

**Johns Hopkins University**

# Center for Environmental & Applied Fluid Mechanics

**3:00 PM, Friday, March 6, 2026**

**Gilman Hall 50**

**Zoom:** <https://wse.zoom.us/j/93762992307>

[Link for Spring 2026 recordings](#)



**Prof. Sukanta Basu**

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***“AIML-Driven Modeling of Atmospheric Turbulence for Weather, Energy, and Defense Applications”***

**Abstract:** Over the past two decades, my research group and collaborators have developed a diverse suite of physics-based modeling techniques (e.g., direct numerical simulation, large-eddy simulation, and mesoscale modeling) and associated parameterizations to advance our understanding of atmospheric flow and turbulence. Beyond conventional weather forecasting, our research findings have direct implications for the design of next-generation utility-scale wind turbines, high-energy laser systems, and free-space optical communication networks, among others.

Recently, our modeling portfolio has expanded significantly with the advent of modern artificial intelligence (AI) and machine learning (ML)-based approaches, including deep learning. In this presentation, I will highlight a selection of ongoing research projects that leverage these new tools. Examples include optical turbulence estimation using tabular foundation models, wind gust nowcasting with U-Nets, and wind speed profile extrapolation using TabNet. I will conclude by outlining my near-term research agenda, which focuses on integrating AIML-driven approaches with traditional physics-based methodologies.

For more details, visit: <https://www.albany.edu/asrc/faculty/sukanta-basu>

**Hosted by:** Dr. Branko Kosović (ROSEI)