

ANSHUL SINGHAL

550 Memorial Drive,
Apt# 24B2
Cambridge, MA 02139, USA

Email: anshuls@mit.edu
Ph: +1 (617) 909 0869
Portfolio: www.anshuls.com

EDUCATION

- **Massachusetts Institute of Technology (MIT), Cambridge, MA** Aug 2014 – Present
MS and PhD., Mechanical Engineering
Grade: 5.0/5.0
- **Indian Institute of Technology (IIT) Delhi, India** Jul 2008 – Jun 2012
Bachelor of Technology, Production and Industrial Engineering
Grade: 8.6 /10.0

EXPERIENCE

- **BioInstrumentation Lab, MIT** Sep 2014 – Present
Research Assistant, Dept. of Mechanical Engineering
Project: Thermal displays for haptic interfaces
Developed sensing and control system for human thermal perception based on skin thermal response
Designed and fabricated experimental setups with integrated thermal sensors and actuators, for multi-user trials
Applied principles of mechanical engineering design, instrumentation, and controls in the project
- **TacWorks Assistive Technology LLP, India** [\[Link\]](#) Sep 2014 – Present
Co-Founder and Chief Technology Officer
TacWorks develops educational tools for blind students. Its first product (“Tactile Caliper”) is in market
Managed engineering & product design process to take product from concept to production stage in team of 2
Created designs and models incorporating DFM & DFA, and worked with manufacturer for production runs
- **IITJEE Lectures** [\[Link\]](#) June 2015 – Present
Co-Founder and Chief Technology Officer
An Ed-Tech initiative to democratize the preparation of IIT-JEE examination in India
The Free and high quality educational content is hosted by the MIT OpenCourseWare High School
The test content on YouTube has over 21000+ views and 1000+ subscribers prior to an official launch
- **JCB India Limited, Delhi, India** Sep 2013 – Aug 2014
Assistant Manager, Engineering and Product Development
Developed a material handling telescopic equipment (“JCB Loadall”) for Indian market in a team of 10
Created concepts, detailed designs, drawings and models of parts and assemblies for various components
Managed material selection and procurement, fabrication of prototypes and passing design reviews
- **Assistive Technologies Group, Indian Institute of Technology Delhi** [\[Link\]](#) Jul 2012 – Aug 2013
Associate, Product Development
Project: Refreshable Braille Display for the People with blindness
Developed a mechatronic refreshable Braille display (“TacRead”) using shape memory actuation
Fabricated multiple functional prototypes for design-build-test-modify iterations and conducted multi-user trials
Technology transferred to Kritikal Solutions, Delhi and Phoenix Medical Systems, Chennai
- **Stanford India Bio-design, Delhi, India** Oct 2012 – Dec 2012
Consulting Engineer, COPD Rehabilitation Device
Consulted on design and analysis in the development of a COPD rehabilitation device (“BreathClear”)
Fabricated multiple prototypes of the device and conducted experiments to characterize the functionality
- **GE Global Research, Bangalore, India** May 2011 – Jul 2011
Intern, Non Destructive Evaluation (NDE) Laboratory
Worked on non destructive inspection technology for online detection of pipeline defects
Conducted finite element modeling of ultrasonic guided waves in curved pipes in Abaqus/CAE

OTHER PROJECTS

- **CNC Benchtop Lathe** Feb 2016 – May 2016
Designed and fabricated a benchtop lathe with x & z axes CNC for turning steel & aluminum with 50um precision
Performed design and analysis of spindle, x & z-feed drive mechanisms through parametric models
Developed process plans and GD&T equipped 2D drawings for fabrication, and performed machining operations
Created analytical model of cutting forces and deformations, and formulated an error budget to track errors
- **Hearing Loss Diagnostic Device** Feb 2015 – May 2016
Developed a device for hearing loss detection by measuring Auditory Evoked Potentials (AEP) in a team of 5
Fabricated instrumentation setups & used 'System Identification' techniques for auditory system characterization
- **Process Parameter Selection in Micro and Macro End-Milling** Dec 2010 – May 2011
Devised a methodology using modeling of tool deflection induced surface error in End-milling process
Compared & validated cutting force models of micro & macro milling with experimental observations
Demonstrated improvements in productivity and quality over current industrial practice

