Sayali Ravindra Kedari

kedarisa@mail.uc.edu | Website | LinkedIn | GitHub | Publications

Skills

- **Programming**: Python (numpy, pandas, scipy, sympy, scikit-learn, tkinter, Pyro), C++, Julia, C, MATLAB
- **FEA**: Abaqus
- **CAD**: CATIA V5, SOLIDWORKS
- **OS**: Linux, Windows
- **Technologies**: Git

Experience

Graduate Researcher, Vemaganti Research Group, University of Cincinnati *2016 – present*

- Developing probabilistic machine learning approaches for modeling and predicting the thermal and viscoelastic behavior of polymers.
- Developed optimal design of stress relaxation experiments to maximize information gained about the viscoelastic model parameters.
- Employed Bayesian framework using Python, PyTorch, and message passing interface (MPI) for calibration and validation of viscoelastic material models for soft biological materials and polymers in applications such as computer-aided surgery and soft robotics.
- Simulated the nonlinear material response based on hyperelastic models for solids under different loads using Python, MATLAB.
- Implemented the parallel finite difference method with domain decomposition to solve the Poisson problem using C++, MPI.

Graduate Research Assistant, UC Simulation Center/Procter & Gamble *Aug 2018 – present*

- Collaborating with interdisciplinary teams to drive and outline process design and optimization guidelines for P&G products.
- Performed finite element analysis (FEA) for optimizing and improving production turnovers of baby care products using Abaqus, Siemens Teamcenter, Solid Edge, and Fortran.
- Employed physics-based predictive design and developed a digital twin to resolve complex flow, thermal and mechanical challenges faced for feminine and baby care products using Python and MATLAB.

Instructor and Graduate Teaching Assistant, University of Cincinnati *Aug 2016 – Aug 2018*

- Instructed large enrollment (60 students) lab sessions of Applied Computational Methods.
- Assisted in teaching the courses of Applied Computational Methods, Solid Mechanics, Finite Element Method (FEM).
- Supervised students for the class projects based on Ansys, Abaqus and MATLAB.

Graduate Teaching Assistant, University of Kansas *Sept 2014 – May 2016*

- Instructed large enrollment (70 students) lab sessions of Physics and Digital Computational Methods.
- Tutored the students with learning differences for courses of Physics and Intermediate Mathematics.

Research

Publications

- **Kedari, S. R.**, Atluri, G., Vemaganti, K., *A hierarchical Bayesian approach to regularization with application to the inference of relaxation spectra*, Journal of Rheology, (2021)
- Vemaganti, K., Madireddy, S., **Kedari, S.**, *On the inference of viscoelastic constants from stress relaxation experiments*, Mechanics of Time-Dependent Materials, (2019): 1-24
- Surana, K. S., Joy, A. D., **Kedari, S. R.**, Nunez, D., Reddy, J. N., Dalkilic, A. S., *A nonlinear constitutive theory for heat conduction in Lagrangian description based on integrity*, Journal of Thermal Engineering, Vol. 3, no. 6, Special Issue 6, (2017): 1615-1631
- Surana, K. S., Joy, A. D., **Kedari, S. R.**, Nunez, D., Reddy, J. N., Wongwises, S., *A nonlinear constitutive theory for deviatoric Cauchy stress tensor for incompressible viscous fluids*, Journal of Thermal Engineering, Vol. 3, no. 3 (2017): 1221-1240
- **Kedari, S. R.**, *Investigation of more complete constitutive theories for heat conduction in solids and for deviatoric stress tensor in incompressible fluids*, MS Thesis, KU (2016)

Presentations

- **Kedari, S. R.**, Atluri, G., Vemaganti, K., *A hierarchical Bayesian approach to regularization with application to the inference of relaxation spectra*, 16th U.S. National Congress on Computational Mechanics (USNCCM16), July 2021

Posters

- **Kedari, S. R.**, Atluri, G., Vemaganti, K., *Hierarchical Bayesian inference for inverse problems in rheology*, International HPC Summer School, XSEDE, PRACE, R-CCS, and SciNet HPC Consortium, July 2021

Workshops

- Collaborated with graduates/post-doctorates from diverse backgrounds to reproduce, containerize, and optimize various numerical codes using Python, Docker, Singularity, MPI, C++ during the NSF Cyber Carpentry: Data Life-Cycle Training and International HPC Summer School.
- Performed FE simulations for impact, quasi-static, high strain-rate deformation problems faced in real-world industrial applications, during the Dassault Systèmes: Abaqus/Explicit - Advanced Topics training.

Education

University of Cincinnati (UC), Cincinnati, Ohio, US
Doctor of Philosophy (PhD) candidate in Mechanical Engineering, GPA 3.76/4.0 *Expected Feb 2022*
Advisor : Prof. Kumar Vemaganti, PhD
Research focus : Computational mechanics, numerical analysis, uncertainty quantification, machine learning

University of Kansas (KU), Lawrence, Kansas, US
Master of Science in Mechanical Engineering, GPA 3.84/4.0 *2016*
Thesis : Finite element analysis for heat conduction in solids and for deviatoric stress tensor in incompressible fluids

University of Pune, Pune, India
Bachelor of Engineering in Mechanical Engineering, first class with distinction *2014*

Conferences & Workshops

- **Virtual Grace Hopper Celebration (vGHC)**, AnitaB.org, 2021
- **16th U.S. National Congress on Computational Mechanics (USNCCM)**, 2021
- **International HPC Summer School (IHPCSS)**, XSEDE, PRACE, R-CCS, and SciNet HPC Consortium, 2021
- **Abaqus/Explicit - Advanced Topics**, Dassault Systèmes, 2019
- **NSF Cyber Carpentry: Data Life-Cycle Training**, University of North Carolina at Chapel Hill, 2018

Affiliations

- Student member, **AnitaB.org**, 2021-22
- Student member, **Society of Women Engineers (SWE)**, 2021-22
- Student member, **U.S. Association for Computational Mechanics (USACM)**, 2021-22
- Student member, **Society for Industrial and Applied Mathematics (SIAM)**, 2019-22

Awards

- **CEAS Modeling & Simulation Fellowship**, UC Simulation Center/Procter & Gamble, 2018 – present
- **University Graduate Scholarship**, University of Cincinnati, 2016 – present
- **University Graduate Scholarship**, Government of Maharashtra, India, 2014 – 2015
- Certificate of appreciation for volunteering at "**YOU at KU**" **International Student Orientation**, University of Kansas, 2015

Relevant Graduate Coursework

- **Engineering**: Continuum mechanics, finite element method, high performance computing, advanced fluid mechanics
- **Mathematics & applied statistics**: Learning probabilistic models, applied probability and stochastic processes, advanced numerical analysis, applied partial differential equations, calculus of variations and integral equations, decision engineering

References

- Available upon request