manufacturing with Integrated Thermal Processing*, DOE SC Office of Science STTR Phase 1, PI: Daniel Codd, KVA Stainless, Co-PIs: Stephen Taller, U.S. Department of Energy, $206,500, 2023-2024. This project will develop and demonstrate novel integrated AM thermal processing methods relevant to high performance nuclear energy alloys.

[8] **Co-Principal Investigator**, *Mechanism Driven Evaluations of Sequential and Simultaneous Irradiation-Creep-Fatigue Testing*, Nuclear Energy Univeristy Programs (NEUP) CINR Workscope NM-2, Project CFA-23-29058, PI: Kevin Field, Co-PIs: Eric Lang, Khalid Hattar, Caleb Massey, Stephen Taller, Collaborator: Charles Hirst, U.S. Department of Energy, Office of Nuclear Energy, $1,000,000, 2023-2026. The goal of the proposed research is to develop a fundamental understanding of the interplay between creep and fatigue mechanisms using ion irradiation during in situ creep, fatigue, and creep-fatigue testing to emulate in-core advanced reactor mechanical loading conditions.

[9] **Co-Principal Investigator**, *Grand Challenge to Accelerated Deployment of Advanced Reactors A Predictive Pathway for Rapid Qualification of Core Structural Materials*, Integrated Research Project (IRP), Project 23-29881, PI: Gary Was, co-PIs: Brian Wirth, Steven Zinkle, Arthur Motta, Kevin Field, Emmanuelle Marquis, Lijun Qian, Xiaoning Qian, Muhammet Ayanoglu, Benjamin Eftink, Andrea Jokisaari, Stuart Maloy, Mychailo Toloczko, U.S. Department of Energy, Office of Nuclear Energy, $3,000,000, 2023-2026, Provide a predictive tool that incorporates ion irradiation and computational materials modeling to determine the microstructure and mechanical

properties of core structural materials that are benchmarked against reactor data on the same alloys, and codified in ASTM standards.

[10] **Principal Investigator**, *Increasing the Sensitivity of Passive SiC Thermometry Through Nanocalorimetry Experiments*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 23-4676, Co-PIs: Charles Hirst, Michael Short, Peng Wang, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Evaluate the use of flash differential scanning calorimetry to assess thermal and defect properties of neutron or ion-irradiated SiC in a highly localized volume.

[11] **Co-Principal Investigator**, *Quantifying the effect of simultaneous vs. sequential irradiation on creep performance of additively manufactured austenitic stainless steel*, PI: Caleb Massey, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Co-PIs: Stephen Taller, Charles Hirst, Kevin Field, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Quantify differences in strain rate during high temperature creep experiments with and without simultaneous ion bombardment.

[12] **Co-Principal Investigator**, *Assessing Deformation Mechanisms in Irradiated Superalloy 718 using Ultra-Miniature Specimens*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), PI: Janelle Wharry, Co-PIs: Maxim Gussev, Stephen Taller, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Investigate differences in deformation mechanisms between 300 ŕC and 600 ŕC irradiated wrought superalloy 718 specimens to produce a multi-length scale comprehension linking deformation and irradiated induced defects.

[13] **Co-Principal Investigator**, *The Role of Nb and Impurities on Nano-oxide Retention under Neutron Irradiation*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), PI: Elizabeth Getto, Co-PIs: Stephen Taller, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Evaluate the effectiveness of impurity sequestration in ODS steels under irradiation conditions relevant to current and advanced reactors using detailed post irradiation examination.

[14] **Co-Principal Investigator**, *Critical database development of high dose microstructure evolution in irradiated advanced steels*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), PI: Arthur Motta, Co-PIs: Gary Was, Kevin Field, Stephen Taller, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. This RTE focuses on the generation of data on high dose neutron irradiation in reactor for the purpose of benchmarking ion irradiation as a viable technique for rapidly advancing the development of materials for advanced reactor concepts and core structural components in life-extended LWRs.

[15] **Co-Principal Investigator**, *Microstructural Origin of Irradiation Hardening and Embrittlement in Irradiated Second Generation FeCrAl Alloys*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 23-1890, PI: Nathan Almirall, Co-PIs: Stephen Taller, Xiang Chen, Caleb Massey, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2023. Investigate the relationship between the irradiated microstructure and irradiation hardening and embrittlement using nanoindentation and detailed post irradiation electron microscopy to produce the first ever neutron irradiated structure-hardness-fracture property data.

[16] **Co-Principal Investigator**, *Hydrogen-Rentention of Yttrium Hydride under High Temperature Proton Irradiation*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 22-4396, PI: Timothy Lach, Co-PIs: Takaaki Koyanagi, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2022. The correlation between irradiated induced phase transition and hydrogen retention is being

investigated in yttrium hydride using ion irradiation, ion beam analysis, and post irradiation thermal desorption spectroscopy and electron microscopy.

[17] **Principal Investigator**, *The Role of Precipitate Coherency on Helium Trapping in Additively Manufactured Alloy 718*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 21-4272, Co-PI: Tim Lach, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2021. Helium cavity formation on precipitates is being invesitgated using a combination of in-situ ion irradiation, in-situ annealing, and post-irradiation examination using STEM-EDS.

[18] **Principal Investigator**, *Improving Nuclear Materials Development Cycles with High Throughput Microscopy and Machine Learning*, Oak Ridge National Laboratory - Laboratory Directed Research and Development (LDRD), 2020-2023, Precipitate evolution and helium trapping are being investigated in Ni-based alloys by developing and utilizing high throughput STEM imaging and machine learning to enhance radiation induced defect identification, characterization, and understanding.

[19] **Principal Investigator**, *Critical Evaluation of Solute Segregation and Precipitation Across Damage Rates in Dual Ion Irradiated T91 Steel*, Nuclear Science User Facilities - Rapid Turnaround Experiment (NSUF-RTE), Project 19-1624, Co-PIs: Gary S. Was, Zhijie Jiao, U.S. Department of Energy, Office of Nuclear Energy, $50,000, 2019. Radiation induced segregation and precipitation of Ni/Si clusters are being investigated across nearly two orders of magnitude in ion irradiation damage rate using STEM-EDS.

