

SUYASH TANDON

Ph.D. Candidate



1231 Beal Ave, Room 2016
Ann Arbor, MI- 48109, USA
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RESEARCH INTEREST

My research interest lie in the interseption of three fields - fluid dynamics with focus in turbulent flows, high-order numerical methods development, and high-performace computing using many-core and GPU implementations for performance portability.

EDUCATION

Jan 2016 - May 2020
(expected) **UNIVERSITY OF MICHIGAN**
Ph.D. Mechanical Engineering
Ph.D. Scientific Computing (Joint Degree)

Research Advisor : Associate Prof. Eric Johnsen, Mechanical Engineering
Research Summary : Complex turbulent flow patterns are common in many engineering applications including aerospace, automotive, chemical, biological, and other flow systems. To understand the physics that govern the dynamics of unsteady motions in a turbulent flow its essential to conduct spatially and temporally-resolved numerical investigations. The focus of this work is bifold: physics and numerical development. On the physics front, this work leverages existig high-performance computers (HPC) to conduct large-scale numerical experiments of turbulent flow separation and modulation using passive-flow techniques. The numerical development work exlores a modern framework that can extract benefits from the many-core, extreme-scale concurrency of next-generation HPC platforms for compressible turbulent flow problems.

Jan 2014 - Aug 2015 **M.S.E Mechanical Engineering**

Master Thesis Title : Large-Eddy Simulations of Flow Over A Backward-Facing Ramp With Vortex Generators
Thesis Advisor : Associate Prof. Eric Johnsen, Mechanical Engineering
Thesis Summary : This ressearch explores the separation of flow over a backward-facing ramp with a mean turbulent boundary layer as inflow with no turbulent fluctuations. We reduced the separated region by employing passive vortex generators. This study used the Large-Eddy Simulations approach.
G.P.A (scale of 4.0) : 3.80

Aug 2008 - Jun 2012 **FR. C.RC.E, UNIVERSITY OF MUMBAI**
B.E Production Engineering

JOURNAL PUBLICATIONS

S. Tandon, K. Maki and E. Johnsen, "Modulation of flow on a backward-facing ramp by a wall-mounted cube". Journal of Fluid Mechanics. (submitted, March 2020)

S. Tandon, K. Maki and E. Johnsen, "Modulation of flow on a backward-facing ramp by an array of equally-spaced wall-mounted cubes". Journal of Fluid Mechanics. (in preparation)

S. Tandon, I. Marincic, H. Hoffmann and E. Johnsen, "Power-performance tradeoffs of high-order discontinuous Galerkin mehods at extreme scales". Journal of Comp. & Fluids (In preparation)

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RESEARCH PRESENTATIONS

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA) CONFERENCES

- Jun 2019 24th AIAA Computational Fluid Dynamics Conference: Dallas, Texas, USA
S. Tandon, E. Johnsen and K. Maki, "*Understanding the dependence of turbulent flow modulation on the spacing between adjacent cubes on a backward-facing ramp*". Contributed paper.
- Jun 2018 AIAA Flow Control Conference: Atlanta, Georgia, USA
S. Tandon, S. Shinde, E. Johnsen and K. Maki, "*Near-wake flow modulation by a cube on a backward-facing ramp*". Contributed paper.
- Jun 2017 47th AIAA Fluid Dynamics Conference: Denver, Colorado, USA
S. Tandon, S. Shinde, K. Maki and E. Johnsen, "*Flow control using passive vortex generators*". Contributed paper.
- Jun 2016 46th AIAA Fluid Dynamics Conference: Washington D.C., USA
S. Shinde, S. Tandon, K. Maki and E. Johnsen, "*Flow separation over a backward-facing ramp with and without a vortex generator*". Contributed paper.

