Vignesh Vittal Srinivasaragavan - Curriculum Vitae

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Profile Summary

An industrious engineer with a strong research background in **computational mechanics/mathematics** complimented by **programming skills**. Currently pursuing a doctoral degree with research focus on **adaptive numerical methods for stochastic PDEs**

Education

Rensselaer Polytechnic Institute, New York, USA — *(Aug '17 – present)*
PhD in Mechanical Engineering — *GPA 3.83/4.00*
Advisor: Dr. Onkar Sahni

Indian Institute of Technology Madras, India — *(Aug '12 – Jul '17)*
B,Tech/M.Tech. in Mechanical Engineering (Product Design) — *GPA 8.38/10.00*
Minor: Industrial Engineering — *Major GPA 8.61/10.00*

Research Interests

- **Uncertainty quantification:** Stochastic PDEs, Intrusive and Non-Intrusive UQ, Stochastic Finite Elements, Multi-level and Multi-fidelity UQ
- **Fluid Mechanics:** Computational Fluid Dynamics, Stabilized Finite Elements

Research Projects

- **Wavelet methods for Linear-Elastic Solids** *(Aug '16 – May '17)*
  - o *Guide: Dr. Raju Sethuraman, Computational Mechanics Lab, Machine Design Section, IIT Madras*
  - o *Skills and Tools: Mathematical modeling, MATLAB*

- Conducted a detailed research on solving ODE/PDEs using Haar wavelets with an emphasis on implementing the same for Linear Elastic equations
- Developed custom MATLAB codes for the same and achieved greater precision, convergence while minimizing computations
- Performed extensive research on Wavelet-Galerkin methods for ODE/PDEs and developed MATLAB codes that evaluates necessary functions (like wavelet integrals, moment terms and connection coefficients) associated with the method
- Thrust also placed on investigation of effect of parameters (like genus of wavelet and resolution used) on convergence and stability of the solutions

- **Modeling, Simulation and Control of a Robot** *(Dec '14 – Aug '16)*
  - o *Guide: Dr. S. Soundarapandian, Manufacturing Engineering Section, IIT Madras*
  - o *Skills and Tools: 3D modeling, Structural analysis, Kinematic and Dynamic analysis, Control systems, ADAMS, MATLAB, SIMULINK, SolidWorks*

- Reverse engineered a robot, created a 3-D model and constructed a path planning algorithm for the same
- Designed the control software for the manipulator arm, which ensures precise and accurate path adherence in minimally-invasive orthopedic surgery applications
- Validated the model and the control systems by creating a co-simulation in the ADAMS environment, with custom MATLAB codes in a SIMULINK module
- An aspect of the project was presented in the 3^{rd} *International Conference on Mechatronics and Mechanical Engineering* held at Shanghai, October 2016 and published in the conference proceedings

Academic Experience

• **Teaching Assistant, Rensselaer Polytechnic Institute** *(Aug '17 – Dec'17)*
o *Course: Engineering Dynamics / Course instructor: Dr. Jeremy Laflin*
- Supervised a class of ∼45 undergraduate students in the sophmore level course
- Assisted course instructor in class, assignments and proctoring examinations

• **Teaching Assistant, Indian Institute of Technology Madras** *(Aug '16 – Nov'16)*
o *Course: Advanced Mechanics of Solids / Course instructor: Dr. Raju Sethuraman*
- Supervised ∼60 undergraduate and post graduate students in the advanced-level course
- Assisted course instructor in conducting class tutorials and examinations

Industrial Experience

• **Winter Intern, Forbes Marshall Ltd.** *(Dec '15 – Jan'16)*
- Mathematically modeled the concentration factor of a Fresnal-type Evacuated Tube Collector in terms of input design parameters
- Estimated the optimal parameter set by running a Monte Carlo simulation

• **Summer Intern, GE India Pvt. Ltd, Transportation division** *(May '15 – Jul'15)*
- Optimized the parameters in Variable Valve Timing (VVT) mechanism in GE Engines
- Suggested possible noise mitigation and heat screening methods to be implemented in GE Engines
- Generated a Requirement Traceability Matrix (RTM) for Lube Oil pump test rig

Skills

• **Modeling** : CreO Parametric, AutoCAD, Inventor, SolidWorks
• **Analysis and Simulation** : MATLAB, SIMULINK, Paraview, Adams, ANSYS, C/C++
• **Symbolic Computation** : Maple, Mathematica
• **Presentation and Documentation** : LaTeX

Scholastic Achievements

• Ranked in **top 1%** in the **IIT-JEE 2012** (from over 0.5 million applicants)
• Ranked in **top 1%** in the **AIEEE 2012** (from over 1.2 million applicants)
• Qualified for the **Indian National Maths Olympiad** 2011 (Among the **top 500** in India)
• Secured **top 1%** in state in **National Standard Examination in Physics** 2011

Publications

• ADAMS-MATLAB Co-Simulation of A Serial Manipulator, Tejaswin Parthasarathy, Vignesh Srinivasaragavan, Soundarapandian Santhanakrishnan. MATEC Web Conf. 95 08002 (2017) DOI: 10.1051/matecconf/20179508002