

Gokul Hariharan,

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Summary

I would like to join the industry in roles involving robotics, motion planning, automated reasoning, formal methods, computer vision, or hardware/software verification to contribute to safe, competent, and reliable systems. I am currently involved in collaborative software projects in these areas.

I am dexterous in Python, C++, OCaml, ROS, and Javascript. I also take keen interest in graphics technology (specifically WebGL, Vulkan and CUDA).

Experience



Research Assistant

Iowa State University

Jan 2021 - Present (10 months +)

- ~ Formal methods, automated reasoning, robotics, autonomous and cyber-physical systems
- ~ Formal logic for autonomous robots
- ~ Design optimization (Integer linear programming, MAXSAT)
- ~ Specification synthesis, verification, observability, consistency



Postdoctoral Researcher

University of Southern California

Apr 2020 – Dec 2020 (9 months)

- ~ 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)

- ~ Carried out direct numerical simulations by creating codes in C++
- ~ Used Matlab, Mathematica, Python, for analytical, numerical and statistical analysis of results



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 ash on coal particles during fluidization using Discrete Element Modeling (DEM).
- ~ Tracked coal and ash movements using Molecular-Dynamics-like Simulations (MDS) using C++
- ~ Leveraged Computational Fluid Dynamics (CFD) in C
- ~ Won the best poster award in Open House – 2015, IIT Delhi



Research Intern

BITS Pilani, Hyderabad Campus

May 2011 - Jun 2011 (2 months)

- ~ Optimal solution between two conflicting objectives in job scheduling using 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 | GPA: 4.0

2021 - 2023

Specialization in Formal Methods, Automated reasoning, Motion planning, Robotics



University of Minnesota

Doctor of Philosophy (Ph.D.), Chemical Engineering | GPA: 3.5.

2015 - 2020

Specialization in Fluid Mechanics. The dissertation consists of four projects:

- Analyzed effects of localized point forces disturbances in viscoelastic channel flow (Matlab)
- Spectral methods for analysis of Newtonian and viscoelastic channel flows (C++, Matlab, and Mathematica)
- Stress amplification in inertialess viscoelastic channel flows
- Direct numerical simulations (DNS) using new and advanced spectral methods (C++, Matlab, Python)



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)

Expertise

Formal Methods • Automated Reasoning • Motion Planning • Satisfiability Checking • Model Checking • Robotics
 • ROS • Requirements Debugging • Spin • NuSMV • Isabelle • Theorem Proving • OCaml • C++ (11) • Python
 • Javascript • Java • Mathematica • Matlab • Git • CUDA • OpenMP • OpenCV • WebGL • ANN •
 Computer Vision • Finite Element Method • Computational Fluid Dynamics (CFD) • Decision-Making • Creative
 Problem Solving • Attention to Detail • Scientific Writing • Linear Systems Theory • Nonlinear Analysis • Applied
 Mathematics • Modeling and Simulation • Parallel Programing • Thermal Engineering

Papers and Presentations

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