[20] Rackham Graduate School Conference Travel Grant, University of Michigan, $800, September 2019

[21] Rackham Graduate School Conference Travel Grant, University of Michigan, $800, March 2018

[22] Rackham Graduate School Conference Travel Grant, University of Michigan, $800, Feb. 2017

Committees and Leadership Positions

- The Minerals, Metals, and Materials Society (TMS), Structural Materials Division, Nuclear Materials Committee, Member, 2021 - Present
- ASTM International, Committee E10 on Nuclear Technology and Applications, Participating Member, Technical contact for ASTM E521, E942, 2022 - Present
- ORNL PRISM Employee Resource Group, Co-chair 2023-present, Secretary 2021 - 2023, Strong contributor to organizational charter and bylaws
- NSUF Users Organization, Vice Chair, 2024 - Present, Strong contributor to organizational bylaws
- Oak Ridge National Laboratory, Fusion and Fission Energy Sciences Directorate Intern Committee, 2024

Fellowships, Awards, and Honors

- Top 100 Most Downloaded Article in Materials Science in Scientific Reports for 2021, out of 23000+ articles published in Scientific Reports in 2021.
- ProQuest Distinguished Dissertation Award - Honorable Mention, University of Michigan, Recognizes highly accomplished graduate students who produced exceptional dissertations of outstanding scholarly quality in any field of study. Selected from over 800 dissertations submitted in calendar year 2020.
- Alvin M. Weinberg Distinguished Staff Fellowship, Oak Ridge National Laboratory, 2020-2023
- Innovations in Nuclear Technology R&D, 2018 Nuclear Technology Student Innovator, First Place, Advanced Fuels, U.S. Department of Energy, Office of Nuclear Energy, Office of Nuclear Technology R&D, $3000, 2018

- Richard and Eleanor Towner Prize for Outstanding Ph.D. Research, University of Michigan, College of Engineering, $2500, Oct. 2018
- Outstanding Contribution in Reviewing, Journal of Nuclear Materials, Elsevier, 2017
- Nuclear Energy University Programs Graduate Fellowship, $155,000 / 3 yr., 2013-2016

Papers In Preparation

[1] D. Collins, T.S. Byun, M. Gussev, **S. Taller**, C. Massey, Assessing the viability of a new subsize tensile geometry for evaluation of structural nuclear and additively manufactured materials, *In Preparation*

Under Review

[1] **S. Taller**, F. Naab, T. Koyanagi, T. Lach, Characterization of the Microstructure of Yttrium Hydride under Proton Irradiation, Journal of Nuclear Materials, *Under Review*

[2] **S. Taller**, Y. Chen, R. Song, W.-Y. Chen, A. Jokisaari, An Approach to Combine Ion and Neutron Irradiation Data to Accelerate Material Qualification for Nuclear Reactors, Journal of Nuclear Materials *Under Review*

[3] A. M. Jokisaari, **S. Taller**, Y. Chen, W.-Y. Chen, R. Song, Promoting regulatory acceptance of combined ion and neutron irradiation testing of nuclear reactor materials: Modeling and software considerations, Progress in Nuclear Energy, *Under Review*

[4] Y. Yan, C. Massey, B. E. Garrison, **S. Taller**, A. T. Nelson, Hydrogen Embirttlement of Zircaloy-4 Fabricated by Ultrasonic Additive Manufacturing, Materials Science and Engineering: A, *Under Review*

Refereed Journal Publications

[1] P. Zhu, Y.-R. Lin, S. Agarwal, V. Pauly, **S. Taller**, S. J. Zinkle, Comparison of hardening and microstructures of ferritic-martensitic steels irradiated with fast neutrons and dual ions, Journal of Nuclear Materials, Volume 599, October 2024, 155211, https://doi.org/10.1016/j.jnucmat.2024.155211

[2] **S. Taller**, L. Scime, T. Austin, A New Paradigm in Electron Microscopy: Automated Characterization using a Dynamic Segmentation Convolutional Neural Network, Materials Today Advances, Volume 21, March 2024, 100468, https://doi.org/10.1016/j.mtadv.2024.100468

[3] **S. Taller**, T. Austin, Using Post-Processing Heat Treatments to Elucidate Precipitate Strengthening of Additively Manufactured Superalloy 718, *Additive Manufacturing*, Volume 60, Part A, December 2022, 103280, https://doi.org/10.1016/j.addma.2022.103280

[4] **S. Taller**, V. Pauly, Z. Jiao, R. Hanbury, G. S. Was, Solute Segregation and Precipitation Across Damage Rates in Dual Ion Irradiated T91 Steel, *Journal of Nuclear Materials*, Volume 563, May 2022, 153626, https://doi.org/10.1016/j.jnucmat.2022.153626

[5] E. Getto, N.Nathan, J. McMahan, **S. Taller**, B. Baker, Understanding Radiation Effects in Friction Stir Welded MA956 using Ion Irradiation and a Rate Theory Model, *Journal of Nuclear Materials*, 153530, April 2022, https://doi.org/10.1016/j.jnucmat.2022.153530

[6] P. Xiu, C. Massey, T. M. K. Green, **S. Taller**, D. Isheim, N. Sridharan, K. G. Field, Microchemical Evolution of Irradiated Additive Manufactured HT9, *Journal of Nuclear Materials*, 153410, February 2022, https://doi.org/10.1016/j.jnucmat.2021.153410

[7] E. Getto, N. Nathan, J. McMahan, B. Baker, **S. Taller**, Contextualizing dispersoid evolution within the microstructure of MA956 using ion irradiation, *Nuclear Materials and Energy*, Vol. 28, 101024, Sept. 2021, https://doi.org/10.1016/j.nme.2021.101024

