Shreyas Vathul Subramanian

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Director of Research at Robust Analytics, Inc.

EDUCATION

2012-2015	**PhD** (Aerospace Engineering)	Purdue University, West Lafayette, IN	**4.0/4.0**
2011-2012	**MS** (Mechanical Engineering)	Wright State University (WSU), Dayton OH	**4.0/4.0**
2007-2011	**BTech** (Mechanical Engineering)	National Institute of Technology Karnataka (NITK), India	**3.91/4.0**

EMPLOYMENT HISTORY

Employer	Position Held	Start Date	End Date	Work hours/week
Indian Institute of Science	Research Assistant	05/01/2010	08/01/2010	40
Flow Simulation Research Group	Graduate Research Assistant	08/15/2011	09/01/2012	20
System of Systems Laboratory	Graduate Research Assistant	09/15/2012	08/01/2015	20
First Year Engineering, Purdue	Head Teaching Assistant	08/25/2014	01/01/2015	20
Robust Analytics, Inc.	Aviation Systems Engineer	10/01/2015	10/01/2016	40
Robust Analytics, Inc.	**Director of Research**	**02/01/2017**	**Present**	**40**

PUBLICATIONS

1. **Design of Adaptable Wing Micro Air Vehicle for Higher Endurance**, Symposium on Applied Aerodynamics and Design of Aerospace Vehicles, *Shreyas Vathul, Shashank Mishra, Prashanth Sarathy, Racheet Matai and Vikram Goel,* 2009.
2. **Autonomous Micro Air Vehicle for Coastal Zone Management**, Institute of Engineers (IE) Special Issue on Micro and Nano Air Vehicles, *Pruthviraj U, Shreyas Vathul and Sohan S*, 2010.
3. **Design, Analysis and Flight Testing of a Dynamic Soaring UAV Testbed**, Undergraduate Thesis, *Shreyas Vathul, Riddhiman Roy and Manu Kamin*, 2011
4. **Application of Auto-tracking to the Study of Insect Body Kinematics in Maneuver Flight**, Master's Thesis, *Shreyas Vathul*, 2012
5. **Hierarchical Complexity Guided Optimization of Systems-of-Systems with Evolving Design Spaces**, CESUN 2014, *Shreyas Vathul and Daniel A. DeLaurentis.*
6. **A Hybrid Differential Evolution Self-Organizing-Map Algorithm for Optimization of Expensive Black-box Functions,** AVIATION 2014: Multidisciplinary Analysis and Optimization (Emerging Methods), *Shreyas Vathul and Daniel A. DeLaurentis.*
7. **Dual Averaging with Adaptive Random Projection (ARP) for solving evolving distributed optimization problems,** Journal of Optimization Theory and Applications, *Shreyas Vathul, Dengfeng Sun and Daniel A. DeLuarentis*
8. **Self-Organizing Maps based Differential Evolution for Resource Intensive Optimization,** Submitted to Journal of Global Optimization, *Shreyas Vathul, Daniel A. DeLaurentis*
9. **Dual Phase Consensus Algorithms Distributed Sensor Management,** IEEE Transactions on Aerospace and Electronic Systems, *Kartavya Neema, Shreyas Vathul, Daniel A. DeLaurentis*
10. **Hybrid Optimal Control Method for Generating Time Optimal Trajectories for Fixed-Winged Aircraft,** In preparation for AIAA Scitech 2016, *Shreyas Vathul, Kshitij Mall, Michael Grant, Daniel A. DeLaurentis*
11. **Bringing in the World: Internationalizing the Curriculum of a First-Year Engineering Course at a Large Public American University,** ASEE International Forum 2015 (Seattle), *Shreyas Vathul, Jennifer DeBoer*
12. **Dual Averaging with Adaptive Random Projection for Solving Evolving distributed Optimization Problems,** Journal of Optimization Theory and Applications, *Shreyas Subramanian, Daniel Delaurentis, Dengfeng sun*
13. **Measuring the Impact of Avionics Faults with a Set of Safety Metrics,** 2017 IEEE International Conference on Systems, Man, and Cybernetics, *Michael Jacobs, Varun Sudarsanan, Shreyas Subramanian, Daniel A. DeLaurentis*
14. **Deep-learning based Feature Selection and Time Series Forecasting of Accidents in the National Airspace System**, 2018 AIAA Scitech Forum, *Shreyas Subramanian, Arjun Rao*

15. **Modeling and Simulation of System-of-Systems (SoS) using P-systems theory,** Submitted to International Journal of System of Systems Engineering, *Shreyas Subramanian*
16. **Hidden Markov Model based Terminal Area Safety Margin Evaluation Tool (TASMET),** Submitted to AIAA Aviation 2018, *Shreyas Subramanian, Zhenming Wang, Peter Kostiuk*
17. **Near Real Time Flight Cost Model for Airline Cost and Revenue Assessment,** Submitted to AIAA Aviation 2018, *Shreyas Subramanian, Peter Kostiuk*
18. **Custom IBM Watson Speech-to-text Model for Anomaly Detection using ATC-pilot Voice Communication,** Submitted to AIAA Aviation 2018, *Shreyas Subramanian, Graham Katz, Peter Kostiuk*

