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**Jonathan D. Poplawsky, Ph.D.**

Senior Research Staff

Materials MicroÅnalysis Group

Center for Nanophase Materials Sciences

Oak Ridge National Laboratory

(865) 576-4965

[Website: Google Scholar](http://scholar.google.com/citations?hl=en&user=J405E6EAAAAJ&view_op=list_works&gmla=AJsN-F7sHUj5v-oeQaE9hnVupSkvZ9y_HTwrg33yeLuk-h_M1A0RfZU7wTqtFWD62ro7qDDrNnx271pzr-vvloxYwoiGoLIBrdfd0qo3Yw7EvOy0Fo_zowY&undo=untrash_citations,eQOLeE2rZwMC)

[PoplawskyJD@ornl.gov](mailto:PoplawskyJD@ornl.gov)

***Career Highlights***

**Research: 175** Peer-Reviewed Journal Articles, **1** U.S. Patent, **25** Invited Talks, h-index = 47.

**Selected Awards:** R&D 100 award,ORNL Early Career Researcher award in Science and Technology, DOE top 5 research highlight for 2018, ORNL Strategic Hire, National Research Council Fellowship, Graduate Student Teaching Assistant Award.

**Funding:** DOE-BES user facility,DOE EERE VTO, Intelligence Community, ORNL LDRD, DOE FE XMAT

**Scientific/ORNL Service:** MRS Symposia Organizer, APT&M Symposia Organizer, CNMS User Meeting APT Tutorial Workshop Organizer, PSD Science Fair Outreach Volunteer, CNMS Seminar Series Coordinator

**Mentoring:** 2 Postdocs and 2 Students Supervised

**Education**

Lehigh University, Bethlehem, PA Physics Ph.D., 2012

Lehigh University, Bethlehem, PA Physics M.S., 2010

The University of Scranton, Scranton Physics B.S., 2007

**Research Experience:**

* ~10 years experience in Atom Probe Tomography
* ~16 years experience in Electron Microscopy techniques including Cathodoluminescence (CL), Electron Beam Induced Current (EBIC), Focused Ion Beam (FIB), electron back scattered diffraction (EBSD), and Scanning Transmission Electron Microscopy (STEM).
* Expertise in the experimental analysis of localized elemental compositional changes occurring at grain boundaries, interfaces, and cluster sites for energy related materials via atom probe tomography, and linking materials’ atomic scale structure and composition to bulk electronic, ionic, chemical, or mechanical properties.
* Energy storage materials, structural materials, catalysts, photovoltaics, light emitting diodes, and fuel cells.

**Research and Professional Experience**

2022-present Senior R&D Staff Scientist, Oak Ridge National Laboratory

2017-2022 R&D Staff Scientist, Oak Ridge National Laboratory

2014-2017 (Strategic Hire) R&D Associate Scientist, Oak Ridge National Laboratory

2012-2014 Post-doctoral Research Associate, University of Tennessee

2007-2012 Research Assistant, Lehigh University

**Awards and Honors Received**

2023 DOE EERE VTO team award

2023 Excellence in Reviewing Award, Scripta Materialia

2022 R&D 100 award “DuAlumin-3D: An Additively Manufactured Dual-Strengthened Aluminum Alloy Designed for Extreme Creep and Fatigue Resistance”

2021 ORNL Outstanding Scholarly Output Award

2021 Outstanding CNMS Staff Member Award

2019 ORNL Early Career Researcher award in Science and Technology

2018 Published a DOE top 5 research highlight for 2018

2017 Most Notable CNMS User Project, ORNL CNMS

2014 Ceramographic Exhibit 2nd place award, SEM, American Ceramic Society

2012 National Research Council Fellowship, Navy Research Laboratory

2011 Best Student Presentation Award, MAS CL Topical Conference

2010-2011 Sherman Fairchild Fellowship in Semiconductor Studies**,** Lehigh University

2008 Graduate Student Teaching Assistant Award, Lehigh University

2007 Excellence in Physics Award, University of Scranton

2007 Sigma Pi Sigma Honors, University of Scranton

2003-2007 Loyola Scholarship, University of Scranton

**Patents**

2020 Yang Y, Pint B, Poplawsky JD, and Tan L, “Ta-Containing Fe-Ni Based Superalloys with High Strength and Oxidation Resistance for High-temperature Applications,” Docket No. 6321-508 (157379.08301).

**Experimental Accomplishments**

Developed a D gas charging system for atom probe tomography samples.

Developed a cyro-vacuum transfer system for cryogenic sample transfer between various microscopes.