PUBLICATIONS

- A. Singhal and L.A. Jones, '**Creating Thermal Icons – A Model Based Approach**', Submitted to ACM Transactions on Applied Perception, May 2017.
- A. Singhal and L.A. Jones, '**Perceptual Interactions in Thermo-tactile Displays**', Accepted in IEEE World Haptics Conference (WHC) 2017, Germany, June 2017.
- A. Singhal and L.A. Jones, '**Space-time Dependencies and Thermal Perception**', Eurohaptics 2016, London, UK, July 2016.
- A. Singhal and L.A. Jones, '**Space-time Interactions and the Perceived Location of Cold Stimuli**', IEEE Haptics Symposium (HAPTICS) 2016, Philadelphia, USA, Apr 2016.
- L.A. Jones and A. Singhal. '**Thermal Pattern Identification on the Hand**'. Program No. 240.22. 2015. Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2015. (Poster Presentation)
- A. Singhal and L.A. Jones, '**Dimensionality of Thermal Icons**', Proceedings of World Haptics Conference (WHC) 2015, Chicago, USA, Jun 2015.
- A. Singhal et al., '**Application of Shape Memory Alloy (SMA) Based Actuation in Refreshable Display of Braille**', DETC2013–13159, ASME IDETC/CIE 2013– Mechatronic & Embedded Systems & Applications, Oregon, USA, Aug 2013.
- A. Singhal, P. Jain, T. Molalign, K.A. Desai and P.V.M. Rao, '**On Cutter Deflection in Micro End-Milling**', Proceedings of International Conference on Material Science, Metals & Manufacture 2011, Singapore, Dec 2011.
- P. Jain, A. Singhal and P. V. M. Rao, 'Portable Braille Reader' (Extended Abstract), ASME Summer Bioengineering Conference, Puerto Rico, USA. Jun 2012.
- A. Singhal and V. Kommareddy, '**Ultrasonic Guided Wave Dispersion Curves for complex geometries using FEM**' (Oral Presentation), National Seminar & Exhibition on Non-Destructive Evaluation (NDE) 2011, Chennai, India. Dec 2011.
- K. A. Desai, P. Jain, A. Singhal and P. V. M. Rao, '**Flexible End Milling of Curved Geometries: Process Planning Perspective**', 6th Indo-Japan Seminar on Micro-Nano Manufacturing, New Delhi, India. Mar 2011.

PATENTS

- **Haptic Feedback Device and Spherical Bearing System** - Filed on 31 Mar 2016 in USPTO (62/315,693)
- **Tactile Measuring Instrument with Braille Output** - Filed on 26 Dec 2013 in USPTO (US20150243189 A1)
- **A System for Generating Refreshable Tactile Text and Graphics** - Filed on 31 May 2012 in WIPO (PCT/IN2013/000347) and Indian Patent Office (1669/DEL/2012)

HONORS AND AWARDS

- **MIT Sandbox Grant 2017** – Recipient for IITJEE Lectures and Orpheus Mar 2017
- **VentureWell OPEN Minds 2017** Team - for TacWorks Mar 2017
Invited to exhibit at the Smithsonian's National Museum of American History
- **Best Student Paper** (Honorable Mention), **Eurohaptics 2016**, London, UK Jul 2016
- **VentureWell (Formerly NCIIA), E-Team Grant Recipient (Stages 1 & 2)** Jun 2016
- **Best Student Paper** (Runner-up), **IEEE Haptics Symposium 2016**, Philadelphia, USA Apr 2016
- **ASME Innovation Showcase 2015** (Finalist) May 2015
- **MIT Ideas Global Challenge**, MIT Public Service Center Apr 2015
- **Louis Braille Touch of Genius Award**, National Braille Press, Boston, USA Jun 2014
- **Young Indians Next Practices Award, India Innovation Initiative (i3)**, Delhi, India Dec 2012
- **IIT Class of '89 Innovation Award**, Delhi, India Oct 2012
- **Technology Development Project Initiation Award** – Industrial R&D Unit, IIT Delhi Jul 2012
- **ASME Design Competition in Rehabilitation & Assistive Devices** (Runner-up), Puerto Rico, USA Jun 2012
- **Mahindra Satyam Mechatronics Young Engineer Award** (Runner-up), Bangalore, India 2011

