Tej Jolly

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Education

Carnegie Mellon University *MS Mechanical Engineering, expected 2026* **Pittsburgh, PA**
Johns Hopkins University *BS Mechanical Engineering, 2020* **Baltimore, MD**
Relevant Coursework: Computer Vision, Digital Twins, Deep Learning, Machine Learning and Artificial Intelligence, Cardiovascular Mechanics, Computational Modeling of Aerodynamics and Heat Transfer, Computational Fluid Dynamics, Numerical Methods

Research

BioSiMM Lab *Researcher* August 2024 – Present **Pittsburgh, PA**

- Quantified how microvascular resistance alters diagnostic indices in coronary CFD across controlled stenosis severities and focal vs. diffuse lesion lengths; awarded 1st place, SB3C Bioengineering Conference Master's Student Paper Competition
- Deployed more than 100 simulations (~150,000 core-hours total) via automated, self-built SimVascular pipeline for submission/monitoring, hemodynamic post-processing, ParaView/VTK batch image generation, and dataset assembly; subsequently trained a feed-forward neural network to flag CFR-FFR discordance from derived dataset. Selected to International High-Performance Computing Summer School based on work
- Leading development of an imaging-informed non-invasive approach to estimate microvascular resistance from CT angiography (boundary-condition inference, 0-D LPN tuning, and contrast-based advection–diffusion checks to calibrate coronary model)

Conference Publications

- Jolly T, Garcha A, Grande Gutiérrez N. Influence of microvascular resistance on diagnostic indices of coronary hemodynamics. In: Proceedings of SB3C 2025: Summer Biomechanics, Bioengineering, and Biotransport Conference; 2025 Jun 22–25

Experience

Arup *Mechanical Engineer, Tunnel Ventilation* June 2023 – June 2024 **New York, NY**

- Lead CFD analyst on emissions performance analysis for Heirloom Carbon, leveraging high-performance computing cluster to perform multiple transient CFD studies on direct-air-capture facilities for CO2 removal; determined appropriate multiphase model through high-fidelity LES simulations on reduced-scale models; reduced re-entrainment of exhausted air and particulate matter
- Developed transient Subway Environment Simulator (SES) models for Penn Station Expansion project, assessing temperature profiles for fire emergencies and normal operations; identified and resolved discrepancy between LIRR's proposed trains' heat-rejection mechanism and SES program's built-in heat-rejection assumptions for trains
- Performed CFD analysis for double-skin curtain wall façade for Boston Museum of Science, simulating thermal load with 3D solar ray tracing, implementing adaptive solar shading and ventilation strategies to reduce energy consumption

Mott MacDonald *Mechanical Engineer, Fire and Life Safety* May 2021 – May 2023 **New York, NY**

- Sized jet-fan ventilation system in 2-mile-long tunnel using large-eddy simulations in Fire Dynamics Simulator, creating custom functions to model combustion based on alternative fuel; determined pollution concentrations using Subway Environment Simulator (SES) v6; identified and debugged error in SES's underlying Fortran code; co-authored report for client
- Developed 1D finite-differencing method for calculating temperature profiles in road tunnels, implemented in both Python and VBA for peer accessibility; development involved parametric CFD studies to determine heat transfer coefficients beyond the applicable ranges of studied correlations; resultant chart and tool reduced computation times from days to hours
- Host of nationwide Lunch-and-Learn weekly seminar series, facilitating cross-discipline, cross-industry presentations, and Q&A sessions for both internal and external presenters

Liberty Harbor Construction *Mechanical Engineer, Capital Projects* April 2020 – April 2021 **Jersey City, NJ**

- Reduced energy usage of HVAC system in data center after running simulations in STAR-CCM+ and redesigning layout of hot-aisle/cold-aisle setup, helping achieve LEED certification for 46-story residential building
- Performed FEA analysis of rock-climbing wall and moved installation duties away from contractor to in-house construction team, cutting overall project cost by 45%; rapid-prototyped small-scale model to aid in design

WSP *Intern, Tunnels & Infrastructure* Summers 2018 & 2019 **New York, NY**

- Modeled thermal load on ventilation system in 4-mile tunnel for NY Port Authority's Cross Harbor Tunnel Project while leading migration away from licensed to open-source CFD software, saving $30,000 in annual licensing fees per project

Metropolitan Transportation Authority *Intern, Capital Projects* Summer 2017 **New York, NY**

- Created post-processing scripts in Python to parse temperature, pressure, and airflow values output from Subway Environment Simulator, reducing labor time from hours to minutes

Programs, Languages, Certifications

Ansys Fluent | Fire Dynamics Simulator | SimVascular | HyperMesh | PyTorch | OpenCV | Python | C | OpenMP | Git | EIT Certified