

Anubhav Dwivedi, Ph.D.

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Minneapolis, MN 55455

INTERESTS

Hypersonics, space propulsion, low temperature plasmas
Bayesian inversion, Uncertainty quantification, generative modeling in fluid mechanics

EDUCATION

Ph.D. in Aerospace Engineering Aug. 2020
University of Minnesota Twin Cities, Minneapolis (USA)

M.Tech. in Aerospace Engineering May 2015
Indian Institute of Technology, Kanpur (India)

B.Tech. in Aerospace Engineering May 2015
Indian Institute of Technology, Kanpur (India)

RESEARCH EXPERIENCE

Research Associate, University of Minnesota Dec. 2024 – present

Mentor: Prof. Graham V. Candler

Development of scalable Bayesian inversion techniques for hypersonic systems

Stochastic modeling for transition to turbulence

Postdoctoral Research Associate, Stanford University Sep. 2023 – Nov. 2024

Mentor: Prof. Kentaro Hara

Research on data driven modeling of low-temperature plasmas

Developed assimilation techniques for electron kinetics and dynamics

Postdoctoral Research Associate, University of Southern California Sep. 2020 – Aug. 2023

Mentor: Prof. Mihailo R. Jovanović

Research on analysis and control of transitional and turbulent compressible boundary layers

Developed nonlinear reduced order models for transitional separated hypersonic flows

Graduate Research Assistant, University of Minnesota Twin Cities Aug. 2015 – 2020

Mentor: Prof. Graham V. Candler, Prof. Joseph W. Nichols, Prof. Mihailo R.

Jovanović

Designed novel computational framework for instability growth in complex hypersonic geometries

Identified new mechanisms for predicting 3D thermal loads in flows with shock-wave-boundary-layer interactions

Developed high-fidelity DNS based models of shock dominated unsteady flows

Visiting Researcher, University of Southern California Jan–Jun 2019

Mentor: Prof. Mihailo R. Jovanović

Investigated baroclinic effects on external disturbance amplification in cold wall hypersonic boundary layers

Data-driven stochastic models for turbulence closure

Research Assistant, Indian Institute of Technology, Kanpur (India) May 2014 – 2015

Mentor: Prof. Sanjay Mittal

Absolute and convective instabilities in spatially developing shear flows

Finite element methods in instability analysis

Mentor: Prof. Marek Behr

Finite element method based modeling of aeroelastic deformations in airplane wing

REFEREED JOURNAL ARTICLES

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- | | |
|---|------|
| Castillo, A. M., Hopkins, M. M., Dwivedi, A. , Bennett, N. L., and Hara, K., Global eigenvalue method for stability analysis in crossed-field diodes, <i>Physics of Plasmas</i> , 2025, Submitted, October 2025 | 2025 |
| Jenquin, C., Cui, E. L., Dwivedi, A. , Sidharth, G. S., and Jewell, J. S., Onset of separation unsteadiness in hypersonic shock boundary layer interaction on a cone-step, <i>J. Fluid Mech.</i> , 2025, Under review | 2025 |
| Dwivedi A. , Cerepi, M., and Hara, K., Spatiotemporal state and parameter estimation of plasma dynamics using data assimilation, <i>Physics of Plasmas</i> , Vol. 32, No. 6, 2025 | 2025 |
| Dwivedi A. and Hara, K., Estimation of electron kinetics in low-temperature plasmas using data assimilation, <i>J. Phys. D: Appl. Phys.</i> , Vol. 58, 2025, pp. 175203 | 2025 |
| Wang, H., Li, J., Dwivedi A. , Hara, K., and Wu, T., Beno: Boundary-embedded neural operators for elliptic PDEs, <i>arXiv preprint</i> , 2024 | 2024 |
| Dwivedi, A. , Sidharth, G., and Jovanović, M. R., Oblique transition in hypersonic double-wedge flow, <i>J. Fluid Mech.</i> , Vol. 948, 2022, pp. A37 | 2022 |
| Dwivedi A. , Hildebrand, N., Nichols, J. W., Candler, G. V., and Jovanović, M. R., Transient growth analysis of oblique shock wave/boundary-layer interactions at Mach 5.92, <i>Phys. Rev. Fluids</i> , Vol. 5, No. 6, June 2020, pp. 063904 | 2020 |
| Dwivedi, A. , Sidharth, G. S., Nichols, J. W., Candler, G. V., and Jovanović, M. R., Reattachment streaks in hypersonic compression ramp flow: an input-output analysis, <i>J. Fluid Mech.</i> , Vol. 880, December 2019, pp. 113–135 | 2019 |
| Sidharth, G., Dwivedi, A. , Candler, G. V., and Nichols, J. W., Onset of three-dimensionality in supersonic flow over a slender double wedge, <i>Phys. Rev. Fluids</i> , Vol. 3, No. 9, 2018, pp. 093901 | 2018 |
| Hildebrand, N., Dwivedi, A. , Nichols, J. W., Jovanović, M. R., and Candler, G. V., Simulation and stability analysis of oblique shock-wave/boundary-layer interactions at Mach 5.92, <i>Phys. Rev. Fluids</i> , Vol. 3, 2018, pp. 013906 | 2018 |
| Mittal, S. and Dwivedi, A. , Local and biglobal linear stability analysis of parallel shear flows, <i>Comp. Modeling in Eng. & Sci.</i> , Vol. 113, No. 2, 2017, pp. 219–237 | 2017 |

