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EDUCATION

- 2006: Ph.D., North Carolina State University, Materials Science & Engineering
- 2003: M.S., University of Pittsburgh, Materials Science & Engineering
- 2000: B.S., North Carolina State University, Materials Science & Engineering

EXPERIENCE

- 2012-present: Research and Development Staff, Oak Ridge National Laboratory
- 2011: Research and Development Associate, Oak Ridge National Laboratory
- 2009-2011: Alvin M. Weinberg Fellow, Oak Ridge National Laboratory
- 2007-2009: Postdoctoral Appointee, Sandia National Laboratories

SCIENTIFIC ACCOMPLISHMENTS

- Advanced fundamental understanding of materials science for next-generation nuclear energy systems.
- Developed new insights to underlying microstructural processes in advanced ferritic alloys with unprecedented radiation tolerance for nuclear energy systems.
- Measured effect of surface crystallography on plasma-materials response of tungsten for fusion energy systems for a unique approach to life extension.
- Invented microscopy and microanalysis protocols for analyzing radiation damage in nanostructured metals and ceramics for nuclear energy systems.
- Improved fabrication and processing science and engineering for automotive steels, ferroelectric thin films, and solar photovoltaic thin films for energy efficiency and renewable energy applications.

RESEARCH INTERESTS

- Improving the fundamental understanding of radiation damage in materials for nuclear energy systems and nuclear fuel cycle.
- Developing and deploying new applied materials to allow realization of next-generation nuclear energy systems to improve safety, efficiency, and waste disposal.
- Advancing methods of electron microscopy and microstructural characterization for the study of nuclear, structural, and functional materials.

AWARDS AND HONORS

- Department of Energy, Office of Science Early Career Research Program award, Fiscal Year 2015. (http://science.energy.gov/early-career/)
- Oak Ridge National Laboratory's Alvin M. Weinberg Distinguished Early Career Fellowship.
- Dean's Fellowship for Ph.D. work at NC State University.
- Alumni Fellowship for Ph.D. work at NC State University.
- USX Corporation fellowship for graduate study at University of Pittsburgh.

PROJECTS LED

- "Damage Mechanism Interactions at the Plasma-Materials Interface," Office of Fusion Energy Sciences, Early Career Award. Principal investigator, FY15-FY20.
- "Stability of Nanoclusters in Metal Matrices under Extreme Environments," Office of Basic Energy Sciences. Co-investigator, FY10-FY15. Principal investigator, FY15-FY16.
- "Atomistic response of the MAX phases to irradiation," Oak Ridge National Laboratory LDRD program. Principal investigator, FY14-FY15.
- "Extended defect chemistry and optoelectronic activity in solar photovoltaic CdTe thin films," Oak Ridge National Laboratory LDRD program. Principal investigator, FY10.

PROFESISONAL ACTIVITIES AND SERVICE (2010-present)

- Lead organizer, "Microscopy and Microanalysis of Nuclear and Irradiated Materials" symposium at Microscopy and Microanalysis 2016 conference.
- Lead organizer, "Microscopy and Microanalysis of Nuclear and Irradiated Materials" symposium at Microscopy and Microanalysis 2015 conference.
- Lead organizer, "Microscopy and Microanalysis of Joining and Coating Materials" symposium at Microscopy and Microanalysis 2012 conference.
- Lead organizer, "Recent advances in structural characterization of materials" symposium at Materials Science and Technology 2011 conference.
- Co-organizer, "Recent advances in structural characterization of materials" symposium at Materials Science and Technology 2010 conference.
- Member of the Microscopy Society of America (MSA), the Microanalysis Society (MAS), The Minerals, Metals, and Materials Society (TMS), the American Ceramic Society (ACerS), and the United States Burning Plasma Organization (USBPO).
- Member, Microanalysis Society topical conference organizing committee.

