Dr. Jyoti Prakash Panda, Ph.D.(IITKGP)

Contact Information

Department of Aerospace and Software Engineering
Gyeongsang National University, South Korea

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Current Position

Postdoctoral Research Fellow
Department of Aerospace and Software Engineering
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Research Interests

Turbulent Flows, Data-driven Turbulence Modeling, Direct Numerical Simulation, Machine Learning, Gas Dynamics, Microfluidics, OpenFoam and Python-based Solver Development, Computational Fluid Dynamics

Experience

Gyeongsang National University, South Korea Aug 2022 to present
Post-Doctoral Research Fellow
Roles: a) Development of efficient gas and fluid flow solvers with deep learning
b) Direct numerical simulation of compressible turbulent flows (Decaying isotropic turbulence and shock turbulence interaction)
Supervisor: Prof. R. S. Myong

Indian Institute of Technology Kharagpur, India Mar 2019 to June 2021
Post-Doctoral Research Associate
Funding Agency: Naval Research Board, DRDO
Roles: CFD-based studies on turbulent drag reduction of underwater vehicles
Supervisor: Prof. H. V. Warrior

Education

Indian Institute of Technology Kharagpur, Kharagpur, WB, India

Ph.D., Computational Fluid Dynamics (Turbulence Modeling), Feb 2019

- Department: Ocean Engineering and Naval Architecture
- Thesis Topic: *Pressure Strain Correlation Modeling for Turbulent Flows*
- Advisors: Prof. H. V. Warrior and Prof. O.P. Sha

Indian Institute of Engineering Science and Technology, Shibpur, WB, India

M.E., Mechanics of Fluids (Microfluidics), June 2015

- Department: Aerospace Engineering and Applied Mechanics
- Thesis Topic: *CFD based modeling of electroosmotic mixing and Joule heating in microchannels*
- Advisor: Prof. Debashis Pal
- *Percentage 82.5/100*

Biju Patnaik University of Technology, Rourkela, ODISHA, India

B.Tech., Mechanical Engineering, June 2012

- *CGPA 8/10*

Certificate Course

National Institute of Electronics and Information Technology, India

Machine Learning and Data Science, 10/2020- 01/2021

- Python Programming
- Data Analysis using NumPy and Pandas
- Machine Learning for Engineering and Science Applications

