Adam P. Generale

CONTACT INFORMATION
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EDUCATION

Georgia Institute of Technology, Atlanta, GA, USA (exp.) 2024
Ph.D. Mechanical Engineering
- Thesis: "Neural Inverse Microstructure Design with Bayesian Scale-Bridging"
- Advisor: Surya R. Kalidindi

University of Manchester, Manchester, UK 2014
M.S. Mechanical Engineering
- Thesis: "Generalized Deformation in Heterogeneous Materials in Mode I Fracture"
- Advisor: Andrey Jivkov

Rensselaer Polytechnic Institute, Troy, NY, USA 2011
B.S. Mechanical Engineering

RESEARCH EXPERIENCE

Georgia Institute of Technology, Atlanta, GA, USA Sep 2019 - Present
Graduate Research Assistant
- Focus on flow-based generative models (e.g., continuous normalizing flows, flow matching), Bayesian statistics, and Gaussian processes applied towards enabling data-driven materials exploration, learning process dynamics, and statistical model calibration.

Air Force Research Laboratory, Dayton, OH, USA Jun 2020 - Oct 2020
Research Intern
- Developed framework for the statistical calibration of a multimode constitutive damage model through fusing information from disparate experimental measurements.

PROFESSIONAL EXPERIENCE

Multiscale Technologies, Atlanta, GA, USA Jan 2023 - Present
Materials Data Scientist
- Constructed sparse variational multi-output Gaussian processes for microstructure-sensitive property prediction, and integrated models in the software platform.
- Implemented active learning strategies for the construction of optimal experimental designs in the training of surrogate machine-learned models.

Pratt & Whitney, East Hartford, CT, USA Feb 2016 - April 2020
Senior Aero/Thermal Engineer
- Designed internal cooling schemes through sequentially coupled thermo-mechanical models of turbine airfoils to meet mission life requirements.

AWARDS

IMECE Travel Award, American Society of Mechanical Engineers 2023
CMS3 Fellowship, Texas A&M University 2023
Sloan Foundation Fellowship, Alfred P. Sloan Foundation 2020
President's Fellowship, Georgia Institute of Technology 2020
Team of the Quarter, Pratt & Whitney Q2 2016, Q4 2017
Best Dissertation, University of Manchester 2014
Best Overall Performance, University of Manchester 2014
Rensselaer Leadership Award, Rensselaer Polytechnic Institute 2007

TECHNICAL KNOWLEDGE

Statistical Modeling, Bayesian Statistics, Machine Learning, Signal Processing, Data Analysis, Numerical Methods, Finite Element Analysis, Continuum Mechanics, High-Performance Computing
Software: ABAQUS, ANSYS, Fluent, Star-CCM+
Languages: Proficient: Python (*PyTorch, GPyTorch, Jax*), MATLAB; Familiar: Fortran

PUBLICATIONS

Generale, A.P., Kelly, C., Harrington, G.R., Robertson, A.E., Buzzy, M., Kalidindi, S.R. (2023). A Bayesian Approach to Designing Microstructures and Processing Pathways for Tailored Material Properties. *NeurIPS Workshop - AI for Accelerated Materials Design*.

Generale, A.P., Robertson, A.E., Kelly, C., Kalidindi, S.R. (2023). Inverse Stochastic Microstructure Design. *SSRN Preprint*. doi: 10.2139/ssrn.4590691.

Generale, A.P., Kalidindi, S.R. (2023). Uncertainty quantification and propagation in the microstructure-sensitive prediction of stress-strain response of woven ceramic matrix composites. *Computers & Structures*, 286, 107110. doi: 10.1016/j.compstruc.2023.107110.

Wang, S., **Generale, A.P.**, Kalidindi, S.R., Joseph, V.R. (2023). Sequential Designs for Filling Output Spaces. *Technometrics* , 0, 1-12. doi: 10.1080/00401706.2023.2231042

Generale, A.P., Hall, R.B., Brockman, R.A., Joseph, V.R., Jefferson, G., Zawada, L., Pierce, J., Kalidindi, S.R. (2022). Bayesian calibration of continuum damage model parameters for an oxide-oxide ceramic matrix composite using inhomogeneous experimental data. *Mechanics of Materials*, 175, 104487. doi: 10.1016/j.mechmat.2022.104487.