Pioneered atom probe research on zeolite materials

Clarified the interpretation of voids in atom probe tomography data

Manage and lead over 30 user proposals focused on atom probe tomography per year

Leading Aim 3:Coupled Electron-Ion Transport within the CNMS Electromechanics theme

Expert at conducting and correlating TEM, EBIC, APT, EBSD, and CL experimental results for solar materials

Fabricated Si-based TEM grids capable of correlative APT/TEM experiments

Designed a vacuum transfer system to transport air sensitive samples from the FIB to the atom probe

Designed the first simultaneous Cathodoluminescencene/Photoluminescence system (ref. 79)

Developed a STEM-EBIC holder for the Nion-200 at ORNL (ref. 54)

**Funding**

2018-Present DOE Office of Fossil Energy eXtreme MATerials Program.

2018-Present DOE Office of Energy Efficiency & Renewable Energy Office of Vehicle Technology Powertrain Materials Core Program.

2016-Present U.S. DOE Office of Science User Facility, ORNL Center for Nanophase Materials Sciences, (Grant Numbers: KC0403040; FWP ERKCZ01).

2016-2018 ORNL LDRD, “Supercomputers to Superalloys.” (LOIS ID: 8455)

2016-2018 ORNL LDRD, “Advanced Atom Probe Tomography for Nanoscience Applications.” (LOIS ID: 8241)

2016-2018 ORNL LDRD, “DAPPER: Data Analysis Parallel Package Maker - A Lego Set for Big Data Scientists.” (LOIS ID: 8449)

2015-2017 Intelligence Community: “Understanding Interfacial Structure and Stability in SiGe/Si/SiGe Heterostructures for Quantum Computing.”

2014-2016 ORNL LDRD Strategic Hire Fellowship, “Advanced Atom Probe Tomography for Nanoscience Applications.” (LOIS ID: 7509)

**Journal Articles Published in Peer Reviewed Journals: [citation stats as of 03/14/2024: h-index = 47, citations = 8831, i10-index = 116 (google scholar)]**

175. I. McGieson, **J.D. Poplawsky**, M.K. Santala, J.D. Tucker, Measurement of G-phase volume fraction and number density in duplex stainless steels using transmission electron microscopy, *Materials Today Communications* **38**, 107926, (2024).

174. M. Masoumi, E.A. Ariza, D. Centeno, G. Tressia, A. Márquez-Rossy, **J.D. Poplawsky**, A.P. Tschiptschin, Achieving superior mechanical properties: Tailoring multicomponent microstructure in AISI 9254 spring steel through a two-stage Q&P process and nanoscale carbide integration, *Materials Characterization* **207**, 113523 (2024).

174. J. Chen, Z. Zhang, E. Hershkovitz, **J. Poplawsky**, R.S.B. Dandu, C.-Y. Hung, W. Wang, Y. Yao, L. Li, H. Xin, H. Kim, W. Cai, Selective oxidation and nickel enrichment hinders the repassivation kinetics of multi-principal element alloy surfaces, *Acta Materialia* **263**, 119490 (2024).

173. M. Campos, M. Cartón-Cordero, L. García de la Cruz, F.G. Caballero, J.D. Poplawsky, J.M. Torralba, Enhancement of 𝛾/ 𝛾 ʹ Microstructured Cobalt Superalloys Produced from Atomized Powder by Creating a Harmonic Structure, *Metals*, (2024).

172. J. Ballor, **J.D. Poplawsky**, A. Devaraj, S. Misture, C.J. Boehlert, Lattice Parameter Evolution during the β-to-⍺; and β -to-Ω Transformations of Iron- and Aluminum-Modified Ti-11Cr(at.%), *Crystals*, (2024).

171. J. Vivas, D. De-Castro, **J.D. Poplawsky**, E. Altstadt, M. Houska, E. Urones-Garrote, D. San-Martín, F.G. Caballero, M. Serrano, C. Capdevila, Creep strength boosted by a high-density of stable nanoprecipitates in high-chromium steels, *European Journal of Materials* **3(1)**, 2118082 (2023).

170. M. Titze, **J.D. Poplawsky**, S. Kretschmer, A.V. Krasheninnikov, B.L. Doyle, E.S. Bielejec, G. Hobler, A. Belianinov, Measurement and Simulation of Ultra-Low-Energy Ion-Solid Interaction Dynamics, *Micromachines*, (2023).

169. T. Rahman, H. Yilmazer, B. Dikici, K. Edalati, **J.D. Poplawsky**, C.J. Boehlert, Microstructural evolution and intermetallic formation in Zn-3Mg (wt%) powder mixture processed by high-pressure torsion, *Journal of Alloys and Compounds* **968**, 172101 (2023).

