KRZYSZTOF S. STOPKA

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stopka.kris@gmail.com
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RESEARCH EXPERIENCE

Michael D. Sangid Research Group, Purdue University, *West Lafayette, IN* — July 2021 – Present
Postdoctoral Researcher
- Integration of crystal plasticity, high energy x-ray diffraction experiments, and machine learning to promote the rapid qualification of additively manufactured materials

David L. McDowell Research Group, Georgia Institute of Technology, *Atlanta, GA* — Aug 2016 – May 2021
Graduate Research Assistant
- Performed large-scale Crystal Plasticity finite element simulations of duplex Ti-6Al-4V and Al 7075-T6
- Implemented Python-scripted workflows to explore extreme value fatigue response of intrinsic (grain size, shape, and orientation distributions) and extrinsic (residual stress, surface roughness, inclusions, or pores, etc.) microstructure attributes under various loading (e.g., multiaxial) and boundary conditions
- Developed and currently maintain open-source PRISMS-Fatigue framework
- Contributed to ONR Agile ICME program via collaborations on open-source PRISMS-Plasticity platform at University of Michigan

X-ray Science Division, Argonne National Laboratory, *Lemont, IL* — May – September 2020
Graduate Researcher
- Analyzed high-energy x-ray diffraction data collected *in situ* during fatigue testing of Ti-6Al-4V
- Reconstructed digital microstructure for crystal plasticity simulations using data fusion approaches

EDUCATION

Doctor of Philosophy, Mechanical Engineering — May 2021
Georgia Institute of Technology, *Atlanta, GA*

Master of Science, Mechanical Engineering — May 2018
Georgia Institute of Technology, *Atlanta, GA*

Bachelor of Science, Mechanical Engineering — Nov 2015
Minor in Computational Science
Rose-Hulman Institute of Technology, *Terre Haute, IN*

PUBLICATIONS

- **K. S. Stopka**, M. Yaghoobi, J. E. Allison, and D. L. McDowell. Effects of Boundary Conditions on Microstructure-Sensitive Fatigue Crystal Plasticity Analysis. *Integr. Mater. Manuf. Innov.* (2021) doi
- M. Yaghoobi, **K. S. Stopka**, A. Lakshmanan, V. Sundararaghavan, J. E. Allison, and D. L. McDowell. PRISMS-Fatigue computational framework for fatigue analysis in polycrystalline metals and alloys. *npj Comput. Mater.* **7**, 38 (2021) doi
- **K. S. Stopka** and D. L. McDowell. Microstructure-Sensitive Computational Multiaxial Fatigue of Al 7075-T6 and Duplex Ti-6Al-4V. *Int. J. Fatigue* **133**, 105460 (2020) doi
- **K. S. Stopka** and D. L. McDowell. Microstructure-Sensitive Computational Estimates of Driving Forces for Surface Versus Subsurface Fatigue Crack Formation in Duplex Ti-6Al-4V and Al 7075-T6. *JOM* **72**, 28-38 (2020) doi
- **K. S. Stopka**, T. Gu, and D. L. McDowell. Effects of algorithmic simulation parameters on the prediction of extreme value fatigue indicator parameters in duplex Ti-6Al-4V. *Int. J. Fatigue* **141**, 105865 (2020) doi
- T. Gu, **K. S. Stopka**, C. Xu, and D. L. McDowell. Prediction of Maximum Fatigue Indicator Parameters for Duplex Ti-6Al-4V using Extreme Value Theory. *Acta Mater.* **188**, 504-516 (2020) doi
- A. E. Tallman, **K. S. Stopka**, L. P. Swiler, Y. Wang, S. R. Kalidindi, and D. L. McDowell. Gaussian-Process-Driven Adaptive Sampling for Reduced-Order Modeling of Texture Effects in Polycrystalline Alpha-Ti. *JOM* **71**, 2646-2656 (2019) doi

- **K. S. Stopka**, G. Whelan, and D. L. McDowell. Microstructure-Sensitive ICME Workflows for Fatigue Critical Applications. *Society of the Advancement of Material and Process Engineering (SAMPE) Conference Proceedings* (2019) [doi](doi)

PRESENTATIONS
- **K. S. Stopka**, M. Yaghoobi, A. Lakshmanan, V. Sundararaghavan, J. E. Allison, and D. L. McDowell. PRISMS-Fatigue: Overview and Case Studies. *Annual PRISMS Center Workshop,* August $3^{rd} - 6^{th}$, 2021, virtual event.
- **K. S. Stopka**, J.S. Park, H. Sharma, et al. Reconstruction of Microstructure and Defects in an Alpha + Beta Processed Ti-6Al-4V Plate Product Using High-energy X-ray Diffraction Microscopy and DREAM.3D. *5th International Congress on 3D Materials Science (3DMS 2021)*, June $29^{th} -$ July 2nd, 2021, virtual event.
- **K. S. Stopka** and D. L. McDowell. Effects of surface roughness on microstructure-sensitive computations of fatigue crack formation driving force in duplex Ti-6Al-4V and Al 7075-T6. *The Minerals, Metals & Materials Society (TMS) 2020*, San Diego, CA, February 26th, 2020.
- **K. S. Stopka** and D. L. McDowell. Microstructure-Sensitive Computational Estimates of Driving Forces for Surface vs. Subsurface Fatigue Crack Formation in Duplex Ti-6Al-4V and Al 7075-T6. *Materials Science and Technology (MS&T) 2019*, Portland, OR, September 30th, 2019.
- **K. S. Stopka** and D. L. McDowell. Microstructure-Sensitive Computational Multiaxial Fatigue. *12th International Conference on Multiaxial Fatigue and Fracture (ICMFF12) 2019*, Bordeaux, France, June 24th, 2019.
- A. E. Tallman, **K. S. Stopka**, L. P. Swiler, Y. Wang, S. R. Kalidindi, and D. L. McDowell. Gaussian-Process-Driven Adaptive Sampling for Reduced-Order Modeling of Texture Effects in Polycrystalline Alpha-Ti. *TMS 2019*, San Antonio, TX, March 12th, 2019.
- **K. S. Stopka** and D. L. McDowell. Computational Statistics of Formation and Early Growth of Microstructurally Small Cracks in Ti-6Al-4V. *MS&T 2018*, Columbus, OH, October 17th, 2018.