[8] **S. Taller**, F. Naab, G. S. Was, Corrigendum to "A Methodology for Customizing Implantation Profiles of Light Ions Using a Single Thin Foil Energy Degrader", *Nuclear Inst. and Methods in Physics Research: B*, Volume 493, 44-45, 2021, https://doi.org/10.1016/j.nimb.2021.02.004

[9] D. Woodley, **S. Taller**, Z. Jiao, K. Sun, G. S. Was, The Role of Co-injected Helium on Swelling and Cavity Evolution at High Damage Levels in Ferritic-Martensitic Steels, *Journal of Nuclear Materials*, Volume 550, 152912, July 2021, https://doi.org/10.1016/j.jnucmat.2021.152912

[10] **S. Taller**, G. VanCoevering, B. D. Wirth, G. S. Was, Predicting Structural Material Degradation in Advanced Nuclear Reactors with Ion Irradiation, *Scientific Reports*, Volume 11, 2949, 2021, https://doi.org/10.1038/s41598-021-82512-w

[11] **S. Taller**, G. S. Was, Understanding Bubble and Void Nucleation in Dual Ion Irradiated T91 Steel using Single Parameter Experiments, *Acta Materialia*, Volume 198, 1 October 2020, Pages 47-60, https://doi.org/10.1016/j.actamat.2020.07.060

[12] **S. Taller**, F. Naab, G. S. Was, A Methodology for Customizing Implantation Profiles of Light Ions Using a Single Thin Foil Energy Degrader, *Nuclear Inst. and Methods in Physics Research: B*, Volume 478, 1 September 2020, Pages 274-283, https://doi.org/10.1016/j.nimb.2020.07.017

[13] **S. Taller**, Z. Jiao, K. G. Field, G. S. Was, Emulation of Fast Reactor Irradiated T91 Using Dual Ion Beam Irradiation, *Journal of Nuclear Materials*, Volume 527, 15 December 2019, 151831, https://doi.org/10.1016/j.jnucmat.2019.151831

[14] Z. Jiao, **S. Taller**, K. G. Field, G. Yeli, M.P. Moody, G. S. Was, Microstructure Evolution of T91 Irradiated in the BOR60 Fast Reactor, *Journal of Nuclear Materials*, Volume 504, June 2018, Pages 122-134, https://doi.org/10.1016/j.jnucmat.2018.03.024.

[15] G. S. Was, **S. Taller**, Z. Jiao, A. M. Monterrosa, D. Woodley, D. Jennings, T. Kubley, F. Naab, O. Toader, E. Uberseder, Resolution of the Carbon Contamination Problem in Ion Irradiation Experiments, *Nuclear Inst. and Methods in Physics Research: B*, Volume 412, December 2017, Pages 58-65, https://doi.org/10.1016/j.nimb.2017.08.039

[16] **S. Taller**, D. Woodley, E. Getto, A. M. Monterrosa, Z. Jiao, O. Toader, F. Naab, T. Kubley, S. Dwaraknath, G. S. Was, Multiple Ion Beam Irradiation for the Study of Radiation Damage in Materials, *Nuclear Inst. and Methods in Physics Research: B*, Volume 412, December 2017, Pages 1-10, https://doi.org/10.1016/j.nimb.2017.08.035

[17] O. Toader, F. Naab, E. Uberseder, T. Kubley, **S. Taller** and G. Was, Technical Aspects of Delivering Simultaneous Dual and Triple Ion Beams to a Target at the Michigan Ion Beam Laboratory, *Physics Procedia*, Volume 90, October 2017, Pages 385-390, https://doi.org/10.1016/j.phpro.2017.09.039

[18] X. Hu, K. G. Field, **S. Taller**, Y. Katoh, B. D. Wirth, Impact of neutron irradiation on thermal helium desorption from iron, *Journal of Nuclear Materials*, Volume 489, June 2017, Pages 109-117, https://doi.org/10.1016/j.jnucmat.2017.03.034

[19] E. Getto, K. Sun, **S. Taller**, A. M. Monterrosa, Z. Jiao, G. S. Was, Methodology for determining void swelling at very high damage under ion irradiation, *Journal of Nuclear Materials*, Volume 477, August 2016, Pages 273-279, https://doi.org/10.1016/j.jnucmat.2016.05.026

[20] P. K. Roy, **S. Taller**, O. Toader, F. Naab, S. Dwaraknath, G. S. Was, A Multi-Pinhole Faraday Cup Device for Measurement of Discrete Charge Distribution of Heavy and Light Ions, *IEEE Transactions on Nuclear Science*, Volume 63, No. 2, April 2016, https://doi.org/10.1109/TNS.2015.2483478

[21] **S.A.Taller**, X.-M. Bai, Assessment of structures and stabilities of defect clusters and surface energies predicted by nine interatomic potentials for UO2, *Journal of Nuclear Materials*, Volume 443, November 2013, Pages 84-93, https://doi.org/10.1016/j.jnucmat.2013.06.038

Refereed Conference Publications

[1] **S. Taller**, L. Scime, K. Terrani, Utilizing a Dynamic Segmentation Convolutional Neural Network for Microstructure Analysis of Additively Manufactured Superalloy 718, Microscopy & Microanalysis, Vol. 27, Supplement S1, Aug. 2021, pp.3110-3112. https://doi.org/10.1017/S143192762101076X

[2] **S. Taller**, Z. Jiao, G.S. Was, Application of Multiple Ion Beam Irradiation for the Study of Radiation Damage in Materials, ANS Transactions, Volume 119, Number 1, November 2018. http://epubs.ans.org/download/?a=44187

[3] K.G. Field, **S. Taller**, C.J. Ulmer, Z. Jiao, T.A. Saleh, A.T. Motta, G.S. Was, Application of NSUF capabilities towards understanding the emulation of high dose neutron irradiations with ion beams, ANS Transactions, Volume 116, Number 1, June 2017, Pages 367-368. http://epubs.ans.org/?a=40616

