Samuel A. Briggs

CONTACT INFORMATION

Research Assistant
Engineering Physics Department
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QUALIFICATIONS

Nuclear engineering & Engineering Physics Ph.D. candidate with 5+ years of experience studying radiation effects in materials for nuclear systems. Excels at utilization of analytical microscopy for advanced materials characterization, collaborating with multidisciplinary research and design teams, and utilizing unique capabilities at scientific user facilities through successful proposal writing. U.S. citizen with established record of being an effective communicator through internationally attended presentations and peer-reviewed publications.

EDUCATION

University of Wisconsin - Madison, Madison, WI 2011 to present
Ph.D., Nuclear Engineering & Engineering Physics, December 2016 (Forthcoming)
– Graduate Advisors: Dr. Todd R. Allen & Dr. Kumar Sridharan
M.S., Nuclear Engineering & Engineering Physics, August 2013

Oregon State University, Corvallis, OR 2007 to 2011
B.S., Nuclear Engineering, June 2011
– Honors: *Summa cum laude*
– Minors: Mathematics & Chemistry

RESEARCH EXPERIENCE

Research Assistant 2011 to present
Engineering Physics Department, University of Wisconsin - Madison
Graduate Advisors: Dr. Todd R. Allen & Dr. Kumar Sridharan
Thesis Topic: α' *precipitation phenomena in neutron-irradiated Fe-Cr-Al alloys*

Highlights:
– Investigated composition and dose dependencies of precipitation phenomena affecting long-term operational exposure of Fe-Cr-Al alloys in neutron radiation environments using analytical electron microscopy, atom probe tomography and small angle neutron scattering techniques.
– Developed new techniques to compensate for the effect of trajectory aberration artifacts on calculated phase composition based on quantifying the extent of artificial densification within reconstructed a atom probe tomography data set.
– Compared effects of composition and irradiating ion species on microstructural evolution of ion irradiated Ni-Cr model alloys, with a specific focus on the formation of voids, faulted Frank loops and radiation-induced segregation at grain boundaries.

PROFESSIONAL EXPERIENCE

Corporate Research Internship 2009 and 2011
Pacific Northwest National Laboratory, Richland, WA.
Supervisor: Dr. Andrew Prichard
Engineering Topics:
– *Design of Passively-Safe Interim Dry Storage Pit for Spent Nuclear Fuel*
– *Reconstruction of Legacy Liquid Metal Fast Reactor Structural Bowing Code for Modern Reactor Design Applications*

Corporate Research Internship 2010
NuScale Power, Corvallis, OR
Supervisor: Maurice LaFountain
Engineering Topics:
– *Preparation of Scoping Calculations and Process Flow Diagrams for Various Primary and Balance-of-Plant Reactor Systems*

Refereed Journal Publications

[1] **S.A. Briggs**, C.M. Barr, J. Pakarinen, M. Mahmivand, K. Hattar, D.D. Morgan, M. Taheri, K. Sridharan. Observations of defect structure evolution in proton and Ni ion irradiated Ni-Cr binary alloys. *Journal of Nuclear Materials*, Volume 479, October 2016, Pages 48-58, ISSN 0022-3115, https://dx.doi.org/10.1016/j.jnucmat.2016.06.046.

[2] P.D. Edmondson, **S.A. Briggs**, Y. Yamamoto, R.H. Howard, K. Sridharan, K.A. Terrani, K.G. Field. Irradiation-enhanced α' precipitation in model FeCrAl alloys. *Scripta Materialia*, Volume 116, April 2016, Pages 112-116, ISSN 1359-6462, https://dx.doi.org/10.1016/j.scriptamat.2016.02.002.

Published Reports

[3] K.G. Field, **S.A. Briggs**, P.D. Edmondson, J.C. Haley, R.H. Howard, X. Hu, K.C. Littrell, C.M. Parish, Y. Yamamoto. Database on performance of neutron irradiated FeCrAl alloys. FY-16 FCRD Milestone Report: *ORNL/TM-2016/335,* August 2016, http://www.osti.gov/scitech/biblio/1295144.

[4] K.G. Field, **S.A. Briggs**, P.D. Edmondson, X. Hu, K.C. Littrell, R.H. Howard, C.M. Parish, Y. Yamamoto. Evaluation of the effect of composition on radiation hardening and embrittlement in model FeCrAl alloys. FY-15 FCRD Milestone Report: *ORNL/TM-2015/518,* September 2015, http://www.osti.gov/scitech/biblio/1253237.

