SIDHARTH GS curriculum vitae

Contact

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Theoretical Division, Los Alamos National Laboratory

Experience

Scientific researcher with broad expertise in applied mathematics and scientific computing
Primary research background and interests:

Modeling and simulation for multiphysics flows
Shock waves, multispecies turbulent transport, large eddy simulations, combustion, scramjet propulsion, instabilities and laminar-turbulent transition in high-speed complex flows, high temperature physics, inertial confinement flows

Physical data analysis and information synthesis
Singular value decomposition, resolvent analysis, reduced order modal decomposition, filtering and stochastic processes, supervised machine learning, generative models

High performance parallel computing and algorithm development
MPI, OpenMP, CUDA, Kokkos, finite volume/(discontinuous) finite element/spectral methods

2019- Present	Postdoctoral Research Scientist, Los Alamos National Laboratory
2013 – 2018	Research Assistant, University of Minnesota
2017 (07-08)	Visiting Research Scholar, Technische Universität München
2011 – 2012	Undergraduate Research Assistant, Indian Institute of Technology Kanpur
2011 (05-07)	Visiting Research Scholar, École Centrale Paris

Education

2018	Doctor of Philosophy	Aerospace Engineering and Mechanics (4.0/4.0)
2015	Master of Science	University of Minnesota
2012	Bachelor of Technology	Aerospace Engineering (9.6/10.0) Indian Institute of Technology Kanpur

Publications

Journal articles:

2021 Lagrangian analysis for turbulent transport in variable-density turbulence
Sidharth GS, JR Ristorcelli — Physical Review Fluids

2019 Reattachment streaks in hypersonic compression ramp flow: an input–output analysis
A Dwivedi, Sidharth GS, G Candler, J Nichols, M Jovanovic — Journal of Fluid Mechanics

2018 Onset of three-dimensionality in high speed flow over slender double-wedge
Sidharth GS, A Dwivedi, G Candler, J Nichols — Physical Review Fluids

2018 Subgrid-scale analysis of compressible variable-density decaying turbulence
Sidharth GS, G Candler — Journal of Fluid Mechanics

2014 Steady forces on a cylinder with oblique vortex shedding
S Mittal, Sidharth GS — Journal of Fluid and Structures

2014 A finite element formulation for global linear stability analysis of a nominally two-dimensional base flow

S Mittal, Sidharth GS, A Verma — International Journal of Numerical Methods in Fluids

Interface slope and virtual origin width in Rayleigh-Taylor unstable mixing layer
Sidharth GS, JR Ristorcelli — under review

Hypersonic shock wave/boundary layer interaction: evolution of oblique wave disturbances
A Dwivedi, Sidharth GS, M Jovanovic — under review

Second order modeling of buoyantly-driven variable-density turbulence
Sidharth GS, JR Ristorcelli — In preparation

Global instabilities in laminar shock-boundary layer interactions
Sidharth GS, A Dwivedi, G Candler — In preparation

Subgrid dynamics and turbulent mixing by shock-deposited baroclinic vorticity
Sidharth GS, G Candler — In preparation

Conference articles:

2021 Multigrid Solver with Super-Resolved Interpolation
F Holguin, GS Sidharth, G Portwood — ICLR 2021 SimDL workshop

2020 Effect of anisotropic eddy-diffusivity in LES of reactive turbulent mixing
Sidharth GS, JR Ristorcelli — AIAA Aviation 2020

2020 Hypersonic boundary layer transition over curved-walls: A mechanism based on Görlter vortices
A Dwivedi, Sidharth GS, C Hollander, G Candler — AIAA Aviation 2020

2020 A multiscale subgrid decomposition
Sidharth GS, JR Ristorcelli — AIAA Scitech 2020

2019 Global linear stability and sensitivity of hypersonic shock-boundary layer interactions
Sidharth GS, A Dwivedi, G Candler — IUTAM Transition London
J Nichols, M Jovanovic

2019 Reynolds-filtered large eddy simulation of reacting shock bubble interaction
Sidharth GS, G Candler — IWPCTM Marseille

2018 Instabilities in Mach 6 Flow over a Cone with a Swept Fin
A Knutson, Sidharth GS, G Candler — AIAA Atlanta

2018 Input-Output Analysis of Shock Boundary Layer Interaction
A Dwivedi, Sidharth GS, G Candler — AIAA Atlanta
J Nichols, M Jovanovic

