Nitish Shirish Keskar

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Educational Background

- 2008-2012 (Projected): Pursuing Bachelors of Technology in Mechanical Engineering at Veermata Jijabai Technological Institute (VJTI), Mumbai.

  Cumulative Point Index : 9.3 (Out Of 10). Ranked 1st in Department.

- Higher Secondary Certificate 2008 - Aggregate - 89.00%

- Secondary School Certificate 2006 - Aggregate - 90.80%

Technical Skills

- Programming Languages: Proficiency in Java, C/C++ and Fortran. (Including MPI/OpenMP)

- Softwares: Proficiency in LaTeX, Microsoft Office and MATLAB. Familiar with COMSOL, Flash MX and LINDO.

Honors and Scholarships

- Recipient of Sir Ratan Tata Merit Scholarship for the year 2009 - 2010.

- Sole recipient of the Late C.K.Radhakrishnan Scholarship for securing 1st rank at the end of sophomore year.

Academic Achievements

- All India Rank of 7 in Graduate Aptitude Test in Engineering (GATE) 2011 in Engineering Sciences.

- Selected for the Indian Academy of Sciences (IAS) Summer Research Fellowship Programme 2010. Worked with Dr. N. Balakrishnan (Associate Professor, Department of Aerospace Engineering, Indian Institute of Science (IISc) Bangalore) in the domain of Computational Fluid Dynamics.

- Selected for the Summer Internship Programme 2011 conducted by the Supercomputing Education and Research Centre (SERC), IISc. Worked with Dr. Murugesan Venkatapathi, Assistant Professor, SERC, IISc Bangalore in the field of Numerical Linear Algebra. (Acceptance Rate = 2%)

- Paper titled "Optimization and Pricing of "Shared Taxi" System in Suburban Mumbai" selected for publication in 8th AIMS International Conference on Management.

Projects

- **Title :** Parallel Algorithms for Solving Large Linear Systems[1]
  Advisor : Dr. Murugesan Venkatapathi, Assistant Professor, Indian Institute of Science (IISc), Bangalore.   Ongoing

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[1] Project Undertaken as a part of the Summer Internship Programme (SERC), 2011. Continued it for Final Year Thesis

- Currently working with Dr. Venkatapathi on evaluating the practicality of using Krylov Subspace Methods (KSM) for solving dense non-hermitian linear systems.
- Designed parallel Fortran codes of KSM including Conjugate Gradient Normal Equations (CGNE) and Quasi Minimal Residual (QMR) for solving large non-hermitian linear systems. This was facilitated using manually tuned versions of BLAS and LAPACK libraries.
- Conducted analysis on the convergence of CGNE and QMR with condition number and matrix size as well as their scalability.
- Presently working on adjudging the viability of QMR for solving large dense non-hermitian linear systems including an analysis on preconditioners, manual & automatic tuning, multicore parallelization, GPU computing, improving DGEMV (BLAS Level 2) subroutine and hybrid parallelization.

- **Title :** A Parallel Algorithm for Solving Moving Mesh Problem[2]
  Advisor : Dr. N. Balakrishnan, Associate Professor, IISc, Bangalore.   May-July 2010

  - Worked with Dr. Balakrishnan in the Computational Aerodynamics (CAd) Lab of IISc, Bangalore on HiFUN - 3D, an indigenous CFD package of Dr. Balakrishnan's venture company : SandI (www.sandi.co.in).
  - Was responsible for adding functionality to the solver by enabling it to solve moving/dynamic mesh problems.
  - Designed algorithms for resolving non conformity in static grids and extended the logic for serial and parallel versions of the moving mesh problem.
  - Analyzed and optimized existent algorithms for processor communication and neighbourhood searches in such problems.

- **Title:** Guidance and Navigation of Launch Vehicles.
  Advisor: Prof. Hari Hablani, Aerospace Department, Indian Institute of Technology (IIT), Bombay.   November, 2009 - January, 2010

  - Studied common orbital mechanics problems, rendezvous dynamics and perturbations due to gravity and created interactive GUI based applications using MATLAB.
  - Modeled the problem of guidance, navigation and control of launch vehicles during their ascent phase as 6 degree of freedom problems governed by ordinary differential equations, created C/C++ codes for computation of trajectories and MATLAB codes for effective visualization.
  - Optimized the differential equations governing the trajectory using optimal control theory. The optimization of these ODEs and subsequent coding was achieved through dynamic programming. Conducted in depth analysis of the causal relationship between the fundamental launch parameters and the resultant trajectory.
  - Results showed a dramatic improvement of optimized trajectories over nominal ones. This would result in huge savings in fuel, time and money during space missions.
  - Continued this work during winter of 2010 and analyzed the viability of using convex optimization for solving optimal control problems.

- **Title :** Design and Implementation of Water Rockets
  Location: VJTI, Mumbai   Group Project

  - Studied the effects of various fin designs and fluids on the range, altitude and stability of water rockets.
  - Conducted experiments on the effect of density and viscosity of non-newtonian fluids on propulsive action.
  - Entered 2 prototypes in the Aquajet competition in Institute of Chemical Technology (ICT)'s technical festival, Exergy 2009 and won 1st and 2nd prize along with a prize amounting to a total of Rs. 8000 ($175).

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[2]Project Undertaken as a part of the IAS Summer Research Fellowship, 2010.

Teaching Experience

- Conducted MATLAB and COMSOL workshops for junior and senior students at VJTI.

- Participated in the mentorship program at VJTI wherein junior and senior students conduct doubt solving sessions for freshman and sophomores.

Languages

- Proficiency in English, Hindi and Marathi.

- Elementary Knowledge of French and German.

References

Provided on Request.