168. A.E. Perrin, R.A. Michi, D.N. Leonard, K.D. Sisco, A.J. Plotkowski, A. Shyam, **J.D. Poplawsky**, L.F. Allard, Y. Yang, Effect of Mn on eutectic phase equilibria in Al-rich Al-Ce-Ni alloys, *Journal of Alloys and Compounds* **965**, 171455 (2023).

167. G. Kumari, M. Sundararaman, C.J. Boehlert, **J.D. Poplawsky**, K.A. Unocic, S. Sankaran, Influence of interrupted cooling on the development of bimodal γ' precipitate distributions in ATI 718Plus, Journal of Materials Science (2023).

166. K. Bao, J. Meng, **J.D. Poplawsky**, M. Skowronski, Electrical conductivity of TaOx as function of composition and temperature, *Journal of Non-Crystalline Solids* **617**, 122495 (2023).

165. Bao, K., Meng, J., **Poplawsky, J. D.** & Skowronski, M. Electrical conductivity of TaOx as function of composition and temperature. *Journal of Non-Crystalline Solids* **617**, 122495 (2023).

164. Zand, F., Hangx, S. J. T., Spiers, C. J., van den Brink, P. J., Burns, J., Boebinger, M. G., **Poplawsky, J. D.**, Monai, M. & Weckhuysen, B. M. Elucidating the Structure and Composition of Individual Bimetallic Nanoparticles in Supported Catalysts by Atom Probe Tomography. *J. Am. Chem. Soc.*, (2023).

163. van Vreeswijk, S. H., Parker, L. A., Maris, J. J. E., **Poplawsky, J. D.** & Weckhuysen, B. M. Micro- and Nanoscale Heterogeneities in Zeolite Beta as Measured by Atom Probe Tomography and Confocal Fluorescence Microscopy. *Chemphyschem* **24**, e202300094, (2023).

162. Sisco, K. D., Plotkowski, A., Yang, Y., Allard, L., Fancher, C., Rawn, C., **Poplawsky, J. D.**, Dehoff, R. & Babu, S. S. Heterogeneous phase transformation pathways in additively manufactured Al-Ce-Mn alloys. *Journal of Alloys and Compounds* **938**, 168490, (2023).

161. Raeker, E. B., Pusch, K. M., Forsik, S. A. J., Zhou, N., Dicus, A. D., Ren, Q.-Q., **Poplawsky, J. D.**, Kirka, M. M. & Pollock, T. M. Minor Elements and Solidification Cracking During Laser Powder-Bed Fusion of a High 𝛾ʹ CoNi-Base Superalloy. *Metall. Mater. Trans. A* **54**, 1744-1757, (2023).

160. **Poplawsky, J. D**., Sarker, J., Roldan, M. & Chen, Y. Laser Wavelength Dependence on Perovskite Interface Elemental Diffusion During Atom Probe Experiments. *Microsc. Microanal.* **29**, 612-613, (2023).

159. Pillai, R., Ren, Q. Q., Stephens, C. J., Su, Y.-F., Lance, M. J., **Poplawsky, J.**, Schlagel, D., Lograsso, T., Yamamoto, Y. & Brady, M. P. Challenges in computationally designing high temperature Fe-based austenitic alloys: Addressing the role of Ni additions. *Materialia* **28**, 101772, (2023).

158. Luebbe, M., Duan, J., Zhang, F., **Poplawsky, J.**, Pommeranke, H., Arivu, M., Hoffman, A., Buchely, M. & Wen, H. A high-strength precipitation hardened cobalt-free high-entropy alloy. *Materials Science and Engineering: A* **870**, (2023).

157. Li, Z., Cheng, J. Y., **Poplawsky, J. D.**, Xu, S., Baldwin, J. K., Beyerlein, I. J. & Mara, N. A. Critical length scales for chemical heterogeneity at Cu/Nb 3D interfaces by atom probe tomography. *Scripta Materialia* **223**, 115078, (2023).

156. Li, D.-B., Neupane, S., Bista, S. S., Xiao, C., Abudulimu, A., Jamarkattel, M. K., Phillips, A. B., Heben, M. J., **Poplawsky, J. D.**, Cullen, D. A., Jiang, C.-S., Ellingson, R. J. & Yan, Y. Oxygen Management to Avoid Photo-Inactive Cd(S,Se) for Efficient Cd(Se,Te) Solar Cells. *ACS Energy Letters* **8**, 1529-1534, (2023).