REFEREED CONFERENCE ARTICLES

- Božić, D., **Dwivedi A.**, and Jovanović, M. R., Frequency responses of the Navier-Stokes equations: a weakly nonlinear perturbation analysis, *Proceedings of the 64rd IEEE Conference on Decision and Control*, Rio De Janeiro, Brazil, 2025, to appear 2025
- Hara, K. and **Dwivedi A.**, Data Assimilation to Estimate the State of Partially Ionized Plasmas in Space Propulsion Systems, *Structural Health Monitoring 2025*, 2025 2025
- Laad, P. A., **Dwivedi, A.**, and Sidharth, G. S., Resolvent informed reconstruction of compressible turbulent boundary layers, *AIAA SCITECH 2025 Forum*, 2025, p. 1692 2025
- Sidharth, G. S. and **Dwivedi, A.**, Receptivity of Blunt Flat Plate Hypersonic Boundary Layers to Spanwise Transverse Wave Disturbances and Surface Roughness, *AIAA SCITECH 2025 Forum*, 2025, p. 0309 2025
- Sidharth, G. S. and **Dwivedi, A.**, Wall temperature effects on near-leading-edge perturbation amplification in hypersonic boundary layers, *AIAA SCITECH 2024 Forum*, 2024, p. 2184 2024
- A. Dwivedi** and Jovanović, M. R., Energy amplification of stochastically-forced hypersonic blunt body flows, *Proceedings of the 2023 American Control Conference*, San Diego, CA, 2023, pp. 1596–1601 2023
- A. Dwivedi** and Jovanović, M. R., Noise amplification in hypersonic blunt body flows, *Proceedings of the 2023 AIAA Aviation and Aeronautics Forum*, San Diego, CA, 2023, p. 3709 (12 pages) 2023
- Dwivedi, A.** and Jovanović, M. R., A weakly nonlinear analysis of responses of a hypersonic flow over a double-wedge to oblique disturbances, *Proceedings of the 2022 American Control Conference*, Atlanta, GA, 2022, pp. 4325–4330 2022
- Sidharth, G., **Dwivedi, A.**, Nichols, J., Jovanović, M., and Candler, G., Global Linear Stability and Sensitivity of Hypersonic Shock-Boundary Layer Interactions, *IUTAM Laminar-Turbulent Transition*, Springer, 2022, pp. 489–498 2022
- Melander, L., **Dwivedi, A.**, and Candler, G. V., Nose Bluntness Effects on the Amplification of External Disturbances in Hypersonic Flows, *AIAA SciTech Forum 2022*, 2022, AIAA 2022-0948 2022
- Dwivedi A.**, Candler, G. V., and Jovanović, M. R., A frequency domain analysis of compressible linearized Navier-Stokes equations in a hypersonic compression ramp flow, *Proceedings of the 2020 American Control Conference*, Denver, CO, 2020, pp. 4325–4330 2020

- 2020
Dwivedi, A., Broslawski, C. J., Candler, G. V., and Bowersox, R., Three-dimensionality in shock/boundary layer interactions: a numerical and experimental investigation, *AIAA Aviation 2020 forum*, 2020, AIAA 2020-3011
- 2020
Dwivedi, A., Sidharth, G. S., Hollender, C., and Candler, G. V., Linear analysis of high-speed axisymmetric flows, *AIAA Aviation 2020 forum*, 2020, AIAA 2020-2987
- 2019
Hollender, C., **Dwivedi, A.**, and Candler, G. V., Görtler instability analysis of Mach 6 flow on a flared axisymmetric cone with and without suction, *AIAA Aviation 2019 Forum*, 2019, AIAA 2019-3219
- 2019
Reinert, J. D., **Dwivedi, A.**, and Candler, G. V., Verification of a conjugate heat transfer tool with US3D, *AIAA Scitech Forum*, 2019, AIAA 2019-1892
- 2018
Dwivedi, A., Sidharth, G. S., Candler, G. V., Nichols, J. W., and Jovanović, M. R., Input-output analysis of shock boundary layer interaction, *2018 Fluid Dynamics Conference*, 2018, AIAA 2018-3220
- 2018
Thome, J., Reinert, J. D., **Dwivedi, A.**, and Candler, G., Effects of Variable Wall Temperature Distributions on 3D Boundary Layers, *22nd AIAA International Space Planes and Hypersonics Systems and Technologies Conference*, 2018, AIAA 2018-5271
- 2018
Thome, J., Reinert, J. D., **Dwivedi, A.**, and Candler, G. V., Computational Study of Flow on a Sliced Cone-Flap Geometry, *2018 Fluid Dynamics Conference*, 2018, AIAA 2018-3397
- 2017
Dwivedi, A., Nichols, J. W., Jovanović, M. R., and Candler, G. V., Optimal spatial growth of streaks in oblique shock/boundary layer interaction, *8th AIAA Theoretical Fluid Mechanics Conference*, 2017, AIAA 2017-4163
- 2017
Sidharth, G., **Dwivedi, A.**, Candler, G. V., and Nichols, J. W., Global linear stability analysis of high speed flows on compression ramps, *47th AIAA Fluid Dynamics Conference*, 2017, AIAA 2017-3455
- 2017
Hildebrand, N. J., **Dwivedi, A.**, Nichols, J. W., Candler, G. V., and Jovanovic, M. R., Sensitivity analysis for the control of oblique shock wave/laminar boundary layer interactions at Mach 5.92, *47th AIAA Fluid Dynamics Conference*, 2017, AIAA 2017-4312
- 2016
Shrestha, P., Hildebrand, N. J., **Dwivedi, A.**, Nichols, J. W., Jovanovic, M. R., and Candler, G. V., Interaction of an oblique shock with a transitional Mach 5.92 boundary layer, *46th AIAA Fluid Dynamics Conference*, 2016, AIAA 2016-3647
- 2012
Srivastava, S., **Dwivedi, A.**, Verma, A., and Abhishek, Characterization of Vibration Absorber for Mounting Sensors on Micro Air Vehicle, *Proceedings of International Conference on Intelligent Unmanned Systems*, Vol. 8, 2012