2018 Direct numerical simulation of Mach 6 flow over a cone with a highly swept fin
A Knutson, Sidharth GS, G Candler — AIAA Kissimmee

2017 Large eddy simulation of reacting shock bubble interaction
Sidharth GS, G Candler — SFBTRR40 Summer Program TU Munich

2017 Global linear stability analysis of high speed flows on compression ramps
Sidharth GS, A Dwivedi, G Candler, J Nichols — AIAA Denver

2017 Three-dimensional simulations of hypersonic double wedge flow experiments
J Reinert, Sidharth GS, G Candler, J Komives — AIAA Denver

2016 Filtered velocity based LES of mixing in high speed recirculating shear flow
Sidharth GS, A Kartha, G Candler — AIAA Washington DC

2015 Stretched-vortex based subgrid-scale modeling of variable-density flows
Sidharth GS, G Candler — AIAA Dallas

2014 Baroclinic torque and implications for subgrid-scale modeling
Sidharth GS, G Candler, P Dimotakis — AIAA Atlanta

2011 Three-dimensional instabilities in flow past a spinning and translating cylinder
J Meena, Sidharth GS, M Khan, S Mittal, G Biswas — IUTAM Bluff Body Flows Kanpur

Invited Talks and Presentations

11/2021 APS DFD Phoenix

11/2021 Turbulence Seminar, LANL (Invited)

05/2021 Los Alamos Arizona Days 2021 Virtual (Invited)

04/2021 CNLS Seminar LANL (Invited)

03/2021 XCP Seminar LANL

06/2020 AIAA Aviation Virtual

01/2020 AIAA Scitech Orlando

11/2019 APS DFD Seattle

10/2019 COMUEX Seminar, Los Alamos National Laboratory (Invited)

09/2019 9th MultiMat, Trento

09/2019 17th European Turbulence Conference, Torino

07/2019 AJK Fluids, San Francisco

07/2018 IWPCTM16, Marseille

07/2018 T-5, Los Alamos National Laboratory (Invited)

02/2018 FCAAP Florida State University (Invited)

11/2017 APS DFD Denver

08/2017 SFBTRR40 Summer Program TU Munich

06/2017 AIAA Denver

01/2017 XCP-4, Los Alamos National Laboratory (Invited)

07/2016 IWPCTM15, Sydney

06/2016 AIAA Washington DC

02/2016 GALCIT, Caltech, Pasadena (Invited)

11/2015 APS DFD Boston

06/2015 AIAA Dallas

06/2014 AIAA Atlanta

Awards and Grants

- Travel Grant Award, University of Minnesota 2016
- John A. & Jane Dunning Copper Fellowship in Aerospace Engineering and Mechanics, University of Minnesota, 2013
- Academic Excellence Award IIT Kanpur 2009-12
- Summer Undergraduate Research Grant for Excellence, 2010-11

- Boeing IITK Phase-III Autonomous Vehicle Project Scholarship 2011-12
- National Talent Search Scholar 2006 (Organized by Govt. of India)

Service and Outreach

- Mentor, X Computational Physics Summer Program, 2020
- Reviewer for Journal of Fluid Mechanics, Journal of Computational Physics, Computer and Fluids, Journal of Fluids Engineering, AIAA Journal, Fluids, Energies
- Department Representative, Council of Graduate Students, University of Minnesota 2016 -2020
- Member, Senate Research Committee, University of Minnesota 2016-2018
- Officer, Squash Club UMN 2015-2019
- Graduate Student Member, College of Science and Engineering Consultative Committee, University of Minnesota 2014-15

Mentorship

2016-19 Anubhav Dwivedi, PhD Aerospace Engineering, University of Minnesota

2019 Anneli Brackbill, Sophomore, Nuclear Engineering, Oregon State University

2020 Alex Somers, PhD, Nuclear Engineering, Penn State University

2020 Francisco Holguin, PhD, Astronomy, University of Michigan

2020 Loretta Trevino, PhD, Aerospace Engineering, University of Minnesota

Professional Affiliations

American Physical Society

American Nuclear Society

American Institute of Aeronautics and Astronautics

American Society of Mechanical Engineers