SELECTED INVITED TALKS

- C. M. Parish, et al., "Comparing helium mitigation in nanostructured steels," invited presentation at the International Conference on Fusion Reactor Materials (ICFRM) 17, Aachen, Germany, October 2015.
- C. M. Parish, et al., "Helium-dislocation-nanocluster interactions in nanostructured ferritic alloys," invited presentation at International Conference on Fusion Reactor Materials (ICFRM) 16, Beijing, China, October 2013.
- C. M. Parish, et al., "Phase separation and intermetallic formation in 'high-entropy' alloys," invited presentation at TMS 2013 Annual Meeting & Exhibition, San Antonio, TX, March 2013.
- C. M. Parish and M. K. Miller, "Applying Spectrum Imaging Methodology to Atom Probe Tomography Data," Materials Science and Technology 2010, October 2010, Houston, TX.
- C. M. Parish, et al., "Processing effects on microstructure in Er and ErD_2 thin-films," Hydrogen and Helium Isotopes in Materials 2010, April 2010, Oak Ridge, TN.

- C. M. Parish and L. N. Brewer, "Quantitative STEM-EDS mapping and analysis", Materials Science and Technology 2009, October 2009, Pittsburgh, PA.
- C. M. Parish and L. N. Brewer, "Quantitative STEM-EDS mapping and analysis", Microscopy and Microanalysis 2009, August 2009, Richmond, VA.

SELECTED SHORT-COURSE TUTORIALS AND SEMINARS

- C. M. Parish, "Electron backscatter diffraction for materials problem solving," lecture to University of Tennessee chapter of Materials Research Society Short Course on Materials Characterization, May 2015.
- C. M. Parish, "Spectrum imaging in analytical electron microscopy," lecture to University of Tennessee chapter of Materials Research Society Short Course on Materials Characterization, May 2015.
- C. M. Parish, "When does FIB preparation of irradiated materials make sense?" invited presentation at Department of Energy Workshop on Transmission Electron Microscopy of Irradiated Materials, Argonne National Laboratory, IL, USA, September 2014.
- C. M. Parish, "Characterization of radiation damage using electron microscopy," Tutorial lecture to Oak Ridge National Laboratory/Idaho National Laboratory joint summer school: Modeling, experiment, and validation (MeV), Oak Ridge, TN, June 2012
- Six additional seminars at universities or national laboratories

PATENTS

Two patents pending, multiple invention disclosures. One commercialized license.

SELECTED PUBLICATIONS

Publications >55, Web of Science h-index 13, citations ≥465 (as of August 2015)
http://www.researcherid.com/rid/J-8381-2013
http://scholar.google.com/citations?user=1AHeIrwAAAAJ

Lead author publications:

1. C. M. Parish and M. K. Miller, "A review of advantages of high-efficiency X-ray spectrum imaging for analysis of nanostructured ferritic alloys," Journal of Nuclear Materials, accepted / in press.
2. C. M. Parish, K. G. field, A. G. Certain, and J. P. Wharry, "Application of STEM Characterization for Investigating Radiation Effects in BCC Fe-Based Alloys," Journal of Materials Research, accepted / in press.
3. C. M. Parish, "When will low-contrast features be visible in a STEM X-ray spectrum image?" Microscopy and Microanalysis, accepted / in press.
4. C. M. Parish and M. K. Miller, "Aberration-corrected X-ray spectrum imaging and Fresnel contrast to differentiate nanoclusters and cavities in helium-irradiated alloy 14YWT," Microscopy and Microanalysis, V20(2), P. 613-626 (2014).
5. C. M. Parish, R. M. White, J. M. LeBeau, and M. K. Miller, "Response of nanostructured ferritic alloys to high-dose heavy ion irradiation," Journal of Nuclear Materials, V445, P. 251-260 (2014).
6. C. M. Parish, H. Hijazi, H. M. Meyer III, and F. W. Meyer, "Effect of tungsten crystallographic orientation on He-ion-induced surface morphology changes," Acta Materialia, V62, P. 173-181 (2014).