155. Kombaiah, B., Zhou, Y., Jin, K., Manzoor, A., **Poplawsky, J. D.**, Aguiar, J. A., Bei, H., Aidhy, D. S., Edmondson, P. D. & Zhang, Y. Nanoprecipitates to Enhance Radiation Tolerance in High-Entropy Alloys. *ACS Appl. Mater. Interfaces* **15**, 3912-3924, (2023).

154. El Atwani, O., Vo, H. T., Tunes, M. A., Lee, C., Alvarado, A., Krienke, N., **Poplawsky, J. D.**, Kohnert, A. A., Gigax, J., Chen, W. Y., Li, M., Wang, Y. Q., Wróbel, J. S., Nguyen-Manh, D., Baldwin, J. K. S., Tukac, O. U., Aydogan, E., Fensin, S. & Martinez, E. A quinary WTaCrVHf nanocrystalline refractory high-entropy alloy withholding extreme irradiation environments. *Nat. Commun.* **14**, 2516, (2023).

153. Chen, S., Qiao, J., Diao, H., Yang, T., **Poplawsky, J.**, Li, W., Meng, F., Tong, Y., Jiang, L., Liaw, P. K. & Gao, Y. Extraordinary creep resistance in a non-equiatomic high-entropy alloy from the optimum solid-solution strengthening and stress-assisted precipitation process. *Acta Mater.* **244**, 118600, (2023).

152. Bahl, S., Plotkowski, A., Watkins, T. R., Michi, R. A., Stump, B., Leonard, D. N., **Poplawsky, J. D.**, Dehoff, R. & Shyam, A. 3D Printed eutectic aluminum alloy has facility for site-specific properties. *Additive Manufacturing* **70**, (2023).

151. Alvarado, A. M., Lee, C., Wróbel, J. S., Sobieraj, D., Nguyen-Manh, D., **Poplawsky, J. D.**, Fensin, S. J., Martinez, E. & El-Atwani, O. Predicting short-range order evolution in WTaCrVHf refractory high-entropy alloys. *Scripta Materialia* **233**, 115506, (2023).

150. Wang, X., Jin, K., Wong, C. Y., Chen, D., Bei, H., Wang, Y., Ziatdinov, M., Weber, W. J., Zhang, Y., **Poplawsky, J**. & More, K. L. Understanding effects of chemical complexity on helium bubble formation in Ni-based concentrated solid solution alloys based on elemental segregation measurements. *J. Nucl. Mater.* **569**, 153902, (2022).

149. van Vreeswijk, S. H., Monai, M., Oord, R., Schmidt, J. E., Parvulescu, A. N., Yarulina, I., Karwacki, L., **Poplawsky, J. D.** & Weckhuysen, B. M. Detecting Cage Crossing and Filling Clusters of Magnesium and Carbon Atoms in Zeolite SSZ-13 with Atom Probe Tomography. *JACS Au* **2**, (2022).

148. **Poplawsky, J. D.**, Michi, R. A., Allard, L. F., Bahl, S., Plotkowski, A. J. & Shyam, A. Using θ′ interfaces as templates for planar L12 precipitation in AlCuMnZr alloys. *Additive Manufacturing Letters* **3**, 100086, (2022).

147. Li, D.-B., Bista, S. S., Awni, R. A., Neupane, S., Abudulimu, A., Wang, X., Subedi, K. K., Jamarkattel, M. K., Phillips, A. B., Heben, M. J., **Poplawsky, J. D.**, Cullen, D. A., Ellingson, R. J. & Yan, Y. 20%-efficient polycrystalline Cd(Se,Te) thin-film solar cells with compositional gradient near the front junction. *Nat. Commun.* **13**, (2022).

146. Hsiao, H.-W., Feng, R., Ni, H., An, K., **Poplawsky, J. D**., Liaw, P. K. & Zuo, J.-M. Data-driven electron-diffraction approach reveals local short-range ordering in CrCoNi with ordering effects. *Nat. Commun.* **13**, 6651, (2022).

145. Zhao, Y., Bhattacharya, A., Pareige, C., Massey, C., Zhu, P., **Poplawsky, J. D.**, Henry, J. & Zinkle, S. J. Effect of heavy ion irradiation dose rate and temperature on α′ precipitation in high purity Fe-18%Cr alloy. *Acta Materialia* **231**, 117888, (2022).

144. Yamamoto, Y., Brady, M. P., Ren, Q.-Q., **Poplawsky, J. D.**, Hoelzer, D. T. & Lance, M. J. Creep Behavior and Phase Equilibria in Model Precipitate Strengthened Alumina-Forming Austenitic Alloys. *JOM* **74**, 1453-1468, (2022).

