Samuel A. Briggs

Contact Information

Research Assistant
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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 forthcoming publications in peer-reviewed journals.

Education

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

M.S., Nuclear Engineering & Engineering Physics, 2013

Oregon State University, Corvallis, OR 2007 to 2011
B.S., Nuclear Engineering, 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: *Radiation Damage Effects in Ni- and Fe-based alloys*

Highlights:
- Investigated dependencies of point defect kinetics relating to segregation and precipitation phenomena affecting long-term operational exposure of Fe-Cr-Al alloys in radiation environments using analytical electron microscopy, atom probe tomography and small angle neutron scattering techniques.
- 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] 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. Accepted in *Scripta Materialia*, 2016. https://dx.doi.org/10.1016/j.scriptamat.2016.02.002

Published Reports

[2] K.G. Field, **S.A. Briggs**, P.D. Edmondson, X. Hu, K.C. Littrell, R. 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.

Invited Talks

[3] **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. To be presented at the Microscopy & Microanalysis 2016 Meeting, Columbus, OH, 2016.

Conference Presentations

[4] **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. Presented at the TMS 2016 Annual Meeting and Exhibition, Nashville, TN, 2016.

[5] **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. Presented at the TMS 2015 Annual Meeting and Exhibition, Orlando, FL, 2015.

[6] **S.A. Briggs**, J. Pakarinen, L. Barnard, D.D. Morgan, T.R. Allen, K. Sridharan. Radiation-induced effects in Ni-Cr binary alloys. Presented at the annual Materials Science & Technology conference, Pittsburgh, PA, 2014.

Papers in Submission

[7] **S.A. Briggs**, C.M. Barr, J. Pakarinen, M. Mahmivand, K. Hattar, D.D. Morgan, K. Sridharan, M. Taheri. Comparison of microstructure in proton and heavy ion irradiated Ni-Cr binary alloys. Accepted in *Journal of Nuclear Materials*, 2016.

[8] **S.A. Briggs**, P.D. Edmondson, Y. Yamamoto, K.C. Littrell, 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.

[9] **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. To be submitted to *Scripta Materialia*, 2016.

Scientific Posters

[10] **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. Poster presented at the Nuclear Fuels and Structural Materials embedded topical meeting at the 2016 ANS Annual Meeting, New Orleans, LA, 2016.

[11] 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. Poster presented at the 17th International Conference on Fusion Reactor Materials, Eurogress Aachen, Germany, 2015.

[12] **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. Poster presented at the annual TMS meeting and exhibition, San Diego, CA, 2014.

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, Lyx),
- 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
- National Honor Society Inductee, 2006

PROFESSIONAL MEMBERSHIPS

American Nuclear Society (ANS), Member, 2007 - Present

ADDITIONAL CERTIFICATIONS

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