

MUJAN N. SEIF

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RESEARCH INTERESTS

I am motivated to use both experimental and computational techniques to fundamentally understand dislocation mechanisms in metals and ceramics

EDUCATION

University of Kentucky

Lexington, KY

Ph.D. Materials Science and Engineering

Entered program: May 2018

I am currently in the pre-qualifying residency segment of the Ph.D. degree.

B.S. Materials Science and Engineering

Graduation: May 2017

Special Topics:

EBSD Topical Conference sponsored by The Microanalysis Society (May 2018)

A conference dedicated to the characterization of crystallography using electron backscatter diffraction. Sessions included hands-on demonstrations, tutorials, and lectures on recent developments in the field.

Integrated Computational Materials Education Summer School at the University of Michigan (June 2017)

A program focused on “educating the educators” of computational materials science, organized by Dr. Katsuyo Thornton (U. Michigan) and Dr. Mark Asta (UC Berkeley)

Applications of Mathematics in Materials Science and Engineering (f. 2016)

An advanced elective course focusing on the mathematics that represents various phenomena in materials science, taught by Dr. Fuqian Yang

Collegiate Leadership Institute sponsored by the Society of Women Engineers (sp. 2016 – sp. 2018)

A competitive-admission leadership institute that promotes networking between ambitious colleges students and accomplished professionals in STEM fields

Programming/Computing/Modeling Skills: Fortran, VASP, IDL, MATLAB, ANSYS, BASH, AutoCad

AWARDS

First Prize (Lightning Talk/Research Poster)

Collegiate Competition, WE Local Tulsa, SWE, 2018

Senior Scholarship Award

ASM Bluegrass Chapter, 2017

Outstanding Materials Engineering Senior

CME Dept., University of Kentucky, 2017

Outstanding Materials Engineering Junior

CME Dept., University of Kentucky, 2016

Provost Scholarship

University of Kentucky, 2012-2016

Panhellenic Academic Excellence Award

University of Kentucky, 2014

PUBLICATIONS

C.-L. Park, H. Wang, **M.N. Seif**, S.A. Barnett, K. Thornton. “Microstructural Evolution of LSCF Cathode During Coarsening via Surface Diffusion”, in preparation

Mujan N. Seif, Matthew J. Beck. “A stochastic model for evaluating mechanical behavior of porous materials”, in preparation

Seif, M., & Beck, M. Shape Memory Polymers: A Joint Chemical and Materials Engineering Hands-On Experience. *Chemical Engineering Education*, 52(1), 60-67.

M.N. Seif. “My Life as a Brown Person.” *Arab Detroit 9/11: Life in the Terror Decade*. Ed. N. Abraham, S. Howell, A. Shyrock. Wayne State University Press, 2011. 213-220. Print.

PRESENTATIONS (* indicates presenter)

“Stochastic modeling of the effects of structural randomness on the mechanical behavior of discontinuous fiber-reinforced composites: revealing the role of network coordination state” **M.N. Seif***, M. Martin, D.J. Richardson, S. Mays, T.J. Balk, M.J. Beck. Materials Science & Technology, Columbus, OH, October 2018.

“Microstructural Evolution of LSCF Cathode During Coarsening via Surface Diffusion” C.-L. Park, H. Wang, **M.N. Seif***, S.A. Barnett, K. Thornton. Materials Research Society Spring Meeting, Phoenix, AZ, April 2018

“Stochastic modeling of the effects of structural randomness on the mechanical behavior of nanoporous materials: revealing the role of network coordination state” **M.N. Seif***, M. Martin, D.J. Richardson, M. Turner, T.J. Balk, M.J. Beck. Graduate Collegiate Competition, WE Local, Tulsa, OK, January 2018

“Insights into the Deformation of Nanoporous Gold using Scanning Nanobeam Diffraction” T.J. Balk*, **M.N. Seif**, N.J. Briot, J. Ciston, T.C. Pekin, A.M. Minor. Materials Science & Technology, Pittsburgh, PA, October 2017.