RESEARCH PROJECTS

Year	Topic	Skills Involved
2017	IBM Watson based speech-to-text and sentiment analysis of Air Traffic Control (ATC) pilot communication for anomaly detection	Speech-to-text, signal processing, machine learning
2016	Outdoor and indoor passenger tracking implementation for SMART-NAS Test Bed Use Cases to Improve Passenger Experience (NASA NNA16BD94C)	Technology testing, Systems architecting, Google traffic layer, Network queueing models
2016	Point of contact for cloud-based flight data retrieval, cleaning and post-processing on Microsoft Azure with Microsoft partners	Cloud architecting, *Hive, Pig,* R*,* local code to cloud translation
2016	Designed and tested a GUI tool for assessing network cost impact of fleet-wide policy changes in an airline using historical (BTS) data	GUI design, data scraping, SQLite-Python hybrid design
2016	Created a Hidden Markov Model-based tool for monitoring real-time safety with state-dependent risk models in the terminal airspace	Data Visualization, Probability theory, Markov models, Python
2016	Helped design and test a custom Electronic Flight Bag solution for a NASA project involving air-ground communications to enable TBO	SE, Architecture design, software testing, Python, UI and UX design
2016	ATM cost Assessment Tool for NASA (Designed a fast-time Fuel Burn Model for commercial air transport and validated against industry standard software used for real-world flight planning)	Customized algorithms, V&V, Python, Integration
2015	Pilot Cockpit Display implemented on an Android Tablet for the NASA-Purdue MarsBuggy Team	Android programming, Human-machine interface, Testing
2015	Agricultural fixed wing UAV for Precision-agriculture with Multispectral Imaging	Design, Manufacturing, Systems Integration, Testing
2014	Safety Assessment for Separation Assurance in a Distributed Environment using ADSB communication (NASA project)	Agent Based Models, MATLAB, Fault Detection methods
2013	Aircraft Conflict Detection and Collision Avoidance using convex optimization demonstrated using multiple benchmark problems	Parallel computing, MATLAB programming, Visualization
2012	Multi-fidelity fidelity 3D modeling, analysis and simulation of Unmanned Aerial Vehicles from publicly available sparse data.	Surrogate modeling, Detailed 3D design, Data Analysis
2012	Working ADSB-in module under $10 using a TV dongle, and an open-source GNU software defined library for recording Aircraft data	Hardware-software interfacing, Cost effective design, Testing
2012	Impact of evolving Avionics on NextGen Air Transportation	Predict demand increase due to introduction of new technology
2011	Quantification of air trapping in lungs via Image-processing and Neural Networks.	MATLAB Image processing, GUI design, Algorithm Development
2011	Custom Multi-grid CFD solver in Fortran validated using the Driven Cavity benchmark problem.	CFD solver in Fortran from scratch, Multi-grid speed-up
2010	Construction of a Fully Controllable Single-servo UAV Platform	Design + manufacture of a novel UAV, Aerodynamic analysis
2010	Fabrication of an Autonomous Micro Aerial Vehicle Capable of Deploying a Video Surveillance Pod onto Exact Spatial Coordinates	Wrote a proposal worth $100K, Unique mission MAV design

2009	Structural Optimization of the *Sapthami* MAV with the help of CFD Tools followed by Flight Testing and Hardware-in-the loop simulation.	Optimization, Carbon fiber manufacture, Hardware-in-loop
2009	Design and Construction of an Automatic Irrigation System using the *ATMEGA32* microcontroller with Customized Moisture Sensors and Optical Sensors.	Coding hardware (ATMEGA) in C++, Product design, Product Marketing
2008	Application of Smoke-Tunnel Flow Visualization to Real World Problems such as Drag Reduction of a Cylinder and Pollution Control.	Wind tunnel and Smoke Tunnel experience, Interpretation of raw data

INTERNSHIP / INDUSTRY EXPOSURE (*apart from primary ones listed in Employment History)*

- ***BOEING*** Everett factory tour – B747, B767, B777, B787 Assembly line & Manufacturing Processes.
- **Ford F150** assembly line main factory tour
- **Selected** to experience ***BOSCH*** On-Track training (25 selected Nation-wide)
- Participated in Control Systems and Flight Mechanics Workshop organized by ***HONEYWELL***.
- **Internship** at ***EL FORGE*** (Metal forging and forming company that serves major vehicle and automotive component manufacturers and process industries, both domestic and overseas). Studied Complete Manufacturing Cycles of trademark company products such as Light Duty Crankshafts, Connecting Rods, Wheel hubs and Transmission parts.
- **Manufacturing Skills :** Formal training in woodworking, carving, Sheet-metal, Lathe, Band-saw, Circular Saw, CNC programming, Hydraulic and Pneumatic system design, Carbon Fiber and other composite manufacturing
- **Systems Engineering Skills :** Quality Function Deployment, Pugh's Method, ANOVA, Taguchi's Design of Experiments, Several Linear and Non-linear Optimization Algorithms, System-of-Systems
- **Experimentation :** Low speed wind tunnel (MAV analysis), High subsonic wind tunnel testing in Purdue Boeing wind tunnel (UAV analysis), Smoke tunnel testing, Structural / Impact Analysis (Carbon fiber fuselage testing), Flight Testing and UAV pilot experience (Eight Unmanned Aerial Vehicles, built and piloted), Hardware in the loop simulation.