INVITED TALKS

- Dwivedi, A.**, Estimation of Electron Dynamics Using Data Assimilation in Low Temperature Plasmas, November 6 2025, Research Highlight, International Online Plasma Seminar (IOPS) 2025
- Dwivedi, A.**, Data Assimilation of Plasma Dynamics and Chemistry, October 17 2025, American Physical Society Gaseous Electronics Conference, Seoul, South Korea 2025
- Dwivedi, A.**, Oblique Transition in High-Speed Separated, October 2023, Department of Mechanical Engineering, University of California, Santa Barbara 2023

AWARDS, HONORS & RECOGNITION

- John A. & Jane Dunning Copper Fellowship** 2016
in Aerospace Engineering & Mechanics
For exceptional academic record and outstanding performance in graduate written exam
- Academic Excellence Award of IIT Kanpur** 2013
For exceptional academic record
- Boeing Abhyast Scholarship** 2013
Awarded by the Boeing company and IIT Kanpur for autonomous rover building competition
- Summer Undergraduate Research Grant for Excellence** 2012
Awarded for best research proposal by undergraduate students at IIT Kanpur

PRESENTATIONS AND MEDIA

- A weakly nonlinear analysis of transition in hypersonic flows, 2022 American Control Conference, Atlanta, GA, June 2022.
- Oblique transition in high-speed separated boundary layers, In Wall bounded turbulence: beyond current boundaries, Isaac Newton Institute of Mathematical Sciences, Cambridge, UK, March 2022
- Frequency domain analysis of linearized compressible Navier-Stokes equation, 2020 American Control Conference, Denver, CO (held virtually), July 2020.
- An experimental and numerical investigation of three-dimensionality in shock boundary layer interactions, AIAA 2020 Aviation Forum, Virtual event, June 2020.
- Input-output analysis for Görtler-type instability in axisymmetric hypersonic boundary-layers, AIAA 2020 Aviation Forum, Virtual event, June 2020.
- Toward data-driven stochastically forced turbulence closure models, 72nd Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Seattle, WA, November 2019
- Hypersonic boundary layer transition over curved-walls: A mechanism based on Görtler vortices, 72nd Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Seattle, WA, November 2019
- Steady suction based control of transition in cone-flare geometry, AIAA 2019 Aviation Forum, Dallas, TX, June 2019.
- Reattachment streaks in hypersonic shock boundary layer interactions, 13th Southern California Flow Physics Symposium, Santa Barbara, CA, April 2019.
- Input-output analysis of compressible boundary layer flows, AIAA 2018 Aviation Forum, Atlanta, GA, June 2018.

- Identification of spatially-localized initial conditions via sparse PCA, 70th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Denver, CO, November 2017
- Emergence of three-dimensional flow structures in shock boundary layer interactions, 70th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Denver, CO, November 2017
- Optimal spatial growth of streaks in oblique shock/boundary layer interaction, 8th AIAA Theoretical Fluid Mechanics Conference, Denver, CO, June, 2017
- Transition in hypersonic oblique shock/boundary layer interactions, 69th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, Portland, OR, November 2016
- Design of automatic take-off and landing system using optical sensors for coaxial MAVs, 11th International Conference on Intelligent Unmanned Systems, Singapore, October 2012.

ACADEMIC SERVICE

Journal reviewer

Journal of Fluid Mechanics
IEEE Control Systems Society
Conference and Journals

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

<i>American Institute of Aeronautics and Astronautics (AIAA)</i>	Jul. 2016–present
<i>American Physical Society (APS), Division of Fluid Dynamics</i>	Jul. 2016–present
<i>Institute of Electrical and Electronics Engineers (IEEE), Control Systems Society</i>	Jan. 2019–present