Invited Presentations

[1] **S. Taller**, L. Scime, T. Lach, K. Sun, Accelerating Characterization of Radiation Driven Processe using Machine Learning Tools, invited presentation for *TMS Annual Meeting & Exhibition 2024* in the Materials Informatics to Accelerate Nuclear Materials Investigation symposium, Orlando, FL, Mar. 2024

[2] **S. Taller**, Improving the Nuclear Materials Development Cycle with High Throughput Microscopy and Machine Learning, invited presentation for *Deep Learning for Microscopy Image Analysis in Materials Science: Advancing Research and Education Workshop*, University of Tennessee-Knoxville, Knoxville, TN, June 2023

[3] **S. Taller**, C. Massey, Examining Microstructural Effects on Tensile Properties in Irradiated Inconel 718 Using Miniaturized Tensile Specimens, invited presentation for *TMS Annual Meeting & Exhibition 2023* in the Mechanical Behavior of Nuclear Reactor Materials and Components III symposium, San Diego, CA, Mar. 2023

[4] **S. Taller**, Improving the Nuclear Mateirals Development Cycle with High Throughput Microscopy and Machine Learning, invited poster presentation for the ORNL Scientific Advisory Board, Oak Ridge, TN, Aug. 2022

[5] **S. Taller**, L. Scime, K. Terrani, Utilizing a Dynamic Segementation Convolutional Neural Network for Microstructure Analysis, invited presentation for *Materials Science and Technology 2021* in the Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments symposium, Columbus, Ohio, October 2021.

[6] **S. Taller**, Improving the Nuclear Materials Developement Cycle Using Existing and Emerging Technologies, invited seminar for *Oak Ridge Postdoctoral Association*, Oak Ridge National Laboratory, Oak Ridge, TN, December 2020.

[7] **S. Taller**, V. Pauly, Z. Jiao, G. S. Was, Understanding Physical Processes Through Isolation of Single Parameters, invited presentation at *Workshop on Accelerated Irradiations for Reactor Structural Materials*, Idaho National Laboratory, Idaho Falls, ID, September 2020.

Technical Presentations

[1] **S. Taller**, Overview of Rapid Qualification and Irradiation Efforts for Additively Manufactured 316 SS, *Subcommittee E10.02 on Behavior and Use of Nuclear Structural Materials*, ASTM E10 Committee Week, Philadelphia, PA, June 2024

[2] **S. Taller**, C. Hirst, M. Short, P. Wang, Increasing the Sensitivity of SiC Passive Thermometry through Nanocalorimetry, *SiC Passive Thermometry Workshop*, Oak Ridge, TN, May 2024

[3] **S. Taller**, J. Werden, M. Lynch, Precipitate Evolution and Stability in Superalloy 718 Following HFIR Irradiation or Thermal Aging, *TMS Annual Meeting & Exhibition 2024* in the Phase Stability in Extreme Environments II symposium, Orlando, FL, Mar. 2024

[4] L. Metzger, **S. Taller**, Effects of Microstructural Variance on Edge Dislocation Mobility and Pinning in Nickel Superalloys at High Temperatures, *TMS Annual Meeting & Exhibition 2024* in the Phase Stability in Extreme Environments II symposium, Orlando, FL, Mar. 2024

[5] V. Pauly, **S. Taller**, M. Toloczko, D. Edwards, A. Schemer-Kohrn, G. S. Was, Comparison of Cavity Microstructures from BOR-60, FFTF and Dual-ion Irradiations up to 72 dpa in T91 steel, *TMS Annual Meeting & Exhibition 2024* in the Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories symposium, Orlando, FL, Mar. 2024

[6] **S. Taller**, A. Motta, K. Field, G. S. Was, Comparison of High-dose Microstructure Evolution in HT9 Steel Across Reactor Environments, *TMS Annual Meeting & Exhibition 2024* in the Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories symposium, Orlando, FL, Mar. 2024

[7] **S. Taller**, Y. Chen, W-Y. Chen, R. Song, A. Jokisaari, A Path Forward for the Regulatory Acceptance of Combined Ion/Neutron Irradiation Data for Materials Qualification, *Materials in Nuclear Energy Systems 2023*, New Orleans, LA, Dec. 2023

[8] **S. Taller**, A. Motta, K. Field, G. S. Was, High Dose Microstructure Evolution in Fast Reactor Irradiated HT9 Steel, *Materials in Nuclear Energy Systems 2023*, New Orleans, LA, Dec. 2023

[9] Y. Yan, C. P. Massey, B. E. Garrison, **S. A. Taller**, A. T. Nelson, Hydrogen Embrittlement of Zircaloy-4 Fabricated by Ultrasonic Additive Manufacturing, *Materials in Nuclear Energy Systems 2023*, New Orleans, LA, Dec. 2023

[10] V. Pauly, **S. Taller**, G. S. Was, Prediction of Neutron-Irradiated Cavity Microstructure with Dual-Ion Irradiation up to 72 dpa, *Materials in Nuclear Energy Systems 2023*, New Orleans, LA, Dec. 2023

[11] C. Massey, **S. Taller**, B. E. Garrison, M. Ridley, H. Hyer, Y. Yan, C. Petrie, A. T. Nelson, Ultrasonic Additive Manufacturing: Towards Modernizing Plate Manufacturing, *Materials in Nuclear Energy Systems 2023*, New Orleans, LA, Dec. 2023

[12] **S. Taller**, L. Metzger, M. Lynch, Precipitate Evolution in Post-AM Heat Treated and HFIR Irradiated Inconel 718 Alloys, *TMS Annual Meeting & Exhibition 2023* in the Phase Stability in Extreme Environments symposium, San Diego, CA, Mar. 2023