SCI Journal Publications

1. **Panda, J.**, Warrior, H.,"A representation theory based model for the rapid pressure strain correlation of turbulence"2018, *ASME Journal of Fluids Engg.*, Vol. 140 / 081101-1. (Impact Factor: 1.995) (Q2 Mechanical Engineering)
2. **Panda, J.**, Warrior, H.,"Modeling pressure strain correlation for turbulent flows using deep neural networks" 2021, *Proceedings of the Institution of mechanical engineers, Part C: Journal of Mechanical Engg. Science.* (Impact Factor: 1.762). (Q2 Mechanical Engineering)
3. **Panda, J.**, Warrior, H., "Data-driven prediction of complex flow field over an axisymmetric body of revolution using Machine Learning." 2022, *ASME Journal of Offshore Mechanics and Arctic Engineering.* (Impact Factor: 1.355) (Q2 Energy)
4. **Panda, J.**, Warrior, H.,"Evaluation of machine learning algorithms for predictive Reynolds stress transport modeling" 2021, *Acta Mechanica Sinica* (Accepted), (Impact Factor: 1.975) (Q2 Computational Mechanics)
5. **Panda, J.**, Kumar, B., Patil A., Kumar M. "Machine learning assisted modelling of thermohydraullic correlations for heat exchangers with twisted tape inserts, 2022, *Acta Mechanica Sinica* (Accepted), (Impact Factor: 1.975) (Q2 Computation al Mechanics)
6. Mitra, A. **Panda, J.**, Warrior, H.,"The effects of free stream turbulence on the hydrodynamic characteristics of an AUV hull form" 2019. *Ocean Engineering, Vol. 174 (2) / 148-158.* (Impact Factor: 3.795) (Q1 Environmental engineering)
7. **Panda, J.**, Warrior, H.,"Numerical studies on drag reduction of an axisymmetric body of revolution with antiturbulence surface" 2021, *ASME Journal of Offshore Mechanics and Arctic Engineering*, 143(6), p.064501. (Impact Factor: 1.355) (Q2 Energy)
8. **Panda, J.**, Warrior, H., Maity, S., Mitra, A.,Sasmal, K.,"An improved model including length scale anisotropy for the pressure strain correlation of turbulence" 2017, *ASME Journal of Fluids Engineering*, Vol. 139 / 044503-1. (Impact Factor: 1.995) (Q2 Mechanical Engineering)
9. **Panda, J.**,"A review of pressure strain correlation modeling for Reynolds stress models " 2019, *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science.* DOI:https://doi.org/10.1177/095440-6219893397. (Impact Factor: 1.762) (Q2 Mechanical Engineering)
10. **Panda, J.**, Mitra, A., Warrior, H.,"A review on the hydrodynamic characteristics of autonomous underwater vehicles"2020. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment, DOI: https://doi.org/10.1177/1475090220936896.* (Impact Factor: 1.389) (Q2 Mechanical Engineering)
11. **Panda, J.**,"A reliable pressure strain correlation model for complex turbulent flows" 2020. *Journal of applied fluid mechanics, Vol. 13, No. 4, pp. 1167-1178.* (Impact Factor: 1.783) (Q3 Condensed matter physics)
12. Mitra, A., **Panda, J.**, Warrior, H.,"Experimental and numerical investigation of the hydrodynamic characteristics of Autonomous Underwater Vehicles over seabeds with complex topography"2020. *Ocean Engineering,Volume 198, 106978* . (Impact Factor: 3.795) (Q1 Environmental engineering)
13. **Panda, J.**, Sasmal, K., Maity, S., Warrior, H.,"A Simple Nonlinear Eddy Viscosity Model for Geophysical Turbulent Flows" 2020, *Journal of Applied Fluid Mechanics*, 14(3). (Impact Factor: 1.783) (Q3 Condensed matter physics)

14. Das A., Das, SR., **Panda, J.**, Dey A.,Gajrani KK., Somani N., Gupta N. "Machine learning based modelling and optimization in hard turning of AISI D6 steel with advanced AlTiSiN coated carbide inserts, 2022, *Surface Review and Letters.* (Impact Factor: 1.303) (Q3 Materials chemistry)

15. **Panda, J.**, Kumar, B., Kumar, A.,Patil, A.,"Influence of twisted tape length on the thermal performance of a heat exchanger tube" 2021, *Numerical Heat Transfer, Part A: Applications* (Accepted), (Impact Factor: 2.928) (Q2 Condensed matter physics)

16. **Panda, J.**, Mitra, A., Joshi, A., Warrior, H.,"Experimental and numerical analysis of grid generated turbulence with and without mean strain" 2018, *Experimental Thermal and Fluid Science, Vol. 98 (11) / 594-603.* (Impact Factor: 3.232) (Q1 Aerospace engineering)

17. **Panda, J.**, Handique J., Warrior, H.,"Mechanics of drag reduction of an axisymm etric body of revolution with shallow dimples" 2022, *Proceedings of the iMech, Part M: Journal of Engineering for Maritime Envionment.* (Impact Factor: 1.389) (Q2 Mechanical Engineering)

18. **Panda, J.**"Machine learning for Naval Architecture Ocean and Marine Engineer ing" 2022, *Journal of Marine Science and Technology.* (Impact Factor: 2.005) (Q1 Mechanical Engineering)

Submitted Journal Publications

1. Mitra, A.,**Panda, J.**, Warrior, H.,"The hydrodynamic characteristics of autonomous underwater vehicles in rotating flow fields" 2021, *Proceedings of the iMech, Part M: Journal of Engineering for Maritime Envionment.*

International Conference Publications

1. **Panda, J.**, Sengupta, B., Myong, R. S.,"Direct numerical simulation of shock turbulence interaction with bulk viscosity effects" 2023. *The 34th International Symposium on Shock Waves, Daegu, Korea* (Submitted).

