Jaclyn T. Avallone

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Education

U.C., SANTA BARBARA, MATERIALS DEPARTMENT Santa Barbara, CA
Ph.D. in Materials, Pollock Group (expected June 2018) 2012-Current
Thesis: *High Temperature Stability and Mechanical Behavior of Cu-Nb Multilayer Composites*

Characterization

- Operate Transmission Electron Microscopes (including STEM, BF, and HAADF), regularly.
- Prepare samples via traditional metallography, PIPS, and Focused Ion Beam.
- Collect and analyze orientation and composition information via SEM using BSE, EBSD and EDX.
- Expand microscopy techniques (EELS, PED, HRTEM, HAADF, FIB, ...) by attending hands-on workshops, like *NanoMEGAS workshop on PED, UCLA (2013), School on High Res. Microscopy, ASU (2014).*

Experimentation and Design

- Design specialized creep setup for bulk sheet materials in inert environment, including novel automated image processing and strain analysis coded in Java (Image J) and Matlab.
- Model and quantify creep rates correlated with laminate length scale, temperature history, and stress.
- Establish FEA simulation of experimental test with ABAQUS to observe strain distributions.

ARIZONA STATE UNIVERSITY, FULTON SCHOOL OF ENGINEERING Tempe, AZ
B.S.E. in Materials Science and Engineering 2008-2012

Characterization

- Performed interrupted fatigue tests and evaluated crack propagation using optical microscopy.
- Prepared various aluminum alloys for SEM and EBSD; analyzed fatigue failure with respect to processing.

Experimentation and Design

- Proposed experiments studying the effects of precipitate alignment on anisotropy of rolled Al alloy; developed heat treatment procedures to influence microstructure evolution; programmed PID furnaces for various material geometries. *Funding awarded by the Fulton Undergraduate Research Initiative.*
- Designed grips to accommodate unique woven fiber composite geometries for tensile testing; applied LabView to camera and load frame setup; performed Digital Image Correlation to analyze strain localization.
- Collaborated with a start-up to systematically measure mechanical properties of fiber composites under a variety of environmental conditions *Nuovo Wind LLC. & ASU Materials Senior Design.*

Work Experience

ATI SPECIALTY ALLOYS & COMPONENTS Albany, OR
Technology Student Intern Summer 2017

- Performed lab scale thermomechanical tests on established and novel refractory alloys.
- Analyzed and characterized alloy microstructures using optical microscopy and image processing.
- Modeled temperature, strain and stress variations in processing using DEFORM software.
- Prepared and presented regular project update reports for employees of various technical backgrounds.

LOS ALAMOS NATIONAL LABORATORY Los Alamos, NM
Visiting Scholar Summer 2014

- Prepared FIB specimens and experiment for in-situ TEM tensile testing of Zr-Nb and Mg-Nb thin films.
- Characterized microstructural evolution in Cu-Nb multilayers by performing heat treatments, and using SEM (EBSD) and aberration corrected TEM.

Professional Development

Leadership

- Advised students as a mentor for a 1st place team in a UCSB collaboration with the U.S. Navy.
- Served as Community Service coordinator for TBΠ, engineering honor society, Treasurer for ΩΦΑ, community service sorority, and Team Leader for Science Detectives, elementary school program at *Arizona State University* - facilitating and participating in community service activities amounting to 150^+ hr/year.
- Organized programming and coordinated details for science outreach and professional development events for the *Materials Research Laboratory* and *UCSB Beyond Academia*.
- Voting member of Nanomechanical Behavior, Mechanical Behavior, Education, and Diversity Committees for *The Minerals, Metals, and Materials Society.*
- Identified current challenges in research of High Temp. Materials *2013, 2015*, Additive Manufacturing *2016*, and High Performance Materials *2017* at professional winter study groups supported by *UCSB.*

Communication

- Educated technical audiences about graduate research 10^+ times at the university and professional conferences, winning speaking awards for both *Chemical Sciences Students* and *TMS Young Professionals*.
- Instructed weekly sessions as a teaching assistant for materials science course, *Structure and Properties II.*
- Motivated D.C. political officials to support science policy and STEM education with *Materials Advantage*.
- Demonstrated scientific lessons to children and community members, *awarded outstanding K-12 volunteer*.

Publications

1. **J.T. Avallone**, T.J. Nizolek, B.B. Bales, M.R. Begley, T.M. Pollock. "Predictive Model of Copper-Niobium Composite Creep Behavior," *In preparation.* (2018).

2. **J.T. Avallone**, T.J. Nizolek, B.B. Bales, T.M. Pollock. "Creep Behavior of Bulk Copper-Niobium Composites: a Correlation with Multilayer Length Scale," *In preparation for Scripta Materialia.* (2018).

3. T.J. Nizolek, N.A. Mara, I.J.Beyerlein, **J.T. Avallone**, T.M. Pollock. "Tensile Behavior and Flow Stress Anisotropy of Accumulative Roll Bonded Cu-Nb Nanolaminates," *Applied Physics Letters.* 108(5) 051903 (2016). [**DOI: 10.1063/1.4941043**]

4. T.J. Nizolek, N.A. Mara, I.J.Beyerlein, **J.T. Avallone**, T.M. Pollock. "Enhanced Plasticity via Kinking in Cubic Metallic Nanolaminates," *Advanced Engineering Materials.* 17(6) 781-785 (2015). [**DOI: 10.1002/adem.201400324**]

5. T.J. Nizolek, N.A. Mara, I.J.Beyerlein, **J.T. Avallone**, J.E. Scott, T.M. Pollock. "High Strength Bulk Metallic Nanolaminates," *Advanced Materials and Processes.* 173(2), 18-21 (2015). [**article**]

6. T.J. Nizolek, N.A. Mara, I.J.Beyerlein, **J.T. Avallone**, T.M. Pollock. "Processing and Deformation Behavior of Bulk Cu-Nb Nanolaminates," *Metallography, Microstructure, and Analysis.* 3(6), 470-476 (2014). [**DOI: 10.1007/s13632-014-0172-2**]

7. A. Makas, **J.T. Avallone**, R. MacKinnon, I. Atodaria and P.D. Peralta "Variability on Nucleation and Growth of Short Fatigue Cracks Due to Material Anisotropy in Al 2024-T351 and its Implications for Damage Modeling," *Journal of Intelligent Material Systems and Structures.* 24(17) 2148-2167 (2013). [**DOI: 10.1177/1045389X12468218**]