7. C. M. Parish, P. D. Edmondson, Y. Zhang, and M. K. Miller, "Direct observation of ion-irradiation-induced chemical mixing," Journal of Nuclear Materials, V418, P.106-109 (2011).
8. C. M. Parish, "Multivariate Statistics Applications in Scanning Transmission Electron Microscopy X-Ray Spectrum Imaging," in Advances in Imaging and Electron Physics V168, ed. P. W. Hawkes, Elsevier: Amsterdam, P. 249-295 (2011).
9. C. M. Parish and M. K. Miller, "Multivariate statistical analysis of atom probe tomography data," Ultramicroscopy, V110(11), P. 1362-1373 (2010).
10. C. M. Parish, C. S. Snow, D. R. Kammler, and L. N. Brewer, "Processing effects on microstructure in Er and ErD_2 thin-films," Journal of Nuclear Materials, V403(1-3), P.191-197 (2010).
11. C. M. Parish and L. N. Brewer, "Key parameters affecting quantitative analysis of STEM-EDS spectrum images," Microscopy and Microanalysis, V16(3), P. 259-272 (2010).
12. C. M. Parish and L. N. Brewer, "Multivariate statistics applications in phase analysis of STEM-EDS spectrum images," Ultramicroscopy, V110(2), P. 134-143 (2010).
13. C. M. Parish, C. S. Snow, and L. N. Brewer, "The manifestation of oxygen contamination in ErD_2," Journal of Materials Research, V24(5), P.1868-1879 (2009).
14. C. M. Parish, G. L. Brennecka, B. A. Tuttle, and L. N. Brewer, "Quantitative X-ray spectrum imaging of lead lanthanum zirconate titanate PLZT thin-films," Journal of the American Ceramic Society, V91(11), P. 3690-3697 (2008).
15. C. M. Parish, G. L. Brennecka, B. A. Tuttle, and L. N. Brewer, "Quantitative chemical analysis of fluorite-to-perovskite transformations in $(Pb,La)(Zr,Ti)O_3$ PLZT thin films," Journal of Materials Research, V23(11), P.2944-2953 (2008).
16. C. M. Parish and P. E. Russell, "Scanning cathodoluminescence microscopy," in Advances in Imaging and Electron Physics vol. 147, ed. P. W. Hawkes, Elsevier: Amsterdam, P. 1-135 (2007).
17. C. M. Parish, C. L. Progl, A. D. Batchelor and P. E. Russell, "Tutorial: Electron Beam Induced Current in the SEM," Microscopy and Analysis, V21(5), P.11-13 (2007).
18. C. M. Parish and P. E. Russell, "On the use of Monte Carlo modeling in the mathematical analysis of scanning electron microscopy-electron beam induced current data," Applied Physics Letters, V89(19), #192108 (2006).

Contributing author publications:

1. G. Cao, D.J. Singh, X.-G. Zhang, G. Samolyuk, L. Qiao, C. Parish, K. Jin, Y. Zhang, H. Guo, S. Tang, W. Wang, J. Yi, C. Cantoni, W. Siemons, E.A. Payzant, M. Biegalski, T.Z. Ward, D. Mandrus, G.M. Stocks, Z. Gai, "Ferromagnetism and Nonmetallic Transport of Thin-Film $\alpha-FeSi_2$: A Stabilized Metastable Material," Physical Review Letters, V114(14), #147202 (2015).
2. Y. Yan, S. Qian, K. Littrell, C. M. Parish, and L. K. Plummer, "Fast, Quantitative, and Nondestructive Evaluation of Hydrided LWR Fuel Cladding by Small Angle Incoherent Neutron Scattering of Hydrogen," Journal of Nuclear Materials, V460, P. 114-121 (2015).
3. M. K. Miller and C. M. Parish, "Controlling diffusion for a self-healing radiation tolerant nanostructured ferritic alloy," Journal of Nuclear Materials, accepted / in press.
4. L. J. Santodonato, Y. Zhang, M. Feygenson, C. M. Parish, M. C. Gao, R. J. K. Weber, J. C. Neuefeind, Z. Tang, and P. K. Liaw, "Deviation from high-entropy configurations in the atomic distributions of a multi-principal-element alloy," Nature Communications, V6, Art. #5964 (2015).