143. Ren, Q.-Q., Yamamoto, Y., Brady, M. P. & **Poplawsky, J. D.** Sigma phase evolution and nucleation mechanisms revealed by atom probe tomography in a 347H stainless steel. *Materialia* **24**, 101485, (2022).

142. Ren, J., Zhang, Y., Zhao, D., Chen, Y., Guan, S., Liu, Y., Liu, L., Peng, S., Kong, F., **Poplawsky, J. D.**, Gao, G., Voisin, T., An, K., Wang, Y. M., Xie, K. Y., Zhu, T. & Chen, W. Strong yet ductile nanolamellar high-entropy alloys by additive manufacturing. *Nature* **608**, 62-68, (2022).

141. Michi, R. A., Sisco, K., Bahl, S., Yang, Y., **Poplawsky, J. D.**, Allard, L. F., Dehoff, R. R., Plotkowski, A. & Shyam, A. A creep-resistant additively manufactured Al-Ce-Ni-Mn alloy. *Acta Materialia* **227**, 117699, (2022).

140. Michi, R. A., Sisco, K., Bahl, S., Allard, L. F., Wagner, K. B., **Poplawsky, J. D.**, Leonard, D. N., Dehoff, R. R., Plotkowski, A. & Shyam, A. Microstructural evolution and strengthening mechanisms in a heat-treated additively manufactured Al–Cu–Mn–Zr alloy. *Materials Science and Engineering: A* **840**, 142928, (2022).

139. Meng, J., Lian, E., **Poplawsky, J. D.** & Skowronski, M. Modeling of the Thermodiffusion-Induced Filament Formation in TiN/Ta*x*O*1-x*/TiN Resistive-Switching Devices. *Physical Review Applied* **17**, 054040, (2022).

138. Mandal, S., Kumar Gupta, A., Echeverria, E., McIlroy, D. N., **Poplawsky, J. D.** & Sachan, R. Laser-assisted nanofabrication of multielement complex oxide core–shell nanoparticles. *Mater. Des.* **220**, 110882, (2022).

137. Lin, S.-J., Lin, J.-A., Yu, W., Lee, C., Hung, C.-Y., **Poplawsky, J. D.**, Liaw, P. K. & Chou, Y.-C. Biocompatibility of NbTaTiVZr with Surface Modifications for Osteoblasts. *ACS Applied Bio Materials* **5**, 642-649, (2022).

136. Gwalani, B., Liu, J., Lambeets, S., Olszta, M., **Poplawsky, J.**, Shyam, A. & Devaraj, A. Rapid assessment of interfacial stabilization mechanisms of metastable precipitates to accelerate high-temperature Al-alloy development. *Materials Research Letters* **10**, 771-779, (2022).

135. Glazoff, M. V., Gao, M. C., Capolungo, L., Brady, M. P., Ilevbare, G. O., Yamamoto, Y., Ren, Q.-Q., **Poplawsky, J. D.**, Yu, J. & Zhang, F. Concurrent Precipitation of Nb(C,N) and Metastable M23C6 in Alloy 347H at 700°C and 750°C: Computer Simulations and Comparison to Experiment. *JOM* **74**, 1444-1452, doi:10.1007/s11837-021-05140-9 (2022).

134. Bedekar, V., Mistry, K., Voothaluru, R., Qu, J. & **Poplawsky, J.** Atomistic investigation of calcium sulfonate and lithium complex grease tribofilms under severe sliding conditions. *CIRP Annals.* (2022).

133. van Vreeswijk, S. H., Monai, M., Oord, R., Schmidt, J. E., Vogt, E. T. C., **Poplawsky, J. D.** & Weckhuysen, B. M. Nano-scale insights regarding coke formation in zeolite SSZ-13 subject to the methanol-to-hydrocarbons reaction. *Catalysis Science & Technology*, (2022).

132. **Poplawsky, J. D.**, Pillai, R., Ren, Q.-Q., Breen, A. J., Gault, B. & Brady, M. P. Measuring oxygen solubility in Ni grains and boundaries after oxidation using atom probe tomography. *Scr. Mater.* **210**, 114411, (2022).

131. Costa, A. M. S., Oliveira, J. P., Escobar, J. D., Salvador, C. A. F., Monteiro, M. J., **Poplawsky, J. D.**, Nunes, C. A., Ramirez, A. J. & Tschiptschin, A. P. On the effect of elemental partitioning to secondary phases after solution and aging heat treatments in a Co-Ni-based superalloy. *Materials Letters* **309**, 131377, (2022).