SOFTWARE SKILLS	(working knowledge, *currently learning*)
Microsoft Office / Editing Tools	Word, Excel, Powerpoint, Outlook, Visio, EndNote, Latex, *Access*
Programming Languages	C, C++, Python, Fotran 95, MATLAB, R, SAS, *Java, Google Go*
Web Programming Languages/ Libraries	HTML, PHP, CSS, JavaScript, Drupal, Dojo
Programming IDE	VS 2010, Eclipse, Komodo, SciLab, MATLAB, CUDA, SAS, RStudio
GUI Builders/ Android	MATLAB GUIDE, QT, Microsoft VS, AppMethod, Android SDK, Pencil
Data Visualization/ Plotting	Tecplot, Paraview, OpenGL, Google earth
Parallel/ Cloud Computing	OpenMP, CUDA GPU, Amazon EC2, Heroku*, Hive, Pig, Spark*
3D Modeling (Professional Suites)	CATIA V5, Pro Engineer Wildfire, AutoCAD 2010, SolidWorks 2012
Structural Analysis	ANSYS Structural, ANSYS Explicit Dynamics, Abaqus, COMSOL
Aerodynamic Analysis	Ansys Workbench, Fluent, CFX, Autodesk Falcon, OpenFoam, Palabos, Xfoil direct and inverse airfoil design + wing design, *Star CCM+*
Control Analysis	Simulink, JSBSim, AVL
Meshing Software	enGrid, Meshlab, BlockMesh, SnappyHexMesh, Gmsh, ANSYS Meshing
MATLAB Toolboxes	Aerospace, Optimization, Parallel Computing, Image Processing, Statistics, Curve fitting, Simulink, Neural Network, System Identification
Optimization Toolboxes	Excel (Simplex, GRG, Evolutionary), CPLEX, Xpress, Arena, OpenMDAO
Open Source Libraries	OpenCV, SU2(fluids), Calculix (structural), *Impact* (crash analysis)
Robotics	AVR Studio, Virtual Cockpit, LogixPro, Kestrel Autopilot API, Android SDK
Systems Engineering	Discrete Agent Framework (DAF), Solidworks PLM, IBM Rational *DOORS*, Siemens PLM *Teamcenter*
Aerospace related	XFLR5, CEASIOM, AcBuilder, SimSAC, SUMO, AMB, FACET, ACES
Aerospace related(more)	NeoCASS, MotoCalc, DATCOM, FLOPS, SDSA
Air Transportation System Tools	Sabre Flight Explorer, Flight Direct, eFM, custom Electronic Flight Bag

PRIZES AND HONORS

- Multiple awards for academic proficiency and course accomplishment through high school and college
- Wrote and won a grant worth Rs 200,000 for nation-wide Micro Air Vehicle development
- Dean's List - Maintained a 4.0 GPA in graduate school (M.S. and Ph.D.)
- 2015 Estus H. and Vashti L. Magoon Award for Excellence in Teaching

LEADERSHIP SKILLS AND OTHER INTERESTS

- Lead a team of 10 undergraduate students to teach and manage an Engineering class with 240 students
- Founder and Convener(head) of ***Flying Club*** at NITK
- Head of Drive-train Group and Electronics Core Group in the Purdue NASA Mars-Buggy competition
- Head of Aerodynamic Analysis team in the Purdue ASME Human Powered Vehicle Challenge
- Appointed to be a judge for the AAE RSS technical symposium at Purdue University, Aerospace Department
- Member of ***Music club, Robotics Club and AMES*** at NITK
- High school Volleyball, Ping pong and Football Team
- Performed as a vocalist in South Indian Classical and Light music concerts.
- Image Processing - Photoshop, Gimp, Inkskape, Image magic
- Motion Picture / Editing and Short movies- Sony Vegas, Movie Maker, Fruity Loops, VirtualDub, LightWorks
- Interested in web design, photography and 3D Animation, and App design
- Member of ***GENESIS***, a voluntary social help club

PROFESSIONAL AFFILIATIONS

•**AIAA**•**IEEE**•**SASE** (Society of Asian Scientists and Engineers) •**CISA**(Center for Integrated Systems in Aerospace)
•**ASEE** •*Graduate Research Assistant* - **SoS**(System of Systems Laboratory) • **FSRG**(Flow Simulation Research Group)