JOHN SEBASTIAN

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Research Interests

Biophysics; Mechanics of Materials; Experimental Development; Applied and Computational Mathematics

Education

College of Engineering, Trivandrum
University of Kerala *July 2013 - May 2017*
Bachelor of Technology (Mechanical Engineering)
First Class with Distinction; Top 10%

Professional Research Experience

MRF Tyres (Research & Development) *July 2017 - September 2020*
Research Engineer *Chennai, India*

- Computational modelling of tyre composites; development of functional tread patterns by manipulation of geometry and material properties
- Designed novel experiments to derive the dynamic characteristic curves of motorcycle tyres
- Developed image analysis methods to estimate complex deformations at the tyre contact patch and established its effect on higher harmonic vibrations
- Devised a numerical method for optimising the geometry of cross ply motorcycle tyres using Class Shape Transformation (CST) parameterisation, originally developed for airfoils

STAD TechnoInnovations *October 2015 - April 2016*
Mechanical Design Intern *Ernakulam, India*

- Reverse engineered the complex shape and material characteristics of the tibial bone implant to arrive at an internal mesh structure suitable for 3D printing

Academic Research Projects

Detection of Microplastics in Inland Waters using Impedance Spectroscopy
Supervisor: Dr Manu Prakash *October 2020 - Present*

- Developing an instrument to detect, quantify and characterise microplastics in natural water samples exploiting the large difference in dielectric properties of plastics and water
- Built a water sampler prototype; mathematically modelled as a capacitance module for parametric studies

Design of Short Span Hydrofoils *Bachelor's Thesis, 2017*
Supervisor: Dr Ranjith S Kumar

- Developed a general method for the inverse design of foil sections with improved prescription of structural properties
- Formulated a simple method to integrate the effect of the free surface on hydrofoil lift

Rapid and Low- Cost Fabrication of Microfluidic Panels
Supervisor: Dr Ranjith S Kumar *Micro/nanofluidics Research Laboratory, 2016*

- Contrived a rapid prototyping procedure to make expendable, cheap and accessible microfluidic lab-on-a-chip panels on plastic sheets (sandwiched and layered), with fluid channels as small as 150 microns

Leadership and Mentorship Roles

Member, Emergency Design Collective (EDC) *June 2020 - Present*

- Part of a global team of problem solvers working together to mitigate new challenges in the wake of the COVID-19 pandemic
- Nominated to top three projects under "Pandemic Era Educational Challenges"

Student Coordinator, Innovation Center CET *2016 - 17*

· Coordinated weekly meetings, brainstorming sessions and training programs in the state run facility
· Organised the first undergraduate thesis project expo, Innov-EXPO in May 2017

Project Coordinator, Society of Automotive Engineers (SAE) *2015 - 16*

· Launched and mentored eight projects and maximized participation in national design competitions

Selected Achievements

· Institute Topper - IET PATW 2016 Presentation Competition *"Microfluidics for the Future" Institution of Engineering and Technology (IET)- Present Around The World (PATW)*
· Founded CETALKS, an in- campus talk show in 2015
· Attended Indian Science Congress 2010 as Student Delegate

Technical Strengths

Computational Tools	MATLAB, Abaqus, COMSOL, R, CATIA, SolidWorks
Experimental Tools	Image Processing, Digital Image Correlation, Thermography, Rheometry, Optical Microscopy, Impedance Spectroscopy, Wind Tunnel Testing

Additional Courses (Relevant)

· BIOE 271: Frugal Science *Stanford*
· Advanced MATLAB for Scientific Computing *Stanford, Lagunita*
· Statistical Learning *Stanford, Lagunita*
· Computer Science 101 *Stanford, Lagunita*
· Data Science Math Skills *Duke, Coursera*
· Basics of Transport Phenomena *TUDelft, Edx*
· Mechanics Review (8.MReVx) *MIT, Edx*

Extra Curricular Engagement

· Selected as travel photographer for a Swiss documentary project, "Yuujou" into the final team of five, out of 30,000 global applicants in 2019
· Toy making, DIY Microscopy, Origami, Water Painting, Photography

References

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