130. Wang, S.-S., Huber, D., **Poplawsky, J. D.** & Frankel, G. S. Influence of artificial aging on corrosion of abraded Al-Zn-Mg-Cu alloys. *Corrosion Science* **191**, 109745, (2021).

129. Pan, Q., Zhang, L., Feng, R., Lu, Q., An, K., Chuang Andrew, C., **Poplawsky J.D.**, Liaw Peter, K. & Lu, L. Gradient cell–structured high-entropy alloy with exceptional strength and ductility. *Science* **374**, 984-989, (2021).

128. Bahl, S., Plotkowski, A., Sisco, K., Leonard, D. N., Allard, L. F., Michi, R. A., **Poplawsky, J. D.**, Dehoff, R. & Shyam, A. Elevated temperature ductility dip in an additively manufactured Al-Cu-Ce alloy. *Acta Mater.* **220**, 117285, (2021).

127. Sharma, N. K., Kannan, R., Li, L., Anderson, N., Rashid, M., Collins, L., **Poplawsky, J. D.** & Unocic, R. A Mechanism for Carbon Depletion at Bondline of High-Frequency Electric-Resistance-Welded X70 Pipeline Steel. *Metall. Mater. Trans. A* **52**, 3788-3798, (2021).

126. Feng, R., Feng, B., Gao, M. C., Zhang, C., Neuefeind, J. C., **Poplawsky, J. D.**, Ren, Y., An, K., Widom, M. & Liaw, P. K. Superior High-Temperature Strength in a Supersaturated Refractory High-Entropy Alloy. *Advanced Materials* **n/a**, 2102401, (2021).

125. Gwalani, B., Shukla, S., Leonard, D., **Poplawsky, J. D.**, Pierce, D. T., Kovarik, L., Muralidharan, G. & Devaraj, A. Understanding the microstructural stability in a γ′-strengthened Ni-Fe-Cr-Al-Ti alloy. *J. Alloys Compd.* **886**, 161207, (2021).

124. Kumar, S., Vijayan, S. R., Nandwana, P., **Poplawsky, J. D.**, Yan, C. & Babu, S. S. Role of thermo-mechanical gyrations on the α/β interface stability in a Ti6Al4V AM alloy. *Scr. Mater.* **204**, 114134, (2021).

123. Lee, C., Maresca, F., Feng, R., Chou, Y., Ungar, T., Widom, M., An, K., **Poplawsky, J. D.**, Chou, Y.-C., Liaw, P. K. & Curtin, W. A. Strength can be controlled by edge dislocations in refractory high-entropy alloys. *Nat. Commun.* **12**, 5474, (2021).

122. Lu, C., Li, M., Xiu, P., Wang, X., Velişa, G., Jiang, L., More, K. L., **Poplawsky, J. D.**, Chang, Y., Zhang, Y. & Wang, L. High radiation tolerance of an ultrastrong nanostructured NiCoCr alloy with stable dispersed nanooxides and fine grain structure. *J. Nucl. Mater.* **557**, 153316, (2021).

121. Y. Yang, T. Chen, L. Tan, **J.D. Poplawsky**, K. An, Y. Wang, G.D. Samolyuk, K. Littrell, A.R. Lupini, A. Borisevich, E.P. George, Bifunctional nanoprecipitates strengthen and ductilize a medium-entropy alloy, *Nature* **595**, 245-249, (2021).

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118. Tan, L., **Poplawsky, J. D.** & Yang, Y. Effects of niobium and tantalum on the microstructure and strength of ferritic-martensitic steels. *Materials Science and Engineering: A* **807**, 140900, (2021).

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116. Picard, Y. N., **Poplawsky, J. D**., Lee, S. & Abernathy, H. W. Nanoscale Analysis of LSM/YSZ Interfaces within Composite Cathodes for Commercial Solid Oxide Fuel Cells. *ECS Transactions* **103**, 1351-1362, (2021).

115. Gault, B. & **Poplawsky, J. D.** Correlating advanced microscopies reveals atomic-scale mechanisms limiting lithium-ion battery lifetime. *Nat. Commun.* **12**, 3740, (2021).

114. Feng, R., Zhang, C., Gao, M. C., Pei, Z., Zhang, F., Chen, Y., Ma, D., An, K., **Poplawsky, J. D.**, Ouyang, L., Ren, Y., Hawk, J. A., Widom, M. & Liaw, P. K. High-throughput design of high-performance lightweight high-entropy alloys. *Nat. Commun.* **12**, 4329, (2021).

