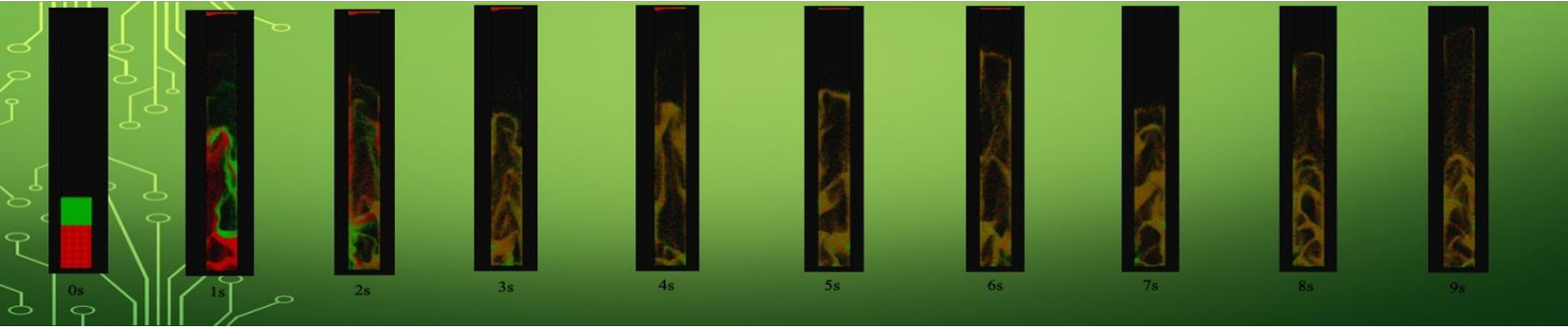

Gokul Hariharan, Ph.D.

Ames, IA. | gokulhariharan1991@gmail.com | linkedin.com/in/gokulhariharan/

Summary

I have rich experience encompassing fluid mechanics, linear and nonlinear systems theory, multiphase flows, control theory, matrix theory, distributed systems analysis, computational fluid dynamics (CFD), discrete element modeling (DEM), principal component analysis (PCA), model reduction, and artificial neural networks (ANN). I am proficient in finite element, finite volume, finite difference, and spectral methods.

Experience

Research Assistant
Iowa State University — Jan 2021 - Present (2 months +)

Runtime verification for safety critical systems.

Postdoctoral Researcher
University of Southern California — Apr 2020 – Dec 2020 (9 months)

Job geared to apply principles of advanced control theory and machine learning to control flow transition in channel flows.

Research Assistant
University of Minnesota — Jan 2016 - Apr 2020 (4 years 4 months)

~ Steered linear nonmodal analysis in viscoelastic channel flow using well-conditioned spectral methods.
~ Carried out direct numerical simulations by creating codes in C++.
~ Identified the most sensitive location to potentially trigger elastic turbulence.

Teaching Assistant
University of Minnesota — Jan 2019 - May 2019 (5 months), Sep 2018 - Dec 2018 (4 months)

Held discussions and proctored exams for two graduate-level courses, Linear Algebra and Fluid Mechanics.

Research Assistant
Indian Institute of Technology, Delhi — Jan 2014 - Jun 2015 (1 year 6 months)

~ Simulated the influence of smaller (ash) particles on larger (coal) particles during fluidization by using Discrete Element Modeling (DEM).
~ Tracked coal and ash movements through methods similar to Molecular Dynamics Simulations (MDS).
~ Leveraged Computational Fluid Dynamics (CFD) to simulate the gas used to fluidize coal..
~ Won the best poster award for presenting a poster in Open House – 2015 in IIT Delhi.

Research Intern
BITS Pilani, Hyderabad Campus — May 2011 - Jun 2011 (2 months)

~ Identified an optimal solution between two conflicting objectives in job scheduling in the semiconductor industry by using Artificial Neural Networks (ANN).
~ Used ANN to predict flow stress in the dynamic strain aging regime of austenitic stainless steel 316.

Education

Iowa State University
Doctor of Philosophy (Ph.D.), Computer Science 2021 - 2023

University of Minnesota
Doctor of Philosophy (Ph.D.), Chemical Engineering | GPA: 3.5. 2015 - 2020
My specialization is in Fluid Mechanics. The dissertation consists of four projects:
-- Amplification of localized body forces in viscoelastic channel flows
Analyzed external disturbances in the form of localized point forces (impulses) in viscoelastic channel flow.
-- Well-conditioned spectral methods for nonmodal analysis of Newtonian and viscoelastic channel flows
Employed recently reported well-conditioned spectral methods to analyze the response of a 2D viscoelastic channel flow to small-amplitude sinusoidal disturbances.
-- Stress amplification in inertialess viscoelastic channel flows
Identified huge, near-wall stress gradients in plane Poiseuille flow and near-center stress gradients in plane Couette flow; a potential root-cause for low-inertia instabilities in viscoelastic channel flows.
-- Direct numerical simulations (DNS) using well-conditioned methods
Provided a new method to perform DNS using well-conditioned spectral methods.

Indian Institute of Technology, Delhi
Master of Technology (M.Tech.), Chemical Engineering | GPA: 3.8 2013 - 2015

National Institute of Technology Warangal
Bachelor of Technology (B.Tech.), Chemical Engineering | GPA: 3.8 2009 - 2013

Honors & Awards

F Wendell Miller Scholarship – Department of Computer Science, Iowa State University, Jan 2021
CEMS Outstanding TA Award - CEMS, University of Minnesota, Jun 2019
Sebastian C. Reyes Fellowship - CEMS, University of Minnesota Jan 2016
Stephan J. Salter Fellowship - CEMS, University of Minnesota Jan 2016
Certificate of Excellence - Chemical Engineering Society, IIT Delhi, 2015 Department rank 1 (of 25)
Best Research Poster Award, Open House 2015 - Indian Institute of Technology Delhi 2015
Roll of Honor Gold Medal - National Institute of Technology Warangal, 2013, Department rank 1 (of 100)

Skills

C++ (Expert, 7 years' experience) • Qt • MATLAB • Python • Mathematica • MS Office • Git • OpenMP • MPI • ANN • Research • Finite Element Method • Computational Fluid Dynamics (CFD) • Decision-Making • Creative Problem Solving • Project Management • Attention to Detail • Scientific Writing • Model Predictive Control • Linear Analysis • Nonlinear Analysis • Applied Mathematics • Modeling and Simulation • Parallel programing • Thermal Engineering • Teaching

Papers and Presentations

Please visit https://gokulhari.github.io/webpage/Papers.html