2. **Panda, J.**, Warrior, H., Maity, S.,"Pressure Strain Correlation for decaying homogeneous turbulence" 2016. *Fluid Mechanics and Fluid Power Conference held at MNNIT Allahabad, India.*

3. **Panda, J.**, Gupta, S., Pal, D.,"Computational Analysis of Liquid-Liquid Mixing In a T-Shaped Serially Connected Converging-Diverging microchannel" 2014. *59th Congress of ISTAM, IIT Kharagpur, India.*

4. Mohapatra, P., **Panda, J.**, Pal, D.,"Electro-osmotic Flow and Mixing in a Microchannel: A Numerical Study" 2014. *59th Congress of ISTAM, IIT Kharagpur, India.*

5. Joshi, A., Warrior, H.,**Panda, J.**"An Improved Single Point Closure Model Based on Dissipation Anisotropy for Geophysical Turbulent Flows" 2018. *Int. Conference on Oceanography held at Miami, USA.*

6. Gupta, S.,**Panda, J.**, Nandi, N."A Model Study of Free Vortex Flow" 2014. *ICTACEM Conference held at IIT Kharagpur, India.*

7. Usmani, A., Gupta, S.,**Panda, J.**"Numerical Simulation of Pulsatile Flow in Stenosed Artery" 2014. *IDMC Conference held at NIT, Rourkela, India.*

Teaching Experience

DIT University, Dehradun, India 2021 to 2022
Assistant Professor
Roles: Teaching subjects of Mechanical Engineering to UG and PG students

Biju Patnaik University of Technology, Odisha, India 2012 to 2013
Junior Lecturer
Roles: Teaching and laboratory activities of UG students

Scholarships

- MHRD government of India fellowship for doctoral studies , India 2015-2018
- MHRD government of India fellowship for PG studies , India 2013-2015

Research Lab Visits

Lab name: Center for Quantum Information Processing,University of Seoul, Korea
Purpose: To learn quantum computing for fluid and gas dynamics applications
Duration: 2nd-3rd Feb 2023

Programming and Software Skills

Programming:
Python, C/C++

Software:
JAX-Fluids (DNS and LES)
OpenFOAM (RANS, LES, DSMC)
Bird's Code (DSMC)
ANSYS Fluent (RANS and RSTM)
ANACONDA
Tensor flow and Keras (Deep learning)
Scikit Learn (Machine Learning)
MATLAB

Experimental work

Instrument: Acoustic Doppler Velocimeter
Principle of operation: Doppler Shift
Measured parameters: Three components of velocity of water
Location: Recirculating water tank, Ship Hydrodynamics Lab, IIT Kharagpur

Short-term courses organized

Topic: Hands-on Python for Mechanical Engineers
Venue: DIT University, Dehradun, India
Duration: 10 am to 4 pm, $9th$ April 2022

Invited Speaker

Topic: Machine Learning for fluid dynamics
Venue: Engineering Staff College of India, Hyderabad
An autonomous organ of The Institution of Engineers, India
Duration: $23th - 27th$ August 2021.

Topic: An introduction to Computational Fluid Dynamics
venue: Engineering Staff College of India, Hyderabad
An autonomous organ of The Institution of Engineers, India
Duration: $26th - 28th$ April 2021.

Professional Profiles

Google Scholar Profile: Citation: 251, h-index: 7, i10-index: 7

Researchgate Profile

Linkedin Profile

Reviewer

Physics of Fluids
Proceeding of the IMECH part C: Journal of Mechanical Engineering and Science
Thermal Science
Ocean Engineering
International Journal of Fluid Mechanics Research
Industrial Robot

References

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Personal Profile

NAME: Jyoti Prakash Panda

DOB: 16th April 1991

NATIONALITY: Indian

PERMANENT ADDRESS: Hiratikiri, Sergarh, Balasore, Odisha, 756060

MARITAL STATUS: Married (Wife: Yoga Professional)

LANGUAGES KNOWN: Odia, Hindi, English