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112. Chisholm, M. F., Shin, D., Duscher, G., Oxley, M. P., Allard, L. F., **Poplawsky, J. D.** & Shyam, A. Atomic structures of interfacial solute gateways to θ′ precipitates in Al-Cu alloys. *Acta Mater.* **212**, 116891, (2021).

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8. Lee, D.-G., Wakamatsu, R., Koizumi, A., Terai, Y., **Poplawsky, J. D.**, Dierolf, V. & Fujiwara, Y. Effect of thermal annealing on luminescence properties of Eu,Mg-codoped GaN grown by organometallic vapor phase epitaxy. *Appl. Phys. Lett.* **102,** 141904–5 (2013).

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5. Metcalfe, G. D., Readinger, E. D., Enck, R., Shen, H., Wraback, M., Woodward, N. T., **Poplawsky, J.** & Dierolf, V. Near-infrared photoluminescence properties of neodymium in in situ doped AlN grown using plasma-assisted molecular beam epitaxy. *Optical Materials Express* **1,** 78–84 (2011).

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3. Zhao, H., Liu, G., Zhang, J., **Poplawsky, J. D.**, Dierolf, V. & Tansu, N. Approaches for high internal quantum efficiency green InGaN light-emitting diodes with large overlap quantum wells. *Opt. Express* **19,** A991–A1007 (2011).

2. Zhao, H. P., Dierolf, V., Liu, G. Y., Huang, G. S., Li, X.-H., **Poplawsky, J. D.**, Arif, R. A., Tafon Penn, S. & Tansu, N. Design and characteristics of staggered InGaN quantum-well light-emitting diodes in the green spectral regime. *IET optoelectronics* **3,** 283–295 (2009).

1. Zhao, H., Liu, G., Li, X.-H., Huang, G. S., **Poplawsky, J. D.**, Penn, S. T., Dierolf, V. & Tansu, N. Growths of staggered InGaN quantum wells light-emitting diodes emitting at 520–525 nm employing graded growth-temperature profile. *Appl. Phys. Lett.* **95,** 061104–4 (2009).

**Invited Seminars**

11. “Revealing Nanoscale Atom Distributions in Zeolite Catalysts with Atom Probe Tomography”. CAMECA webubarm June 13, 2023.

10. “Atom-by-atom Structural Materials Analysis for Alloy Development”. The Microscopy Society of America Student Council (MSA StC) webinar. February 8, 2023.

9. “Atom Probe Tomography for Materials Science,” Penn State University Nuclear Engineering Department, September 29, 2022.

8. “The Multiple Roles of Solute Additions in Maintaining the Strengthening Phase (θ′) in Al-Cu Alloys” Oak Ridge Chapter of ASM International, Oak Ridge, TN, September, 2020.

7. “Understanding Materials Using Atom Probe Tomography,” The University of Tennessee, July 2019.

6. “3D Analysis at the Nanoscale via Atom Probe Tomography: Metals and Beyond,” Washington University, November 2017.

5. “3D Analysis at the Nanoscale via Atom Probe Tomography: Metals and Beyond,” PSD Seminar, ORNL, November 2017.

5. Atom Probe Tomography for Nanoscience Applications,” CNMS user meeting, August 2016.

4. “Grain Boundary and Interfacial Structure-composition-property Relationships in CdTe-based Solar Cells,” The University of Alabama, October 2016.

3. “Grain Boundary and Interfacial Structure-composition-property Relationships in CdTe-based Solar Cells,” Lehigh University, May 2016.

2. “STEM and APT for Understanding Qubit Structure and Chemistry at the Sub-nm-level,” Beyond Exascale: Qubits for Quantum Computing Workshop, 2015.

1. “Direct Imaging of Cl and Cu Electronic Property Changes in Polycrystalline CdTe Solar Cells,” The University of Toledo, October 2013.

**Invited Conference Presentations**

14. “Uncovering Unique Multi-Principal Element Alloy Properties Using Atom Probe Tomography,” TMS2023, San Diego, March 19-23.

13. “Designing Stable θ'/L12 Co-precipitates in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys ,” MS&T 2022, Pittsburgh, PA, October 9-12.

12. “Precipitate Strengthening and Stabilization Mechanisms in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys,” TMS2022, Virtual, February 2021.

11. “Understanding Radiation Resistance in High Entropy Alloys Through Atom Probe Tomography,” TMS2021, Virtual, March 2021.

10. “High temperature Microstructural stability Mechanisms Revealed by Microscopy in Al-Cu-Mn-Zr Alloys,” TMS2020, San Diego, CA, February 2020.

