

Akhilesh Sanjay Somani

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Education

University of Illinois at Urbana-Champaign (UIUC) May 2021
Master of Science (Thesis) in **Mechanical Science & Engineering (MechSE)** (Expected)
(Recipient of the prestigious **Stoyke Fellow Match & Kenametal Fellowship** for the year 2019-2020)

Indian Institute of Technology Bombay (IIT Bombay) Aug 2019
Bachelor of Technology & Honors in **Mechanical Engineering**; Minor in Computer Science **GPA - 9.16/10**
(Awarded the prestigious **Undergraduate Research Award (URA)** for exceptional research contribution)

Technical Experience

Graduate Research Assistant, University of Illinois at Urbana-Champaign Aug 2019 - present

- o Collaborating with 4 research groups & working in a team of 5 to manufacture a novel metal-polymer heat exchanger
- o Designing & building **ultrasonic welding** setup to implement copper-copper seam welds in a roll-to-roll process
- o Working on the design and fabrication of **additively manufacturable** novel micro heat pipes

Mechanical Design & Manufacturing Intern, University of Maryland at College Park May 2018 - Jul 2018

- o **Optimized the design** and determined best materials for 3D printing Cross Media Fiber Heat Exchanger (CHX)
- o Performed **parametric study** for thermal & structural stress optimizations in ANSYS to minimize cost & weight
- o **Additively manufactured** CHX and conducted **Reliability tests** to measure its stress endurance limits
- o Predicted the life of CHX under different industrial operating conditions by applying the Arrhenius Model

Nanotechnology Intern, University of California at Berkeley May 2017 - Jul 2017

- o Operated **Zygo Optical Interferometer** to capture **nanoscale protrusions** of **Thermal Fly-height Control (TFC)** resistor (used to decrease fly-height of the head in hard disk drives (HDDs) and avoid head-disk contacts)
- o Analyzed data in MATLAB establishing a linear relation between TFC protrusions (~10-50 nm) & supplied power
- o Worked on protrusions (~5 nm) of **Touchdown Sensor** using **Atomic Force Microscopy (AFM)** & **Gwyddion**
- o Trained a graduate student to proficiently use Zygo Interferometer to capture nanoscale images of the HDD head

Key Projects

Vertical Wall Climbing Robot, IIT Bombay Aug 2018 - Nov 2018

- o Designed and developed a robot capable of scaling vertical walls and traversing rough terrains
- o Completed **force analysis & topology optimization** in ANSYS to maximize thrust and minimize weight & stresses

Pressure Vessel Optimization, IIT Bombay Oct 2018 - Nov 2018

- o Optimized the design to minimize manufacturing cost, subject to numerous stress & dimensional constraints
- o Employed Interior-Point Method & Sequential Quadratic Programming in GNU Octave & analyzed their accuracies

Rubik's Cube Solver Robot, IIT Bombay May 2016 - Jun 2016

- o Designed and fabricated a robot capable of solving any scrambled $3 \times 3 \times 3$ Rubik's cube within 3 seconds
- o Implemented serial communication between MATLAB and Arduino, thus enabling transfer of solution steps (generated by incorporating Thistlethwaite's algorithm in MATLAB) to control stepper motors to rotate faces

Publications

Experimental and Numerical Study of Convective Dynamics of Rotating Flow with Local Thermal Forcing in a Novel Configuration Sep 2018
11th International Symposium on Turbulence & Shear Flow Phenomena, Southampton, United Kingdom

Technical Skills

Design & Manufacturing Skills: DOE, DFM, CAD, FEA, Data Analysis

Engineering Software: SolidWorks, AutoCAD, ANSYS, MSC ADAMS, ABAQUS, Octave, Gwyddion

Programming Languages: C++, MATLAB, Arduino, \LaTeX