

# Stephen A. Taller, Ph.D.

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## CONTACT

### INFORMATION

Alvin M. Weinberg Distinguished Staff Fellow

Reactor and Nuclear Systems Division  
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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 Distinguished Staff Fellow**

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 and nickel alloys.

**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. Examining the role of radiation damage rate on solute segregation and precipitation in a ferritic-martensitic steel, T91, primarily using S/TEM. Mentoring 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. Examining 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), Mol,*

*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. One paper produced.

**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. One paper produced.

GRANTS

**Awarded**

- [1] **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.
- [2] Rackham Graduate School Conference Travel Grant, University of Michigan, \$800, September 2019
- [3] Rackham Graduate School Conference Travel Grant, University of Michigan, \$800, March 2018
- [4] Rackham Graduate School Conference Travel Grant, University of Michigan, \$800, Feb. 2017

FELLOWSHIPS,  
AWARDS, AND  
HONORS

- 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

OVERVIEW OF  
RESEARCH  
PUBLICATIONS

	2013	2014	2015	2016	2017	2018	2019	2020
Refereed Journal Articles	1	0	0	2	4	1	1	2
Refereed Conf. Proceedings	0	0	0	0	1	1	0	0
DOE Reports	0	2	6	5	4	1	1	0
Other Reports	0	2	1	0	0	1	0	0
<b>Total</b>	1	4	7	7	9	4	2	2

REFEREED  
JOURNAL  
PUBLICATIONS

- [1] **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>
- [2] **S. Taller**, F. Naab, G. S. Was, A Methodology for Customizing Implantation Profiles of Light Ions Using a Single Thin Foil Energy Degradier, *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>
- [3] **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>
- [4] 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>.
- [5] 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>
- [6] **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>
- [7] 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>
- [8] 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>
- [9] 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>

- [10] 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>
- [11] **S.A.Taller**, X.-M. Bai, Assessment of structures and stabilities of defect clusters and surface energies predicted by nine interatomic potentials for UO<sub>2</sub>, *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**, 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>
- [2] 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 TECHNICAL  
PRESENTATIONS

- [1] **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**, 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.
- [2] 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.
- [3] **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.
- [4] **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.
- [5] 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.
- [6] **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.
- [7] 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.

- [8] 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.
- [9] **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.
- [10] 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.
- [11] **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.
- [12] **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.
- [13] **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.
- [14] 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.
- [1] 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 microstructure characterization of alloy T91, DOE-NE IRP Award Number: DE-NE0000639, April 2018. <http://doi.org/10.2172/1437129>
- [2] **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.
- [3] 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.
- [4] 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 microstructure characterization of alloy T91, March 2019.

DEPARTMENT OF  
ENERGY  
REPORTS

- [5] 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.
- [6] 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.
- [7] 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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.
- [12] 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.
- [13] 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.
- [14] 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.
- [15] 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.

- [16] 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.
- [17] 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.
- [18] 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.
- [19] 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.
- [20] 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.
- [21] 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] 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

**Workshop on Accelerated Irradiations for Reactor Structural Materials**, Invited speaker on ion irradiation effects, 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 participated 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 (beginner), SciPy (beginner)

Desktop Editing and Productivity Software:

- Microsoft Office, L<sup>A</sup>T<sub>E</sub>X (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*

TEACHING  
EXPERIENCE

**University of Michigan - Ann Arbor, Ann Arbor, MI**

Course Assistant for NERS 521: “Radiation Materials Science I”

**Fall 2017**

- Responsibilities: Prepared homework solutions and graded homework. Provided assistance at weekly office hours.

PROFESSIONAL  
MEMBERSHIPS

American Nuclear Society (ANS), Member, 2015 - Present

Material Advantage (ACerS, AIST, ASM, TMS), Member, 2013 - Present

Tau Beta Pi, 2012 - Present

Phi Beta Kappa, 2013 - Present

Alpha Nu Sigma, 2011 - Present