OTHER RESEARCH PRESENTATIONS

- Nov 2019 International Conference for High Performance Computing, Networking, Storage and Analysis (SC19): Denver, Colorado, USA
S. Tandon, N. Stegmeier, et al. "*Enabling code portability of a parallel and distributed smooth-particle hydrodynamics application, FleCSPH*". Poster Presentation.
- Nov 2017 University of Michigan Engineering Graduate Symposium (EGS): Ann Arbor, Michigan, USA
S. Tandon, E. Johnsen and K. Maki, "*Flow control using passive vortex generators*". Poster Presentation.
- Nov 2016 University of Michigan Engineering Graduate Symposium (EGS): Ann Arbor, Michigan, USA
S. Tandon, S. Shinde, E. Johnsen and K. Maki, "*Separation control of flow over a backward-facing ramp*". Poster Presentation.

FELLOWSHIPS AND AWARDS

- 2019 - 2020 MICDE Fellowship [Michigan Institute for Computational Discovery & Engineering, UM]
- 2016 - 2019 Graduate Fellowship, Curadev Pharma Pvt. Ltd.
- Nov 2017 Third Place in Engineering Graduate Symposium [College of Engineering, UM]
In Fluids, Acoustics and Thermal Sciences poster session. Presentation entitled: "*Flow control using passive vortex generators*".
- Feb 2011 Shri N. V. Shekhara Varier Scholarship [Fr. C.R.C.E, University of Mumbai]
- Feb 2011 Rohit Kapoor Memorial Prize [Fr. C.R.C.E, University of Mumbai]
- Feb 2011 Academic Achievement Award [Fr. C.R.C.E, University of Mumbai]
- Feb 2010 Academic Achievement Award [Fr. C.R.C.E, University of Mumbai]

WORKSHOPS

- Aug 2019 Petascale Computing Institute
- Mar 2018 Integrating Machine Learning and Predictive Simulation: From Uncertainty Quantification to Digital Twins: University of Minnesota, MN, USA
- Nov 2016 Unsteady Simulations For Engineering Flows : Goteborg, Sweden

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SKILLS

SCIENTIFIC PROGRAMMING

C/C++, Python, Git, Bash, CUDA, MPI, OpenMP, Kokkos, L^AT_EX, Gmsh, MATLAB

CFD TOOLS, MODELING AND SIMULATIONS

OpenFOAM, ANSYS, NX-Unigraphics, SolidWorks, Catia

MACHINE LEARNING FRAMEWORKS AND WORKFLOWS

Amazon SageMaker, PyTorch, Scikit-Learn

DESIGN AND GRAPHICS

Adobe Photoshop, Illustrator, InDesign, Autodesk Sketcher

LANGUAGES

English, Hindi, Marathi, French

CERTIFICATIONS

- | | |
|-----------|---|
| Sept 2019 | Udacity Nanodegree: Machine Learning Engineer |
| Jan 2019 | Fundamentals of accelerated computing with CUDA C/C++
Offered by Nvidia Deep Learning Institute. The certificate program focuses on accelerating CPU-only applications to run their latent parallelism on GPUs, CUDA memory optimization, usage of streams and leveraging profiling tools. |
| Jun 2015 | Graduate Certificate: Computational Discovery and Engineering
Offered by Michigan Institute For Computational Discovery And Engineering (MICDE). The Graduate Certificate program trains graduate students in computationally intensive research so they can excel in interdisciplinary HPC-focused research and product development environments. |
| Jun 2011 | National Service Scheme (NSS)
National Service Scheme, under the Ministry of Youth Affairs & Sports Govt. of India, popularly known as NSS was launched in Gandhiji's Birth Centenary Year 1969, with primary focus on the development of personality of students through community service. |