GRANT AWARDS

- **Wellcome Trust, UK**
Grant of USD 600,000+ awarded under R&D for Affordable Healthcare in India, 2013
Project: Affordable Refreshable Braille Displays Based on Shape Memory Actuation (March 2014 - January 2018)
<https://wellcome.ac.uk/what-we-do/directories/affordable-healthcare-india-projects-funded>
- **Department of Science and Technology, Government of India**
Grant of INR 3,700,000+ awarded under Technology Interventions for Disabled and Elderly (TIDE) Scheme, 2012
Project: Development of a Low-cost Electronics Refreshable Braille Display for the Visually Impaired (January 2013 - August 2015)
<http://www.scienceandsociety-dst.org/TIASN%202013-14.pdf>
- **Industrial Research & Development Unit, IIT Delhi**
A Grant of INR 150,000 awarded under Technology Development Project Initiation Award (TDP-IAS) 2012

RELEVANT COURSES and SKILLS

- MIT Courses** Elements of Mechanical Design, Structural Mechanics, Dynamics, Computational Science and Engineering, Advanced Instrumentation and Measurement, Analysis and Design of Feedback Control Systems
- IIT Courses** Kinematics & Dynamics of Machines, Design Innovation & Manufacture, Machine Element Design, Mechatronic Product Design, Low Cost Automation, Manufacturing Practices, Machine Tools & CNC Manufacturing
- Software:** SolidWorks, NX, Teamcenter, CAMWorks, LabVIEW, Pro-E, ANSYS, Abaqus/CAE, CadSoft EAGLE, MATLAB
- Design:** 3D modeling, 2D drawings, Tolerance Stackups, Error Budgeting, DFM, DFA, Finite Element Analysis

MEDIA COVERAGE

- **MIT News 1:** <http://news.mit.edu/2017/measurable-improvement-in-stem-access-for-the-blind-0322>
- **MIT Twitter:** <https://twitter.com/MIT/status/854697371120394240/photo/1>
- **MIT News 2:** <http://news.mit.edu/2015/ideas-global-challenge-0416>
- **MIT Museum:** <https://www.facebook.com/squirreldevices/photos/pcb.255116694911553/255116328244923/?type=3&theater>
- **Other MIT Outreach Media:**
<http://spectrum.mit.edu/articles/making-it-at-mit/>
<http://mitstudents.tumblr.com/post/132094861133/mit-student-develops-product-to-make-the-sciences>
- **Engineering Community:**
<http://interestingengineering.com/mit-invent-tactile-caliper-impaired-vision/>
<http://wonderfulengineering.com/mit-graduates-invent-a-tactile-caliper-for-people-with-impaired-vision/>
- **Recognition and Reviews in the Assistive Technology community:**
Global Accessibility News: <http://globalaccessibilitynews.com/2017/04/03/mit-graduates-develop-tactile-caliper-for-students-with-vision-disabilities/>
Perkins: <http://www.perkinselearning.org/accessible-science/squirrel-tactile-caliper>
American Foundation for the Blind (AFB): <http://www.afb.org/afbpress/pubnew.asp?DocID=aw170608>
The American Council for the Blind: <http://acb.org/content/here-and-there-edited-sharon-strzalkowski-15>
Others:
<https://www.blindbargains.com/bargains.php?m=15353>
http://newscdn.newsrep.net/h5/nrshare.html?r=3&lan=en_US&pid=14&id=Pfa95dd8dOH_us&app_lan=&mcc=&declared_lan=&pubaccount=ocms_0&showall=1
<http://www.wonderbaby.org/resources/tactile-caliper-provides-braille-output-blind-users>
- **Online Stores selling the Tactile Caliper:**
<https://www.amazon.com/National-Braille-Press-Inc-Tactile/dp/B01K883Q2W>
<https://www.maxiaids.com/tactile-braille-caliper>
<http://www.nbp.org/ic/nbp/CALIPER.html>