

SUJAL DAVE, PHD

Postdoctoral Scholar, Stanford University | Computational Mechanics & Scientific Computing

 sdave03@stanford.edu  Stanford, CA  sujaldave.github.io  sujal-d-dave  sujaldave  Google Scholar

EXPERIENCE

Postdoctoral Scholar

Stanford University | Marsden Lab, Dept. of Pediatrics

 Oct 2025 – Present  Stanford, CA

- Accelerating the open-source **SimVascular** FEM solver (*svMultiPhysics*) by offloading Krylov solvers and preconditioners to GPUs with **Trilinos** (Tpetra, Belos) and **Kokkos**; up to **90%** lower wall time for cardiovascular FSI.
- Building fluid–structure interaction models of the Fontan circulation (TCPC) to quantify hemodynamic loads linked to Fontan-associated liver disease.
- Built an end-to-end CAD-to-CFD pipeline (Fusion, TetGen, VMTK) to tune wall shear stress in microfluidic devices for human cardiac organoids.

PhD Researcher

University of Calgary | CFSM Lab

 May 2021 – Jul 2025  Calgary, Canada

- Developed a consistent **VMS-ROM** (POD–Galerkin) framework inside an in-house **FORTTRAN/MPI** FEM solver (10,000+ lines) for turbulent, stratified and wind-turbine flows.
- Built a hyper-reduced ALM-VMS-ROM for wind turbine wakes with a **~13× speed-up** over the full-order model.
- Predicted smooth-body turbulent separation with RBVMS and weak boundary conditions, matching DNS/LES references; ran million-element simulations on national HPC clusters.

Research Exchange Student (Mitacs Globalink)

SISSA | mathLab

 Mar – Aug 2023  Trieste, Italy

Implemented reduced order modeling frameworks with Prof. G. Rozza's group.

Multiphysics Developer Intern

BosonQ Psi

 Mar – Apr 2021  India

Wrote a linear-elasticity FEM code from scratch; studied quantum linear solvers for CFD.

SELECTED PUBLICATIONS

- Dave S**, Korobenko A. Consistent reduced order modeling for wind turbine wakes using VMS and actuator line model. *Comput. Methods Appl. Mech. Eng.*, 2025.
- Dave S**, Korobenko A. Predicting smooth body flow separation with finite-element-based VMS formulation. *Computational Mechanics*, 2025.
- Codoni D, **Dave S**, ..., Marsden AL. svMultiPhysics: a finite element-based solver for cardiovascular simulations. *Under review*, 2026.
- Dave S**, Kleinstreuer C, Chari S. An effective PBPK model predicting dissolved drug transfer from a nasal cavity to the blood stream. *J. Aerosol Science*, 2022.

6 publications • 2 under review • 13 conference presentations • 1 invited talk

EDUCATION

PhD, Mechanical Eng. (4.0/4.0)

University of Calgary

 2021 – 2025

MS, Mech. & Aerospace Eng. (3.9/4.0)

North Carolina State University

 2018 – 2020

B.Tech, Mechanical Eng. (8.0/10)

Nirma University, India

 2014 – 2018

HONORS

 **Rising Star, Comp. & Data Sciences**
Oden Institute, UT Austin, 2026

 **Eyes High Doctoral Scholarship**
University of Calgary, 2023

 **Mitacs Globalink Research Award**
Mitacs Canada, 2023

 **Khanna Graduate Scholarship**
University of Calgary, 2021 & 2024

SKILLS

FORTTRAN

C++

MATLAB

Python



MPI Kokkos Trilinos GPU

PyTorch TensorFlow JAX

svMultiPhysics OpenFOAM

Fluent ANSA GMSH VisIt

ParaView FEM VMS ROM

IGA FSI PINNs DeepONet

TEACHING & MENTORING

- TA for 7 terms in CFD, FEM, Aerodynamics & Fluids; taught ANSA, OpenFOAM, Fluent.
- Mentored 6 undergraduate researchers.
- Stanford Postdoc Mentoring Certificate; SFDC Teaching Workshop (2026).