Hall, R.B., Brockman, R.A., **Generale, A.P.**, Joseph, V.R., Kalidindi, S.R. (2022). A Viscous Damage Theory for Ceramic Matrix Composites in Multi-Axial Loading. *Proceedings of the 12th International Conference on the Mechanics of Time Dependent Materials*.

Generale, A.P., Kalidindi, S.R. (2021). Reduced-order Models for Microstructure-Sensitive Effective thermal Conductivity of Woven Ceramic Matrix Composites with Residual Porosity. *Compos. Structures*, 274, 114399. doi: 10.1016/j.compstruct.2021.114399

PATENTS

Jackson, R.W., **Generale, A.P.**, Liu, X., Zelesky, M.F., 2023. Airfoil having environmental barrier topcoats that vary in composition by location. US11608749B2.

Quach, S., **Generale, A.P.**, Surace, R., Dvorozniak, L., 2022. Engine with cooling passage circuit for air prior to ceramic component. US11492914B2.

Generale, A.P., Dvorozniak, L., Quach, S., 2022. Ceramic airfoil with cooling air turn. US11473444B2.

Generale, A.P., Dvorozniak, L., Quach, S., 2022. Baffle with impingement holes. US11415002B2.

Generale, A.P., Mongillo, D.J., 2022. Components for gas turbine engines. US11371360B2.

Quach, S., Dube, B.P., Propheter-Hinckley, T.A., Arisi, A.N., **Generale, A.P.**, Dvorozniak, L., Liles, H.J., 2022. Cooling arrangement including overlapping diffusers. US11339667B2.

Generale, A.P., Dvorozniak, L., Quach, S., Dube, B.P., 2022. Baffle with tail. US11280201B2.

Generale, A.P., Mongillo, D.J., 2022. Components for gas turbine engines. US11261749B2.

Generale, A.P., Mongillo, D.J., 2022. Trailing edge insert for airfoil vane. US11242758B2.

Generale, A.P., Propheter-Hinckley, T.A., 2021. Airfoil assembly with ceramic airfoil pieces and seal. US11162368B2.

Spangler, B.W., **Generale, A.P.**, Vu, K.H., 2021. Gas turbine engine cooling component. US11131212B2.

Generale, A.P., Liles, H.J., 2021. Airfoil with metallic shield. US11092015B2.

Generale, A.P., Dube, B.P., 2021. Thermal gradient reducing device for gas turbine engine component. US11078844B2.

Generale, A.P., Dube, B.P., 2021. CMC airfoil with cooling holes. EP3808940A1.

Spangler, B.W., **Generale, A.P.**, 2021. Shell and spar airfoil. US10934857B2.

Vu, K.H., **Generale, A.P.**, 2020. Vane platform leading edge recessed pocket with cover. US10822962B2.

Devore, M.A., **Generale, A.P.**, Propheter-Hinckley, T.A., 2020. Airfoil with geometrically segmented coating section. US10711624B2.

Spangler, B.W., **Generale, A.P.**, 2020. Axial flow cooling scheme with castable structural rib for a gas turbine engine. US10822963B2.

Mongillo, D.J., **Generale, A.P.**, 2020. Platform flow turning elements for gas turbine engine components. US10655496B2.

Spangler, B.W., **Generale, A.P.**, 2020. Gas turbine engine cooling component. US10648351B2.

Generale, A.P., Howard, B.L., 2020. Vane air inlet with fillet. US10619492B2.

Clum, C., **Generale, A.P.**, 2019. Adjustable flow split platform cooling for gas turbine engine. US1051 3947B2.

Thornton, L.M., **Generale, A.P.**, 2019. Vane including internal radiant heat shield. EP3567220B8.