LEADERSHIP AND PROFESSIONAL EXPERIENCE

- | | |
|----------------------|---|
| Jun 2019 - Aug 2019 | Los Alamos National Laboratory: Computational Sciences Grad. Intern
Focus of the Co-design Summer School (CDSS) was on containerization using Charliecloud, of a high-performance multi-physics hydrodynamics code (FLECSPH), to study the effects of asymmetries and mixing on the distribution of isotopic yields in core-collapse supernovae, and to improve performance portability by integrating Kokkos framework. |
| Jan 2019 - Present | Scientific Computing Student Club: President
A student organization at the University of Michigan that includes students and postdocs from many disciplines and interests and fosters collaboration and peer support for scientific computing. |
| July 2018 - Jan 2019 | Engineering Graduate Symposium: Co-Chair
EGS is an annual celebration of graduate student research at College of Engineering, University of Michigan, providing opportunity for recognition of outstanding work through poster presentations and scientific visualizations. |
| Sept 2017 - Present | Mechanical Engineering Graduate Council: Workshop Co-Chair
The ME Graduate Council is a student body that offers a range of technical workshops, from scientific programming skills to data analysis tools and effective tricks to publish good quality research articles, that help the graduate students get comfortable and learn new skills. |
| Feb 2014 - Aug 2014 | University of Michigan Solar Car: Aerodynamics Team Member
A student organization at the University of Michigan that is an entirely student run project team that designs, builds, and races the world's fastest solar vehicles. As part of the Aerodynamics team I helped in CFD simulations and exterior designing. |

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- Jul 2012 - Jul 2013 Godrej & Boyce Mfg. Co. Ltd. : Graduate Engineer Trainee (GET)
Worked as a GET in the Capital Purchase & EXIM Service dept and handled capital procurement for special projects. Implemented vendor base enhancement, and cost model prediction of recurring procurement items based on historical data.
- Nov 2011 - Apr 2012 Godrej & Boyce Mfg. Co. Ltd. : B.E. Project Trainee
Interned on the machine shop floor for Final Year Thesis as a B.E. Project Trainee. Thesis entitled: "Troubleshooting in safe assembly" investigated all the processes in the machine shop. Used Failure Mode Effect Analysis to eventually short list the most critical processes and identify and relate the most commonly occurring defects.
- Feb 2011 - Aug 2012 Society of Automotive Engineers: Vice Captain, SAE Baja India 2012 Challenge
A student run project team that designs, builds, and races all-terrain vehicles. Led the structural and dynamics testing team and organized regular meetings between teams to keep track of overall progress.
- Jun 2010 - May 2011 Indian Society of Mechanical Engineers: Joint Secretary
A student organization at the Fr. C.R.C.E, University of Mumbai that intends to foster a greater sense of community among the wide variety of students.
- Jun 2010 - May 2011 Entrepreneurship Cell (E-Cell): Council Member
A student chapter for the E-Cell at the Fr. C.R.C.E, University of Mumbai that promotes entrepreneurs and bright innovations from students. The E-Cell is an opportunity to network with other entrepreneurs and alumnis of the school.
- Jun 2010 - May 2011 National Service Scheme (NSS): Student Member
Served two years of continuous community work through NSS. Dedicated more than 120hrs of community service in development of basic necessities in remote villages.
- Jun 2010 - Jul 2010 Siemens : Summer Intern
Interned in the Quality and Assurance dept. of Siemens, Mumbai, India.

PROFESSIONAL SOCIETIES/ MEMBERSHIPS

- Feb 2016 - Present American Institute for Aeronautics and Astronautics
- Feb 2011 - Aug 2012 Society for Automotive Engineers
- Jun 2011 - Jun 2012 Association of Production Engineering Students [Fr. C.R.C.E, University of Mumbai]
- Jun 2010 - Jun 2012 Indian Society of Mechanical Engineers [Fr. C.R.C.E, University of Mumbai]
- Jun 2010 - Jun 2012 Entrepreneurship Cell [Fr. C.R.C.E, University of Mumbai]
- Jun 2009 - Jun 2011 National Service Scheme

WORK AUTHORIZATION

U.S. Permanent Resident
Country of Citizenship: India

REFERENCES

Available upon request.