Potluri Vachan Deep

Ph.D. research scholar, IIT Bombay

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Education

Ph.D. Mechanical Engineering | IIT Bombay — Jul '18 – Dec '23*

Thesis title	Development and analysis of discontinuous Galerkin computational framework for high order simulation of hypersonic shock-boundary layer interaction
CPI	9.86
Key electives	Galerkin Methods for Fluid Dynamics, High Performance Scientific Computing, Magnetohydrodynamics and its engineering applications

B.Tech. Mechanical Engineering | IIT Bombay — Jul '14 – Jul '18

CPI	9.72
Key electives	Computational Fluid Dynamics and Heat Transfer, Essentials of Turbulence, Finite Element and Boundary Element Methods, Fuels and Combustion, Numerical Methods for Conservation Laws

Related experience

- Development of high resolution schemes for compressible flows in OpenFOAM — Dec '16 – Apr '18
  Prof. Bhalchandra Puranik | IIT Bombay
  - **Modified an existing solver** `rhoCentralFoam` to use TVD-RK3 time integration scheme
  - **Developed a new solver** `ausmPlusUpFoamRK3` that uses AUSM$^+$-up flux scheme along with RK3 time integration scheme
  - **Performed a comparative study** using these two solvers by conducting simulations of several 1D and 2D test cases to draw useful conclusions

Other experience

- Unified 2D Finite Element — Mar '18 – Apr '18
  Prof. Parag Tandiya | IIT Bombay
  - **Implemented a subroutine** in FORTRAN77 library FEAP for a new combined Plane Stress, Plain Strain and Axi–symmetric linear elasto–static element, and validated the subroutine using several simple test cases
- Stair climbing wheel chair — Jul '17 – Dec '17
  Prof. Shantanu Tripathi | IIT Bombay
  - **Proposed a mechanism** for a passive wheel chair capable of climbing stairs using the force provided by a companion
  - **Built** a full scale basic functioning prototype within 2 months constraining to the alloted budget and resources
  - **Tested the prototype** on 2 different stair geometries and demonstrated it's effectiveness to Mechanical Engineering Department faculty, staff, and other students
- GE90 HPC airfoil durability analysis — May '17 – Jul '17
  Mr. Nageswara Ganji, Mr. Devesh Ojha | John F. Welch Technology Center, General Electric
  - **Modified** the mesh of existing GE90-115B high pressure compressor stage-9 rotor blade, to model
    1. Three types of damaged blades by making notches at different locations on the leading edge
    2. A defectively manufactured blade by changing thickness of leading edge according to manufacturing tolerance
  - **Generated Campbell Diagrams** by simulating the vibration response and **recalculated fatigue factor of safety** at critical locations of undamaged, damaged and defected blades for 3 different materials

Publications

Potluri, Vachan D., Bhalchandra P. Puranik, and Kowsik V.R. Bodi (2022). “Effect of polynomial degree on discontinuous Galerkin simulation of Euler equations”. In: *International Shock Interaction Symposium*. Springer Nature.

— (2023). “High order discontinuous Galerkin simulation of hypersonic shock-boundary layer interaction using subcell limiting approach”. In: *Journal of Computational Physics* 485, p. 112117. DOI: https://doi.org/10.1016/j.jcp.2023.112117.

Scholastic Achievements

- **Stood 2nd in Department** out of more than 150 students in B.Tech. — May ‘18
- **Scored 829** in Graduate Aptitude Test in Engineering (GATE) 2018 — Mar ‘18
- **Secured All India Rank 129** in JEE Advanced 2014 in general category — May ‘14
- Awarded **Kishore Vigyanik Protshahan Yogana** (KVPY) fellowship by Indian Institute of Science (IISc), Bangalore — Dec ‘13
- **Secured position among top 1% students** of former Andhra Pradesh who participated in National Standard Examination in Physics (NSEP) — Dec ‘13