PUBLICATIONS IN PREPARATION
- **K. S. Stopka**, M. Yaghoobi, J. E. Allison, and D. L. McDowell, "Modeling surface roughness in microstructure-sensitive computations of Al 7075-T6."
- **K. S. Stopka**, M. Yaghoobi, J. E. Allison, and D. L. McDowell, "Microstructure effects on the extreme value fatigue response of FCC metals and alloys: Effects of sample size and grain neighborhood."

PROFESSIONAL DEVELOPMENT
- **Tech to Teaching,** Georgia Tech, Center for Teaching and Learning   Fall 2019 – Fall 2020
  Completed two graduate-level courses and a capstone teaching experience to prepare future faculty

EDITORIAL EXPERIENCE
Peer Reviewer for the following journals, Publons Profile   Mar 2019 – Present
- International Journal of Fatigue (IJF), 23 reviews
- Journal of The Minerals, Metals & Materials Society (TMS) (JOM), 2 reviews

INDUSTRY EXPERIENCE
B/E Aerospace, *Rockford, IL*   Dec 2015 – Jul 2016
Project Engineer
- Conducted Root Cause Analysis to improve reliability of Vacuum Pump
- Worked with customers / suppliers to improve Vacuum Pump performance for multiple aircraft
- Collaborated with design engineers to redesign Embraer Vacuum Waste System

GE Aviation, *Evendale, OH*   Jun – Aug 2015
GEnx Engine Performance Intern
- Remedied process of deriving humidity and condensation fan speed adders for production
- Calculated Test Vectors to support new 76K thrust rating for Boeing
- Determined effects of engine's physical turbine deviation on thrust and SFC

Space Exploration Technologies (SpaceX), *Hawthorne, CA*   Sep – Nov 2014
Structures Intern
- Designed testing fixture for v2.0 Landing Leg weather seal Research and Development
- Directed tensile, fatigue, torch, and vacuum testing to validate Pyron and Nomex felts as replacement for cork as Temperature Protection System on Falcon 9 Landing Legs
- Evaluated strength of Carbon Fiber samples with Composi-lok fasteners for v2.0 Landing Legs

GE Aviation, *Rockford, IL*   Jun – Aug 2014
Manufacturing Engineering Intern
- Appraised LEAP combustor Nacelle Anti-Ice Valve drawings for manufacturability and cost
- Enhanced Qualification Matrix to expand site worker versatility
- Created drawings and process plans for developmental parts using SolidWorks

Tesla Motors, *Fremont, CA*   Sep 2013 – Feb 2014
Craftsmanship Vehicle Engineering Intern
- Determined root cause and solution to Model S Instrument Panel fitment inconsistency
- Enriched Research and Development for Model X program to study what competitor vehicles are doing and set competitive or class leading margins for interior and exterior components
- Sourced an E-Cube and Blue Buck project to aid Model X future dimensional quality
- Lead and assisted in custom Model S builds to assess new and modified components

GE Aviation, *Terre Haute, IN*   Mar – Aug 2013
Manufacturing Engineering Intern
- Completed weld certifications and gathered dimensional data for Passport and LEAP combustors
- Interpreted GD&T blueprints for online characteristic accountability system
- Updated operation sketches, part routers and check sheets

Diesel Radiator Company, *Melrose Park, IL*   Jun – Aug 2012
Design and Manufacturing Engineering Intern
- Reduced steel scrap by an average of 9.7% for high quantity radiator jobs
- Designed facility apparatuses, such as stainless-steel ductwork, and a brass uncoiler and shear rail
- Resolved day to day computer numerical control issues affecting production

LEADERSHIP
Georgia Institute of Technology, *Atlanta, GA*   Aug 2018 – May 2019
Leadership Education and Development (LEAD) Coach
- Met one-on-one with undergraduate and graduate students for personalized coaching sessions
- Developed a total of six students during the 2018-2019 academic year

AWARDS
- President's Fellowship – Georgia Institute of Technology (2016-2020)
- Graduate Scholarship – Polish National Alliance (2016 – 2019)
- Undergraduate Scholarship – Polish National Alliance (2011 – 2015)
- Scholar of the year – Pi Kappa Alpha Fraternity (2015)

SKILLS
- Background: Mechanics of materials, applied mechanics, computational materials science, fatigue and fracture, numerical analysis and modeling, data science
- Languages: Python, MatLab, FORTRAN, C++, Polish, Spanish
- Software: ABAQUS, ANSYS, SolidWorks, NX, DREAM.3D, WinSCP, Git, ParaView
- Hobbies: Fitness, running, hiking, mentorship