[13] **S. Taller**, T. Lach, K. Sun, Precipitate and Cavity Evolution in Alloy 718 Under High Temperature In-situ Ion Irradiation using Machine Learning, *TMS Annual Meeting & Exhibition 2023* in the Methods, Techniques, and Materials Discovery of Irradiation Effect Using In-situ Microscopy symposium, San Diego, CA, Mar. 2023

[14] **S. Taller**, T. Lach, K. Sun, Microstructural Evolution of Alloy 718 Under High Temperature In-situ Ion Irradiation with Machine Learning, *Materials Science and Technology 2022* in the Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III symposium, Pittsburgh, PA, Oct. 2022

[15] **S. Taller**, T. Lach, K. Sun, Microstructural Evolution of Alloy 718 Under High Temperature In-situ Ion Irradiation, *Sixth International Workshop on Structural Materials for Innovative Nuclear Systems (SMINS-6)*, Idaho Falls, ID, Sept. 2022

[16] **S. Taller**, T. Austin, K. Terrani, Deconvoluting Properties of Additively Manufactured Alloy 718 Utilizing Coupled Microscopy and Machine Learning, presented at *TMS Annual Meeting & Exhibition 2022* in the Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials symposium, Online because of SARS-CoV-2, Feb. 2022

[17] V. Pauly, **S. Taller**, Z. Jiao, G. S. Was, Effect of Helium Injection Rate on Cavity Microstructure in Dual Ion Irradiated T91 Steel, presented at *Materials in Nuclear Energy Systems 2021*, Pittsburgh, PA, November 2021

[18] E. Getto, N. Nathan, J. McMahan, B. Baker, **S. Taller**, Contextualizing Dispersoid Evolution within Friction Stir Welded and Ion Irradiated MA956, presented at *Materials in Nuclear Energy Systems 2021*, Pittsburgh, PA, November 2021

[19] **S. Taller**, V. Pauly, Z. Jiao, G. S. Was, Solute Segregation and Precipitation Across Damage Rates in Dual Ion Irradiated T91 Steel, presented at *Materials in Nuclear Energy Systems 2021*, Pittsburgh, PA, November 2021, presented by V. Pauly.

[20] **S. Taller**, L. Scime, K. Terrani, Utilizing a Dynamic Segmentation Convolutional Neural Network for Microstructure Analysis of Additively Manufactured Superalloy 718, presented at *Microscopy & Microanalysis 2021*, Online because of SARS-CoV-2, August 2021

[21] **S. Taller**, L. Scime, K. Terrani, Characterization of As-Fabricated Additively Manufactured Alloy 718 Enhanced by Modern Tools and Machine Learning, presented at *TMS Annual Meeting & Exhibition 2021* in the Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications symposium, Online because of SARS-CoV-2, March 2021

[22] **S. Taller**, G. Van Coevering, B. D. Wirth, G. S. Was, Predicting the Cavity Microstructure in Reactor-Irradiated T91 Steel with Dual Ion Irradiation, presented at *The Nuclear Materials Conference 2020*, Track 1A: Metallic Alloys, Ghent, Belgium (online because of SARS-CoV-2), October 2020.

[23] **S. Taller**, Z. Jiao, G. S. Was, The Roles of Helium Rate and Damage Rate on Cavity Nucleation with Co-Injected Helium in Dual Ion Irradiated T91 Steel, presented at *Materials in Nuclear Energy Systems*, Integrated Phenomena: Neutron-Ion Irradiated Microstructures session, Baltimore, MD, October 2019.

[24] K. G. Field, **S. A. Taller**, N. Sridharan, Radiation Tolerance of Additively Manufactured HT-9 Ferritic/Martensitic Steel, poster presentation at *Materials in Nuclear Energy Systems*, Irradiation Damage and Microstructures, Radiation Effects Simulation and Evaluation, Integrated Phenomena, and Mechanical Properties session, Baltimore, MD, October 2019.

[25] **S. Taller**, Z. Jiao, G. S. Was, Application of Multiple Ion Beam Irradiation for the Study of Radiation Damage in Materials, presented at the *American Nuclear Society Winter Meeting and Expo 2018* in the Innovations in Nuclear Technology R&D Awards session, Orlando, FL, November 2018.

[26] **S. Taller**, Z. Jiao, K. G. Field, G. S. Was, Emulation of BOR-60 Irradiated T91 Using Dual Ion Irradiation, presented at the *Engineering Graduate Symposium* at the University of Michigan, Richard and Eleanor Towner session, Ann Arbor, MI, October 2018.

[27] F. Naab, **S. Taller**, Z. Jiao, A. M. Monterrosa, D. Woodley, T. Kubley, O. Toader, E. Uberseder and G. S. Was, Mitigation of Carbon Contamination in Ion Irradiation Experiments Through Environmental Conditioning, presented at the *25th Conference on Application of Accelerators in Research and Industry*, Grapevine, TX, August 2018.

[28] **S. Taller**, Z. Jiao, K. Field, G. S. Was, Impact of Temperature on Microstructural Features using Dual Ion Irradiation in T91 Steel, presented at the *TMS Annual Meeting & Exhibition 2018* in the Accelerated Materials Evaluation for Nuclear Application Utilizing Test Reactors, Ion Beam Facilities and Integrated Modeling Symposium, Phoenix, AZ, March 2018.

[29] Z. Jiao, **S. Taller**, K. Field, G. S. Was, Microstructure Evolution in BOR60 Irradiated T91, presented at the *TMS Annual Meeting & Exhibition 2018* in the Accelerated Materials Evaluation for Nuclear Application Utilizing Test Reactors, Ion Beam Facilities and Integrated Modeling Symposium, Phoenix, AZ, March 2018.

[30] G. Was, **S. Taller**, Z. Jiao, K. Field, Microstructure Evolution in Neutron Irradiated and Ion Irradiated Alloy T91, invited presentation at the *TMS Annual Meeting & Exhibition 2018* in the Materials and Fuels for the Current and Advanced Nuclear Reactors Symposium, Phoenix, AZ, March 2018.