5. J. Frantti, Y. Fujioka, A. Puretzky, Y. Xie, Z. G. Ye, C. Parish, A. M. Glazer, "Phase transitions and thermal-stress-induced structural changes in a ferroelectric $Pb(Zr_{0.80}Ti_{0.20})O_3$ single crystal," Journal of Physics-Condensed Matter, V27(2), Art. #025901 (2014).
6. J. D. Poplawsky, N. R. Paudel, C. Li, C. M. Parish, D. Leonard, Y. Yan and S. J. Pennycook, "Direct Imaging of Cl- and Cu-Induced Short-Circuit Efficiency Changes in CdTe Solar Cells," Advanced Energy Materials, V4(15), #1400454 (2014).
7. K. A. Terrani, B. A. Pint, C. M. Parish, C. M. Silva, L. L. Snead and Y. Katoh, "Silicon Carbide Oxidation in Steam up to 2 MPa," Journal of the American Ceramic Society, V97(8), P. 2331-2352 (2014).
8. Q. Li, C. M. Parish, K. A. Powers, and M. K. Miller, "Helium solubility and bubble formation in a nanostructured ferritic alloy," Journal of Nuclear Materials, V445, P. 165-174 (2014).
9. P. D. Edmondson, C. M. Parish, Q. Li, and M. K. Miller, "Thermal stability of nanoscale helium bubbles in a 14YWT nanostructured ferritic alloy," Journal of Nuclear Materials, V445(1-3), P. 84-90 (2014).
10. B. Zhou, G. Muralidharan, K. Kurumadalli, C.M. Parish, S. Leslie, and T. R. Bieler, "Microstructure and Sn Crystal Orientation Evolution in Sn-3.5Ag Lead-Free Solders in High-Temperature Packaging Applications," Journal of Electronic Materials, V43(1), P. 57-68 (2014).
11. M.N. Gussev, J.T. Busby, T.S. Byun, and C.M. Parish, "Twinning and martensitic transformations in nickel-enriched 304 austenitic steel during tensile and indentation deformations," Materials Science and Engineering A, V588, P. 299-307 (2013).
12. Vlassiouk, S. Smirnov, M. Regmi, S. P. Surwade, N. Srivastava, R. Feenstra, G. Eres, C. Parish, N. Lavrik, P. Datskos, S. Dai, and P. Fulvio, "Graphene nucleation density on copper: fundamental role of background pressure," Journal of Physical Chemistry C, V117, P. 18919-18926 (2013).
13. K. A. Terrani, C. M. Parish, D. Shin, and B. A. Pint, "Protection of Zirconium by Alumina- and Chromia-Forming Iron Alloys under High-Temperature Steam Exposure," Journal of Nuclear Materials, V438, P.64-71 (2013).
14. C. M. Enloe, K. O. Findley, C. M. Parish, M. K. Miller, B. C. De Cooman, and J. G. Speer, "Compositional evolution of microalloy carbonitrides in a Mo-bearing microalloyed steel," Scripta Materialia, V68, P. 55-58 (2013).
15. S. H. Lee, X.-G. Zhang, C. M. Parish, H. N. Lee, D. B. Smith, Y. He, and J. Xu, "Nanocone Tip-Film Solar Cells with Efficient Charge Transport," Advanced Materials, V23, P. 4381-4385 (2011).
16. P.D. Edmondson, C.M. Parish, Y. Zhang, A. Hallén, M.K. Miller, "Helium entrapment in a nanostructured ferritic alloy," Scripta Materialia, V65, P. 731-734 (2011).
17. B. Guiton, V. Iberi, S. Li, D. N. Leonard, C. M. Parish, P. G. Kotula, M. Varela, G. C. Schatz, S. J. Pennycook, and J. P. Camden, "Correlated optical measurements and plasmon mapping of silver nanorods," Nano Letters, V11, P3482-3488 (2011).
18. G. L. Brennecka, C. M. Parish, B. A. Tuttle, L. N. Brewer, and M. A. Rodriguez, "Reversibility of the perovskite-to-fluorite phase transformation in lead-based thin and ultrathin films," Advanced Materials, V20, P. 1407-1411 (2008).
19. C. L. Progl, C. M. Parish, J. P. Vitarelli, and P. E. Russell, "Analysis of V defects in GaN-based light emitting diodes by scanning transmission electron microscopy and electron beam induced current," Applied Physics Letters, V92(24), #242103 (2008).

Approximately eighteen additional contributing-author publications (as of August 2015)