Published Conference Abstracts

[5] **S.A. Briggs**, P.D. Edmondson, K.G. Field, Y. Yamamoto, K.C. Littrell, C.R. Daily, K. Sridharan. Complementary techniques for quantification of α' phase precipitation in neutron-irradiated Fe-Cr-Al model alloys. Microscopy & Microanalysis, Volume 22, Supplement S3, July 2016, Pages 1470-1471, http://dx.doi.org/10.1017/S1431927616008199.

[6] K.G. Field, Y. Yamamoto, **S.A. Briggs**, M.N. Gussev, K.A. Unocic, B.A. Pint, R.B. Rebak, L.L. Snead, K.A. Terrani. Advancements in FeCrAl alloys for enhanced accident tolerant fuel claddings for light water reactors. ANS Transactions, Volume 114, Number 1, June 2016, Pages 975-976, http://epubs.ans.org/?a=38737.

[7] **S.A. Briggs**, P.D. Edmondson, K.C. Littrell, Y. Yamamoto, K. Sridharan, K.G. Field. Dependencies of α' embrittlement in neutron-irradiated model Fe-Cr-Al alloys. ANS Transactions, Volume 114, Number 1, June 2016, Pages 1046-1047, http://epubs.ans.org/?a=38766.

Technical Presentations

[8] **S.A. Briggs**, P.D. Edmondson, K.G. Field, Y. Yamamoto, K.C. Littrell, C.R. Daily, K. Sridharan. Quantification of α' precipitation in neutron-irradiated Fe-Cr-Al model alloys utilizing complementary SANS & APT techniques. Contributed presentation at *NuMat 2016*, Montpellier, France, November 2016.

[9] **S.A. Briggs**, P.D. Edmondson, K.G. Field, Y. Yamamoto, K.C. Littrell, C.R. Daily, K. Sridharan. Complementary techniques for quantification of α' phase precipitation in neutron-irradiated Fe-Cr-Al model alloys. Invited presentation at *Microscopy & Microanalysis 2016 Meeting*, Columbus, OH USA, July 2016.

[10] **S.A. Briggs**, P.D. Edmondson, K.C. Littrell, Y. Yamamoto, K. Sridharan, K.G. Field. Solute redistribution processes in neutron-irradiated model FeCrAl alloys. Contributed presentation at *TMS 2016 Annual Meeting and Exhibition*, Nashville, TN USA, February 2016.

[11] **S.A. Briggs**, J. Pakarinen, L. Barnard, D.D. Morgan, K. Sridharan, J.D. Tucker, T.R. Allen. Radiation-induced microstructural effects in nickel-chromium binary alloys. Contributed presentation at *TMS 2015 Annual Meeting and Exhibition*, Orlando, FL USA, March 2015.

[12] **S.A. Briggs**, J. Pakarinen, L. Barnard, D.D. Morgan, T.R. Allen, K. Sridharan. Radiation-induced effects in Ni-Cr binary alloys. Contributed presentation at *Materials Science & Technology 2016*, Pittsburgh, PA USA, October 2014.

PAPERS IN SUBMISSION

[13] K.G. Field, **S.A. Briggs**, X. Hu, Y. Yamamoto, R.H. Howard, K. Sridharan. Heterogeneous dislocation loop formation near grain boundaries in a neutron-irradiated commercial FeCrAl alloy. Submitted to *Journal of Nuclear Materials*, 2016.

[14] **S.A. Briggs**, P.D. Edmondson, K.C. Littrell, Y. Yamamoto, R.H. Howard, C.R. Daily, K.A. Terrani, K. Sridharan, K.G. Field. A combined APT and SANS investigation of α' phase precipitation in neutron-irradiated model FeCrAl alloys. Submitted to *Acta Materialia*, 2016.

[15] **S.A. Briggs**, K. Sridharan, K.G. Field. Correlative microscopy of neutron-irradiated materials. Submitted to *Advanced Materials & Processes Magazine*, 2016.

[16] **S.A. Briggs**, J. Pakarinen, D.D. Morgan, K. Sridharan. Combined effects of radiation-enhanced grain boundary migration and solute segregation in Ni-Cr binary alloys. In preparation to *Scripta Materialia*, 2016.

[17] K.G. Field, **S.A. Briggs**, K. Sridharan, R.H. Howard, Y. Yamamoto. Tensile properties of neutron-irradiated model and commercial FeCrAl alloys. In preparation to *Journal of Nuclear Materials*, 2016.