[31] **S. Taller**, Z. Jiao, K. Field, G. S. Was, Emulation of Reactor-Irradiated Microstructural Features with Dual Ion-Irradiation in T91 Steel, presented at the *TMS Annual Meeting & Exhibition 2017* in the Microstructural Processes in Irradiation Materials Symposium, San Diego, CA, February 2017.

[32] Z. Jiao, **S. Taller**, D. Woodley, K. Field, G. Yeli, M. Moody, G. S. Was, Dual Ion Irradiation in Emulation of Reactor Irradiation Microstructures in F-M Alloys, presented at the *18th International Conference on Fusion Reactor Materials*, Aomori, Japan, November 2017.

[33] **S. Taller**, Z. Jiao, G. S. Was, Effect of Helium Implantation Mode on Void Formation in Ion-Irradiated T91 Steel, presented at the *TMS Annual Meeting & Exhibition 2016* in the Accelerated Materials Evaluation for Nuclear Application Utilizing Test Reactors, Ion Beam Facilities and Integrated Modeling Symposium, Nashville, TN, February 2016.

[34] **S. Taller**, D. Woodley, S. Dwaraknath, G. S. Was, Modeling and Measurement of Simultaneous Heavy and Light Ion Beam Injection, poster presentation at *12th International Topical Meeting on Nuclear Applications of Accelerators (AccApp'15)*, Washington D.C., November 2015.

[35] **S. Taller**, Z. Jiao, E. Getto, A. M. Monterrosa, G. S. Was, Role of Helium on Swelling at Low Doses in Ion-Irradiated T91 Steel, poster presentation at *TMS Annual Meeting & Exhibition 2016* in the Microstructural Processes in Irradiated Materials Symposium, Orlando, FL, March 2015.

[36] N. Sridharan, T. M. K. Green, P. Xiu, G. Bruno, **S. Taller**, X. Chen, L. Tan, Y. Yang, K. G. Field, Tailored Radiation Responses of 9-12 wt.% Cr Steels Through Additive Manufacturing, presented at *TMS Annual Meeting & Exhibition 2021* in the Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications symposium, Online because of SARS-CoV-2, March 2021

[37] N. Sridharan, T. K. Green, **S. Taller**, K. G. Field, Additive manufacturing (AM) of steels for extreme environments- Opportunities and Challenges, invited presentation at *TMS Annual Meeting & Exhibition 2020*, San Diego, CA, February 2020.

[38] G. S. Was, E. Getto, A. Monterrosa, **S. Taller**, D. Woodley, Z. Jiao, K. Sun, Use of Ion Irradiation to Simulate Radiation Damage from Neutrons, invited presentation at *International Nuclear Target Development Society*, Lansing, MI, October 2018

DEPARTMENT OF ENERGY REPORTS

[1] S. Dryepondt, **S. Taller**, Z. Snow, H. Hyer, A. Ziabari, Y.-F. Su, L3 Milestone, Complete Optimization of Laser Powder Bed Fusion Nickel-Based Alloys Downselected from FY 2023 Candidate Materials including Thermodynamic Modeling, Sample Fabrication, and Microstructure Characterization, ORNL/TM-2024/3464, July 2024.

[2] A. Jokisaari, W-Y. Chen, Y. Chen, R. Song, **S. Taller**, L2 Milestone, Promoting the regulatory acceptance of combined ion and neutron irradiation data for material degradation in nuclear reactors, INL/RPT-23-74577, September 2023. https://doi.org/10.2172/2251504

[3] S. Dryepondt, **S. Taller**, F. List, Z. Snow, M. D. McMurtrey, M. Moorehead, M. Mulholland, L2 Milestone, Prioritization of Existing Reactor Materials, ORNL/TM-2023/3108, September 2023, https://doi.org/10.2172/2345330

[4] M. Messner et al., L2 Milestone, ASME Code Qualification Plan for LPBF 316 SS, ANL-AMMT-009, September 2023, https://doi.org/10.2172/1997134

[5] P. A. Champlin, C. P. Massey, A. G. Le Coq, **S. A. Taller**, T. S. Byun, K. D. Linton, L3 Milestone, AMMT FY23 HFIR Irradiation Test Matrix Supported by the Design of a Miniature Bend Bar Irradiation Vehicle, ORNL/TM-2023/3037, Augsut 2023, https://doi.org/10.2172/1996657

[6] S. Dryepondt, **S. Taller**, F. List, Z. Snow, L4 Milestone, Prioritization of Current Reactor Materials for Advanced Manufacturing: Ni-based Alloys, July 2023

[7] A. Huning, S. Arndt, C. Massey, **S. Taller**, R. Dehoff, M. Russell, L. Scime, Z. Snow, A. Ziabari, W. Halsey, S. Cooper, V. Orlyanchik, M. Sprayberry, G. Knapp, B. Stump, V. Paquit, T. Butcher, L4 Milestone, Oak Ridge National Laboratory Input to Laser Powder Bed Fusion Qualification of 316 Stainless Steel, July 2023

[8] **S. Taller**, K. Linton, L3 Milestone Report, Report on Inventory of Samples from Four Capsules from BOR-60, March 2023

[9] **S. Taller**, A. Le Coq, C. Massey, J. Werden, M. Lynch, K. Linton, L3 Milestone Report, Report on Evolution of Inconel 718 Following HFIR Irradiation, Oct. 2022, https://doi.org/10.2172/1963154

[10] **S. Taller**, T. Austin, V. Paquit, K. Terrani, L3 Milestone Report, Report on Properties and Microstructure of 3D Printed Inc-718, Sept. 2021, https://doi.org/10.2172/1820785

[11] Contributing author, G. S. Was, et al., High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, Final Technical Report, contributed to section 1 on ion irradiation and section 2 on microstucture charaterization of alloy T91, DOE-NE IRP Award Number: DE-NE0000639, April 2018. http://doi.org/10.2172/1437129

[12] **S. Taller**, V. Pauly, T. M. K. Green, G. Bruno, P. Zhu, S. Agarwal, Z. Jiao, K. G. Field, G. S. Was, S. Zinkle, L2 Milestone Report, Ion Irradiation and Characterization of T91 and HT9 Complements to Microstructures from P038 and P043, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, Gary. S. Was, Principal Investigator for DOE-NE IRP, Award Number: DE-NE0000639, February 2020.