9. “Interpreting APT Data Containing He-bubbles in Irradiated Single-phase Concentrated Solid-solution

Alloys (SP-CSAs),” TMS2020, San Diego, CA, February 2020.

8. “Nanoscale Characterization of Zeolites using Atom Probe Tomography,” ACS 2019, Orlando, FL, April 2019.

7. “Correlating He Bubble Segregation in APT Data to Radiation Tolerance for Single-phase Concentrated Solid-solution Alloys (SP-CSAs),” TMS 2019, San Antonio, TX, March 2019.

6. “Understanding Irradiation Induced Defects in Multicomponent Alloys,” Atom Probe Tomography and Microscopy, NIST Gaithersburg, MD, June 2018.

5. “Radiation Effects in High Entropy Alloys Revealed by Atom Probe Tomography,” TMS 2018, Phoenix, AZ, March 2018.

4. “An Atom Probe Perspective on High Entropy Alloys,” International Conference on Plasticity, Damage, and Fracture, San Juan, Puerto Rico, January 2018.

3. “Nano to Mesoscale CdTe Solar Cell Structure-composition-property Relationships Revealed by Microscopy and Electron Beam Induced Current Techniques,” Fall MRS 2016, Boston, MA, November 28 – December 2, 2016.

2. “Atom Probe Tomography for Nanoscience Applications,” CNMS user week, Deep Data in Materials Characterization Workshop, Oak Ridge, TN, August 2016.

1. “A Method to Quantify Si/SiGe Interface Profiles Via Atom Probe Tomography,” Atom Probe Tomography and Microscopy, Gyeongju, Korea, June 2016.

**Tutorials and Workshops Led**

3. “Chemical Characterization of Materials workshop,” CNMS User Meeting, ORNL, August 2023.

2. “Live Lab Demo and Tutorial of Atom Probe Tomography and Scanning Transmission Electron

Microscopy,” CNMS User Meeting, ORNL, August 2017.

1. “Electron Beam Induced Current and Cathodoluminescence,” AREMS, November 2013.

**Professional Activities: (International Conference and Workshop Organizer)**

2022 “Expanding the Limits of Atom Probe Tomography,” Microscopy and Microanalysis, David Diercks, Ann Chiaramonti Debay, and Francois Vurpillot (co-organizers), August 2022.

2020 “Advancements in Atom Probe Tomography for Materials Characterization,” Materials Research Society, Baishakhi Mazumder, Jaebok Seol, Mukesh Bakav (co-organizers), December 2020.

2018 “Semiconductor and Devices,” Atom Probe Tomography and Microscopy, Baishakhi Mazumder (co-organizer), June 2018.

2017 “Live Lab Demo and Tutorial of Atom Probe Tomography and Scanning Transmission Electron Microscopy,” Baishakhi Mazumder, Wei Guo (co-organizers), CNMS User Meeting, August 2017.

**ORNL Service and Committee Membership**

2021 ORNL Gives Fundraising Coordinator

2017-2023 CNMS Seminar Series Coordinator

2018-2020 Scanning Electron Microscopy Outreach Coordinator

2016-present PSD Science Fair Trailer Volunteer

2017 PSD Communications Action Committee

**Professional Society Membership:** International Field Emission Society (IFES), Materials Research Society (MRS), Microscopy Society of America (MSA), The Minerals, Metals, and Materials Society (TMS), and Microanalysis Society (MAS).

**Graduate and Post-doctoral Advisors**

Ph.D. Advisor: Dr. Volkmar Dierolf (Lehigh University, Bethlehem, PA, USA)

Postdoctoral Advisor: Dr. Stephen J. Pennycook (ORNL, University of Tennessee)

**Post-doctoral Researchers Advised**

3. Dr. Yajie Zhao (Oak Ridge National Laboratory, 2023-present)

2. Dr. Qingqiang Ren (Oak Ridge National Laboratory, 2020-2023)

1. Dr. Wei Guo (Oak Ridge National Laboratory, 2015-2018)

**Students Advised**

3. Geeta Kumari (Michigan State University, Prof. Carl Boehlert), “Atom Probe Tomography Studies of Additively Manufactured Al alloys,” NSF Intern, 2023.

2. Jith Sarker (The University of Buffalo, Prof. Baishakhi Mazumder), “Migration of oxygen vacancies, oxygen, and metal ions in metal-oxide materials,” Advanced Short-term Research Opportunity (ASTRO), 2019.

1. Linqing Peng (Grinnell University), “A New Program for Three-dimensional Quantification of Elemental Segregation to Precipitate Interfaces,” Oak Ridge Science Semester, 2017.