RESEARCH EXPERIENCE

Graduate Research Assistant – Beck Research Group, University of Kentucky | *Lexington, KY* *Present*

Structure-Property Relationships in High-Performance Dispenser Cathodes

- Perform quantum mechanical calculations to identify relationships between surface structure and work function of high-performance dispenser cathodes

Mechanical Properties of Nanoporous Materials/Random Structures

- Perform finite element calculations to extract properties of bulk random structures using related calculations on primitive structures

Research Assistant – Thornton Research Group, University of Michigan | *Ann Arbor, MI* *Aug. 2017 – April 2018*

Coarsening of Complex Microstructures in Solid Oxide Fuel Cell Electrodes

- Phase field modeling – writing finite difference schemes to solve the Cahn-Hilliard equation surface diffusion as the dominant mode of transport

Strontium Segregation in Lanthanum Strontium Cobalt Ferrite (LSCF) SOFC Electrodes

- Improve a preliminary model that uses a combination of the diffusion equation and the Cahn-Hilliard equation in Smooth Boundary formulation

Undergraduate Research Assistant – Beck Research Group, University of Kentucky | *Lexington, KY* *Jan. – Aug. 2017*

Mechanical Properties of Nanoporous Materials/Random Structures

- Calculated the stiffness of randomly oriented primitive structures for the underlying method of calculating approximations for the stiffness of complex structures
- Oversaw multiple undergraduate/high school students as they executed tasks as needed by the group [simple finite element calculations, compression testing, 3D printing]

Undergrad. Research Assistant – Balk Research Group, University of Kentucky | *Lexington, KY* *Jan. 2016 – Aug. 2017*

Gas Permeability of Fluoroelastomers for Parker Hannifin O-Ring Division

- Independently designed and built a vacuum apparatus to test gas permeability of o-ring elastomers
 - Built apparatus from spare vacuum components with few additional purchases
 - Gained experience with instrumentation absent from traditional MSE lab courses i.e. ion gauges, mechanical and turbo pumps, residual gas analyzers

Mechanical Properties of Nanoporous Materials

- Recorded a method for taking FIB-SEM images of np-Au, processing it with Avizo (visualization software), and eventually 3D printing a physical model of material
- Employed computational tools to model and analyze load and displacement values generated by nanoindentation of nanoporous silicon in an effort to characterize its viscoelastic nature

Course Assistant for Intro to MSE (advisor: Dr. Matthew J. Beck), U. Kentucky | *Lexington, KY* Sept. – Dec. 2015

- Developed a technique for initiating crosslinking in PMMA that utilizes an acrylic nail lamp
- Allowed for the development of a freshmen lab experience for over 150 students

Associate Investigator, DuPont Titanium (now the Chemours Company) | *New Johnsonville, TN* Jan. – Dec. 2014

- Designed and built a lab scale process that neutralizes waste by a more cost efficient method
- Evaluated a pilot process designed to remove contaminants from a major product stream

SYNERGISTIC ACTIVITIES

Graduate Programming Coordinator, Society of Women Engineers – Society Level *Oct.2018 - present*

Graduate Programming Coordinator-Elect, Society of Women Engineers – Society Level *Dec. 2017 – Oct.2018*

- Generate, gather, approve, and implement content (talks, sessions, programs) for graduate and perspective graduate students at the SWE's annual society conference
- Act as a liaison between graduate students and SWE's Conference Advisory Board

Vice President of Material Advantage *April 2016 – May 2017*

- Organized recruitment efforts aimed at first year engineering freshmen
 - Designed promotional items for distribution among incoming freshmen
 - Built and maintained organization's first website
- Wrote and updated the organization's first itemized budget and secured multiple source of funding
- Staged the MSE department's first internal resume workshop
- Organized the MSE program's first Senior Sendoff

Career Fair Chair, Society of Women Engineers – University of Kentucky Section *April 2015 – May 2017*

- Improved employee registration to 100+ companies for the first time in event's history
- Coordinated 75+ student volunteers
- Acted as liaison between students and College staff