[13] Z. Jiao, **S. Taller**, K. G. Field, G. S. Was, L2 Milestone Report, Microstructure Characterization of T91 Samples in Capsules P038 and P043, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, Gary. S. Was, Principal Investigator for DOE-NE IRP, Award Number: DE-NE0000639, January 2020.

[14] Contributing author, L3 Milestone Report, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, *Comparison of ion to neutron irradiation data at 360°C: Alloys T91, HT9, 800H and Fe-21Cr32Ni*, contributed to section 1 on microstucture charaterization of alloy T91, March 2019.

[15] Contributing author, L2 Milestone Report, Comparison of Ion and Neutron Irradiated Microstructures Alloys T91 and 800H, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on microstructure characterization of neutron and ion irradiated alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, February 2016.

[16] Z. Jiao, **S. Taller**, G. S. Was, L2 Milestone Report, Establishment of Multiple Beam Capability at the Michigan Ion Beam Laboratory, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, Gary. S. Was, Principal Investigator for DOE-NE IRP, Award Number: DE-NE0000639, June 2015.

[17] Z. Jiao, **S. Taller**, G. S. Was, L3 Milestone Report, Single Ion Irradiations, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, February 2015.

[18] Contributing author, Quarterly Technical Progress Report Y4Q2, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, October 2017.

[19] Contributing author, Quarterly Technical Progress Report Y4Q1, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, July 2017.

[20] Contributing author, Quarterly Technical Progress Report Y3Q4, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, April 2017.

[21] Contributing author, Quarterly Technical Progress Report Y3Q3, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, January 2017.

[22] Contributing author, Quarterly Technical Progress Report Y3Q2, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, October 2016.

[23] Contributing author, Quarterly Technical Progress Report Y3Q1, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, July 2016.

[24] Contributing author, Quarterly Technical Progress Report Y2Q4, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, April 2016.

[25] Contributing author, Quarterly Technical Progress Report Y2Q3, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, January 2016.

[26] Contributing author, Quarterly Technical Progress Report Y2Q2, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, October 2015.

[27] Contributing author, Quarterly Technical Progress Report Y2Q1, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, July 2015.

[28] Contributing author, Quarterly Technical Progress Report Y1Q4, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, April 2015.

[29] Contributing author, Quarterly Technical Progress Report Y1Q3, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, January 2015.

[30] Contributing author, Quarterly Technical Progress Report Y1Q2, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, October 2014.

[31] Contributing author, Quarterly Technical Progress Report Y1Q1, High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation, contributed to section 1 on ion irradiation progress and section 2 on microstructure characterization of alloy T91, Gary. S. Was, Principal Investigator for DOE-NE IRP Award Number: DE-NE0000639, July 2014.

OTHER TECHNICAL REPORTS

[1] Contributing Author, Nuclear Science User Facilities 2021 Annual Report, "Ion Irradiation for High Fidelity Simulation of High Dose Neutron Irradiation", https://nsuf.inl.gov/file/2021AnnualReport.pdf

[2] F. Pellemoine, C. Barbier, Y. Sun, K. Ammigan, S. Bidhar, B. Zwaska, D. McClintock, **S. Taller**, D. Winder, C.S. Cutler, D. Kim, Y. Chiu, M. Freer, C. Wheldon, A. Gottberg, F. Boix Pamies, M. Calviani, N. Moncoffre, S. Meigo, T. Ishida, Y. Dai, A. Couet, K. Kriewaldt, M. Moorhead, G.S. Was, O. Toader, F. Naab, P. Wang, D. Woodley, E. Getto, S. Raiman, C. Grygiel, I. Monnet, A. Alessi, Irradiation Facilities and Irradiation Methods for High Power Target, Snowmass 2021, https://doi.org/10.48550/arXiv.2203.08239

[3] B.T. Clay, A. Bakaev, L. Buongiorno, **S. A. Taller**, M. Verwerft, K. Lambrinou, MS4 Mining of Existing Irradiation Data, 2nd Ed., Innovative Cladding Materials for Advanced Accident-Tolerant Energy Systems, K. Lambrinou, Principal Investigator for NFRP-2016-2017, Grant Agreement Number: 740415

[4] A. Bakaev, **S. A. Taller**, M. Verwerft, K. Lambrinou, MS4 Mining of Existing Irradiation Data, Innovative Cladding Materials for Advanced Accident-Tolerant Energy Systems, K. Lambrinou, Principal Investigator for NFRP-2016-2017, Grant Agreement Number: 740415

PROFESSIONAL WORKSHOPS

SiC Passive Thermometry Workshop, participated in discussions of SiC as a passive thermometry device in neutron radiation environments, Oak Ridge, TN, USA, May 2024

Oppenheimer Science and Energy Leadership Program, invited participation in a panel discussion of Diversity, Equity, Inclusion, and Accessibility efforts with OSELP Cohort 6, Oak Ridge, TN, USA, August 2023

SRS Observance Program - LGBTQ+ Pride Month: Peace, Love, Revolution, invited participation in a panel discussion for the Savannah River Site with representatives across the DOE complex, Virtual, Aiken, SC, USA, June 2023

American Nuclear Society - Student Conference, ORNL Lunch and Learn: Working with ORNL Internships, Postdocs, and Early Careers, Presented on experiences as an intern, graduate student, and early career scientist at ORNL to undergraduate and graduate students, Knoxville, TN, USA, April 2023

