Manan **Doshi**

Third year PhD Student · Computational Science and Engineering

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Education

PhD in Computational Science and Engg. & Mechanical Engg. — *GPA: **5.0**/5*
Massachusetts Institute of Technology — *2023 (expected)*

SM in Computational Science and Engineering — *GPA: **5.0**/5*
Massachusetts Institute of Technology — *Feb 2021*

- Tata tuition award for 2020-2021

BTech with Honors in Mechanical Engineering — *GPA: **9.33**/10*
Indian Institute of Technology, Bombay — *Aug 2018*

Minor in Computer Science and Engineering — *GPA: **8.50**/10*
Indian Institute of Technology, Bombay — *Aug 2018*

Publications

Bhabra, Manmeet S. et al. (Oct. 2020). "Optimal Harvesting with Autonomous Tow Vessels for Offshore Macroalgae Farming". In: *OCEANS 2020 IEEE/MTS*. In press. IEEE.

Doshi, **Manan**, Manmeet Bhabra, and Pierre F. J. Lermusiaux (2021). "Energy-Time Optimal Path Planning in Dynamic Flows: Theory and Schemes". In: *In preparation*.

Doshi, **Manan**, Chinmay S. Kulkarni, et al. (Oct. 2019). "Flow Maps and Coherent Sets for Characterizing Residence Times and Connectivity in Lagoons and Coral Reefs: The Case of the Red Sea". In: *OCEANS Conference 2019*. In press. IEEE. Seattle.

Lermusiaux, Pierre F. J. et al. (Oct. 2019). "Plastic Pollution in the Coastal Oceans: Characterization and Modeling". In: *OCEANS Conference 2019*. In press. IEEE. Seattle.

Key Projects

Energy-Time Optimal Path Planning in Dynamic Fields — *Masters Research*
Guide: Prof. Pierre Lermusiaux | MIT — *Current*

- Derived and implemented schemes to solve the multi-objective problem of traveling between two points in the minimum time while using minimum energy by using the Hamilton-Jacobi optimal control formulation
- Extended the method to problems which allow for harvesting external fields and implemented it to compute paths to optimally collect algae for offshore farming. Computed optimal paths based on real biogeochemical simulations in the Massachusetts Bay region

Lagrangian Analysis of Inertial Particles in Ocean Flow — *Masters Research*
Guide: Prof. Pierre Lermusiaux | MIT — *Current*

- Built on top of existing methodology to study mixing and transport of passive material to account for particle inertia
- Proposed schemes to use properties of forward and backward transport to improve accuracy of transport predictions

Simulating Incompressible Fluid Flow using DG Methods — *Undergraduate Thesis*
Guide: Prof. Shivasubramanian Gopalakrishnan | IIT Bombay — *Aug 2017 - Apr 2018*

- Developed a python framework to solve incompressible Navier Stokes equations using Discontinuous Galerkin methods

Accelerating Vesicle simulation using Machine learning — *Summer Internship*
Guide: Prof. George Biros | University of Texas at Austin — *May 2017 - Jul 2017*

- Attempted to use a deep CNN to speed up existing Boundary Element Method based simulation of inextensible vesicles suspended in viscous fluid

Technical Skills

Python (SciPy stack + TensorFlow)	C++	Julia
MATLAB	git	LaTeX