

# Alex Selimov

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Motivated soon-to-be PhD graduate seeking to apply extensive experience in high performance computing, simulation tool development, and materials modeling to Computational Research Scientist position.

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## Education

- **Georgia Institute of Technology** (North Avenue, Atlanta, GA 30332)  
PhD in Materials Science and Engineering (August 2017 - December 2022 Expected)  
Dissertation: Concurrent Atomistic-Continuum Studies of Interface/Dislocation Interactions in Nanolaminates and with He bubbles in Stainless Steels
- **University of Central Florida** (4000 Central Florida Blvd, Orlando, FL 32816)  
B.S. in Mechanical Engineering (August 2013 - December 2016)

## Experience

**McDowell Research Group**, Dr. David McDowell, Georgia Tech  
*Graduate Research Assistant (August 2017 – Present)*

- Developed and extended Concurrent Atomistic-Continuum (CAC) simulation toolkit to enable simulations of nanolaminate and irradiated stainless steel materials.
- Improved algorithmic efficiency and parallel implementation of in-house simulation toolkit to **reduce simulation runtimes by 60%** involving the use of parallel debugging and profiling tools.
- Worked independently on self-guided research topics while also collaborating with external sources such as Sandia National Lab and University of Florida.
- **Wrote proposals which earned allocations on XSEDE clusters** for two consecutive years.
- **Authored two published journal articles** with two additional articles currently in review.
- **Presented at two conferences** with an additional two scheduled for Fall 2022.

**Mechanics of Materials Organization**, Dr. Xiaowang Zhou., Sandia National Lab  
*Intern - Engineering Sciences Summer institute (May 2021 – Aug 2021)s*

- Restructured simulation toolkit codebase to abide by an object oriented programming paradigm to ease addition of functionality.
- Worked on the development of finite temperature CAC simulations through design of novel finite elements.
- Developed algorithm to implement CAC simulations at constant pressure.

**AeroStructures Lab**, Dr. Seetha Raghavan, UCF  
*Research Assistant (September 2013 – December 2016)*

- Collaborated with German Aerospace Center (DLR) and Imperial College London, serving to characterize the microstructure and mechanical properties of collaborator manufactured specimens.
- Developed analysis tools to characterize distributions of nanoparticles in particulate reinforced carbon fiber samples from optical microscopy images and photoluminescence spectroscopy maps.
- **Authored three journal articles** and two additional papers published in conference proceedings.

**Pollock Research Group**, Dr. Tresa Pollock, UCSB  
*RISE Undergraduate Intern, NSF funded REU (June – August 2015)*

- Utilized scanning electron microscopy to take secondary electron images, backscatter electron images, and analyze crystallographic texture through electron backscatter diffraction
- Prepared image analysis tools to determine volume fraction of intermetallic particles from SEM images for comparison to grain size distribution of samples with Matlab.

## Skills

- Programming Languages: Fortran, Python, C, C++, Shell Scripting, CSS, HTML
- High Performance Computing: Message Passing Interface (MPI), Intel VTune profiler, gprof, Tau, parallel debugging with gdb
- Simulation methods: Molecular Dynamics, Molecular Statics, Monte-Carlo, Finite Element Method, Nudged elastic band method, Concurrent Atomistic-Continuum method.
- Proficient in Linux environments on desktop, personal server, and computing cluster architectures.
- General knowledge of product development tools such as git and CI/CD pipelines.

## Publications

- Chu, K., **Selimov, A.**, Chen, Y., McDowell, D.L. (2022). A coarse grained atomistics Concurrent Atomistic-Continuum (CAC) implementation of the nudged elastic band method, in prep
- **Selimov, A.**, Chu, K., & McDowell, D. (2022). Effects of interdiffusion on shear response of semi-coherent {111} interfaces in Ni/Cu, *in review*
- **Selimov, A.**, Chu, K., & McDowell, D. L. (2022). Coarse-grained atomistic modeling of dislocations and generalized crystal plasticity. *Journal of Micromechanics and Molecular Physics*, 1-23.
- **Selimov, A.**, Xu, S., Chen, Y., & McDowell, D. (2021). Lattice dislocation induced misfit dislocation evolution in semi-coherent {111} bimetal interfaces. *Journal of Materials Research*, 1-16.
- **Selimov, A.**, Jahan, S. A., Barker, E., Dackus, P., Carolan, D., Taylor, A., Raghavan, S. (2018). Silane functionalization effects on dispersion of alumina nanoparticles in hybrid carbon fiber composites. *Applied optics*, 57(23), 6671-6678.
- **Selimov, A.** P., Hoover, R., Foulard, Q., Manero, A. C., Dackus, P., Carolan, D., ... Raghavan, S. (2017). Characterization of hybrid carbon fiber composites using photoluminescence spectroscopy. In 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference (p. 0123).
- Manero II, A., **Selimov, A.**, Foulard, Q., Knipe, K., Wischek, J., Meid, C., ... Raghavan, S. (2017). Piezospectroscopic evaluation and damage identification for thermal barrier coatings subjected to simulated engine environments. *Surface and Coatings Technology*, 323, 30-38.
- Hanhan, I., **Selimov, A.**, Carolan, D., Taylor, A. C., Raghavan, S. (2017). Quantifying alumina nanoparticle dispersion in hybrid carbon fiber composites using photoluminescent spectroscopy. *Applied spectroscopy*, 71(2), 258-266.
- Hanhan, I., **Selimov, A.** P., Carolan, D., Taylor, A., Raghavan, S. (2016). Characterizing mechanical properties of hybrid alumina carbon fiber composites with piezospectroscopy. In 57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference (p. 1413).