Sixth International Workshop on Structural Materials for Innovative Nuclear Systems (SMINS-6), Presented on Microstructural Evolution of Alloy 718 Under High Temperature In-situ Ion Irradiation, hosted by the Nuclear Energy Agency (NEA) at Idaho National Laboratory, Idaho Falls, ID, USA, September 2022

Material Challenges for Nuclear Fusion and Fission Energy, ORNL Workshop, Oak Ridge, TN, USA, August 2022

Workshop on Advanced Characterization on Nuclear Fuel and Materials. Attended presentations remotely, McMaster University, Hamilton, Ontario, Canada, January 2021

Workshop on Accelerated Irradiations for Reactor Structural Materials, Invited speaker on Understanding Physical Processes Through Isolation of Single Parameters, Idaho National Laboratory, Idaho Falls, ID, September 2020

High Fidelity Ion Beam Simulation of High Dose Neutron Irradiation Ferritic-Martensitic Steel Characterization Workshop, Organized and led practical demonstrations for the characterization of irradiation induced defects in ferritic-martensitic steels using SEM/FIB, STEM/TEM, Michigan Center for Materials Characterization, University of Michigan, Ann Arbor, Michigan, October 2018

Workshop on Ion Irradiation For the Study of Radiation Damage in Materials, Contributed to *Best Practices for Conducting Ion Irradiation to Study Radiation Damage in Materials*, G. S. Was editor, The Pennsylvania State University, State College, Pennsylvania, June 2015

Workshop on The Characterization of Radiation Damage in Metals Using Transmission Electron Microscopy, Contributed to *Report on the Best Practices for Transmission Electron Microscopy Characterization of Irradiation Induced Defects*, A.T. Motta and M.A. Kirk, editors, Argonne National Laboratory, Lemont, Illinois, September 2014

Workshop on Ion Beam Simulation of High Dose Neutron Irradiation, Attended plenary talks and partcipated in discussion sections, University of Michigan, Ann Arbor, Michigan, March 2014

Laboratory Skills

Analytical Microscopy:

- Transmission Electron Microscopy (TEM), Scanning TEM (STEM), Energy-dispersive X-ray spectroscopy (EDS), Electron Energy Loss Spectroscopy (EELS) on JEOL and FEI suite of transmission electron microscopes

– Scanning Electron Microscopy (SEM), Focused Ion Beam (FIB) on FEI suite of scanning electron microscopes
– Digital Micrograph, ImageJ, FIJI

Ion Beam Techniques and Software:
– Particle Induced X-ray Emission (PIXE) Analysis, Nuclear Reaction Analysis (NRA), Rutherford Backscattering (RBS) Analysis
– Stopping and Range of Ions in Matter (SRIM), GEANT4 (beginner), SimNRA, IRADINA (beginner)

Proton, Heavy Ion, and Multiple Ion Beam Irradiations of Metals and Ceramics

Numerical Analysis:
– MATLAB, NumPy, SciPy (beginner)

Desktop Editing and Productivity Software:
– Microsoft Office, LaTeX (beginner), Google Docs

Programming Languages:
– MATLAB, Python, C++ (beginner)

PROFESSIONAL SERVICE

Referee Service
– *Journal of Nuclear Materials*
– *Nuclear Materials and Energy*
– *Materials Letters*
– *Vacuum*
– *The Journal of Visualized Experiments*
– *The Journal of Materials Science and Technology*
– *Scripta Materialia*
– *Scientific Reports*
– *Nuclear Science and Engineering*

MENTORING AND TEACHING EXPERIENCE

Oak Ridge National Laboratory, Oak Ridge, TN

Guest Lectures **Spring 2024**
University of Tennessee - Knoxville, NE540 "Fundamentals of Irradiation Effects in Nuclear Materials" on Radiation Hardening and Embrittlement, Void Swelling

Matthew Lynch
Graduate student in Nuclear Engineering, University of Michigan. Machine learning for microstructure identification using Transmission Electron Microscopy. Primary advisor: Prof. Kevin Field. Summer 2022.

Lukas Metzger
Graduate student in Nuclear Engineering, Virginia Polytechnic Institute and State University. Molecular dynamics simulation of defect interactions with Ni-Nb precipitates in FCC Nickel. Primary advisor: Prof. Jinsuo Zhang. Summer 2022.

Ty Austin
Graduate student in Nuclear Engineering, University of Tennessee - Knoxville. Machine learning for microstructure defect identification and data processing techniques. Served on Ph.D. dissertation committee. Primary advisor: Prof. Steven Zinkle. Summer 2021.

Andrew Kupferberg
Graduate student in Materials Science Engineering, Rutgers University. Molecular dynamics simulation of defects in FCC Nickel and helium effects on cavities. Summer 2021. Now: Corning Incorporated.

University of Michigan - Ann Arbor, Ann Arbor, MI

Valentin Pauly
Graduate student in Nuclear Engineering, University of Michigan - Ann Arbor. Simulation of high dose neutron damage using dual ion beam irradiations. Serving on Ph.D. dissertation committee. Primary advisor: Prof. Gary Was. Fall 2019 and Winter 2020.

Logan Clowers
Graduate student in Nuclear Engineering, University of Michigan - Ann Arbor. Simulation of radiation damage in fusion reaction materials using multiple ion beam irradiations. Primary advisor: Prof. Gary Was. Fall 2019 and Winter 2020.

Course Assistant for NERS 521: "Radiation Materials Science I" **Fall 2017**
- Responsibilities: Prepared homework solutions and graded homework. Provided assistance at weekly office hours.

Sunming Qin
Undergraduate student in Nuclear Engineering, University of Michigan - Ann Arbor. Design and programming for a rotating thin foil energy degrader. Primary advisor: Prof. Gary Was. Winter 2015 and Spring 2015.

Professional Memberships

American Nuclear Society (ANS), Member, 2015 - Present
Material Advantage (ACerS, AIST, ASM, TMS), Member, 2013 - Present
ASTM International, 2022 - Present
Tau Beta Pi
Phi Beta Kappa
Alpha Nu Sigma