SCIENTIFIC POSTERS

[18] **S.A. Briggs**, P.D. Edmondson, K.C. Littrell, Y. Yamamoto, K. Sridharan, K.G. Field. Dependencies of α' embrittlement in neutron-irradiated model Fe-Cr-Al alloys. Contributed poster presented at the Nuclear Fuels and Structural Materials embedded topical meeting at the 2016 ANS Annual Meeting, New Orleans, LA USA, June 2016.

[19] K.G. Field, **S.A. Briggs**, P.D. Edmondson, X. Hu, K.C. Littrell, R. Howard, C.M. Parish, Y. Yamamoto. Radiation tolerance of Fe-Cr-Al alloys: Role of Al & Cr on phase stability under neutron irradiation. Contributed poster presented at the 17$^{\text{th}}$ International Conference on Fusion Reactor Materials, Eurogress Aachen, Germany, October 2015.

[20] **S.A. Briggs**, J. Pakarinen, L. Barnard, D.D. Morgan, I, T.R. Allen, K. Sridharan. Study of radiation-induced segregation using nickel-chromium binary alloys. Contributed poster presented at the annual TMS meeting and exhibition, San Diego, CA USA, February 2014.

GRANTS

Awaiting Decision

[1] None

Awarded

[2] Principle Investigator, "Parametric study of factors affecting precipitation in model FeCrAl alloys", DOE, *NSUF-RTE*, Project Number - 16-687, Atom probe tomography access, 2016.

[3] Co-PI, "Characterization of precipitation behavior in HFIR irradiated FeCrAl alloys for nuclear applications", DOE, *NSUF-RTE*, Project Number - IPTS-13692, Accepted 2015, Programmatic proposal for GP-SANS (neutron scattering) facility access, 2015 to 2017.

[4] Principle Investigator, "Mechanistic determination of dislocation loop formation in irradiated FeCrAl alloys through systematic in situ experimentation", *ANL IVEM-Tandem*, IVEM user access, 2015.

[5] Principle Investigator, "Investigation of precipitate formation kinetics and interactions in FeCrAl alloys", DOE, *NSUF-RTE*, Project Number - 15-556, Atom probe tomography access, 2015.

Not Awarded

[6] None

Current Collaborators (Past 5 years)

Todd R. Allen (UW-Madison/INL), Mahmood Mamivand (UW-Madison), Dane Morgan (UW-Madison), Kumar Sridharan (UW-Madison), Janne Pakarinen (SKC•CEN), Christopher Barr (Drexel), James Nathaniel (Drexel), Mitra Taheri (Drexel), Leland Barnard (Bechtel Corp.), Charles R. Daily (ORNL), Phillip D. Edmondson (ORNL), Kevin G. Field (ORNL), Richard H. Howard (ORNL), Xunxiang Hu (ORNL), Kenneth C. Littrel (ORNL), Chad M. Parish (ORNL), Kurt A. Terrani (ORNL), Yukinori Yamamoto (ORNL), Julie Tucker (Oregon State), Khalid Hattar (Sandia National Laboratory).

Hardware and Software Skills

Analytical Microscopy:
- TEM, STEM, EDS, EELS on FEI and JEOL suite of transmission electron microscopes
- SEM, FIB, EDS, EBSD on FEI and JEOL suite of scanning electron microscopes
- APT on CAMECA suite of local electrode atom probes
- Digital Micrograph
- ImageJ
- IVAS

Numerical Analysis:
- MATLAB, Mathematica

Desktop Editing and Productivity Software:
- TEX (LATEX, BIBTEX),
- Microsoft Office, OpenOffice.org, OriginPro, Google Docs
- Adobe Creative Suite, GIMP

Operating Systems:
- Microsoft Windows family, Apple OS X, Linux, Unix, Android, Mac iOS

Awards, Honors, and Recognition

- Materials & Microscopy Meeting Scholar Award Recipient, 2016
- Nuclear Fuels & Structural Materials Meeting Student Poster Award, 2016
- Nuclear Energy University Program Fellow, 2012-2015
- Alpha Nu Sigma Nuclear Engineering Honor Society Inductee, 2010
- Lower Division Nuclear Engineering Student of the Year, 2009
- Oregon State University Presidential Scholarship Award Winner, 2007-2011
- Dean of Engineering Scholarship Recipient, 2007-2010
- National Merit Scholar, 2007

Additional Certifications

Oregon State Board of Examiners for Engineering and Land Surveying (OSBEELS) Engineer in Training, 2011