

ABHINANDAN JAIN

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Fluid Interfaces Group, MIT Media Lab

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EDUCATION	Ph.D.	MIT Media Lab <i>Jun. 2020 – Present</i> Media, Arts and Science (advisor: Prof. Pattie Maes) Human-Computer Interaction, Non-Conscious Interfaces, Wearables
	S.M.	MIT Media Lab <i>Jun. 2018 – Jun. 2020</i> Media, Arts and Science (advisor: Prof. Pattie Maes) Thesis: ‘Body Driven Cognition: Writing to the body to Influence Mind’
	B.Tech	ZHCET, AMU <i>Aug. 2013 – Jun. 2017</i> Electronics Engineering (advisor: Prof. M. Hasan) Thesis: “FPGA Implementation of Image Coder for WSN”
EXPERIENCE	Research Assistant	MIT Media Lab <i>Jun. 2018 – Present</i> Fluid Interfaces Group (advisor: Prof. Pattie Maes) <ul style="list-style-type: none">- Research on inducing aesthetic chills by thermo feedback for enabling self modulation of empathy, preference, and bias.- Research on prevention of motion sickness by synchronizing vestibular and visual sensory signals for virtual reality, autonomous vehicles and space exploration applications.- Research on designing framework for developing computer to human interaction for modulating cognitive processes.
	Teaching Assistant	MAS.S65 Cognitive Augmentation <i>Sept. 2021 – Dec 2021</i>
	Visiting Scholar	MIT Media Lab <i>Oct. 2017 – Apr. 2018</i> Fluid Interfaces Group (advisor: Prof. Pattie Maes) <ul style="list-style-type: none">- Research in Robotic Symbionts. Developed Guitar Machine v2 - a human machine interface for augmenting human capabilities and creativity during playing a Guitar.- Research in sleep stage classification using bio-signals for using auditory biofeedback in hypnagogic stage for augmenting cognitive process and creativity.
	Research Assistant	Dept. of Petroleum Studies, AMU <i>Jul. 2017 – Sep. 2017</i> Polymer and Composite Material Lab (advisor: Dr. S.J.A Rizvi) <ul style="list-style-type: none">- Developed actuator based on Ionic Polymer Metal Composite (IPMC) for soft robotics applications as in artificial muscles.- Developed low cost flexible inkjet-printed passive RF sensor tags for humidity, temperature and strain sensing applications.- Developed automatic impact testing apparatus for measuring impact strength and impact energy of a composite material.

**TALKS AND
EXHIBITIONS**

UBICOMP 2021, Designing Interfaces beyond conscious control, *Sep. 2021*
Neurotechnology in Action, Designing Interfaces beyond conscious control, *Apr. 2020*
TEI 2020 Arts Exhibition, Guitar Machine, *Mar. 2020*
NASA HRP Workshop, Sensory Synchrony and Wearable Lab on Body, *Jan. 2020*
Smithsonian Year of Music, Guitar Machine, *Dec. 2019*
Space Exploration Initiative Showcase 2019, Sensory Synchrony, *Nov. 2019*
London Design Week 2019, Wearable Lab on Body, *Sep. 2019*
NIME 2019, Exploring Human-Machine Synergy and Interaction on a Robotic Instrument, *Jun. 2019*
CHI 2019, Adding Proprioceptive Feedback to Virtual Reality Experiences Using Galvanic Vestibular Stimulation, *Apr. 2019*
MIT Media Lab Dream Engineering Workshop 2019, Writing to the Body, *Jan. 2019*

PUBLICATIONS

*equal contribution

Journal Publications

- M. Tausif, **Abhinandan Jain**, Ekram Khan, Mohd Hasan, “Memory-efficient architecture for FrWF-based DWT of high-resolution images for IoMT applications”, Springer Multimedia Tools and Applications, 2021
- Adam Haar Horowitz*, **Abhinandan Jain***, Felix Schoeller*, Pattie Maes, “Augmenting aesthetic chills using a wearable prosthesis improves their downstream effects on reward and social cognition”, Scientific Reports 2020
- **Abhinandan Jain***, Adam Haar Horowitz*, Felix Schoeller, Sang-won Leigh, Pattie Maes, Misha Sra, “Designing Interactions Beyond Conscious Control: A New Model for Wearable Interfaces”, IMWUT 2020
- Michelle Carr, Adam Haar, Judith Amores, Pedro Lopes, Guillermo Bernal, Tomás Vega, Oscar Rosello, **Abhinandan Jain**, Pattie Maes, “Dream engineering: Simulating worlds through sensory stimulation”, Consciousness and Cognition, 2020
- Felix Schoeller*, Adam Horowitz*, **Abhinandan Jain***, Pattie Maes, “Enhancing human emotions with interoceptive technologies”, Physics of life reviews, Elsevier, 2019
- M. Tausif, **Abhinandan Jain**, Ekram Khan, Mohd Hasan, “Low Memory Architectures of Fractional Wavelet Filter for low-cost Visual Sensors and Wearable Devices”, IEEE Sensors Journal, 2019
- M. A. Husain, **Abhinandan Jain**, A. Tariq, A. Iqbal, “Fast and precise global maximum power point tracking techniques for photovoltaic system”, IET Renewable Power Generation, 2019
- Felix Schoeller, Franck Zenasni, Philippe Bertrand, Lynda Joy Gerry, **Abhinandan Jain**, Adam Horowitz, “Combining virtual reality and biofeedback to foster empathic abilities in humans”, Frontiers in psychology, 2018
- Afshan Ilyas, M. Ayyub, M. Rizwan Khan, **Abhinandan Jain** & M. Aslam Husain, “Realization of Incremental Conductance MPPT Algorithm for Solar Photovoltaic System”, International Journal of Ambient Energy, Taylor & Francis, 2018
- M. Aslam Husain, **Abhinandan Jain**, Abu Tariq, “A Novel Fast Mutable Duty (FMD) MPPT technique for solar PV system with reduced searching area”, Journal of Renewable Sustainable Energy 8, 054703, AIP, 2016
- M. Aslam Husain, Abu Tariq, Salman Hameed, M Saad Bin Arif, **Abhinandan Jain**, “Comparative Assessment of Maximum Power Point Tracking Procedures for Photovoltaic Systems”, Green Energy & Environment, Elsevier, In Press, Available Online, 2016

PUBLICATIONS

*equal contribution

Conference Papers

- Sang-won Leigh, Harshit Agrawal, **Abhinandan Jain**, "Machine-enacted Modes of Creative Exploration", ISEA 2020
- Pat Pataranutaporn*, **Abhinandan Jain***, Casey M Johnson, Pratik Shah, Pattie Maes, "Wearable Lab on Body: Combining Sensing of Biochemical and Digital Markers in a Wearable Device", IEEE Engineering in Medicine and Biology Society (EMBC-2019), Berlin
- Sang-won Leigh, **Abhinandan Jain**, Pattie Maes, "Exploring Human-Machine Synergy and Interaction on a Robotic Instrument", NIME-2019, Porto Alegre
- Misha Sra, **Abhinandan Jain**, Pattie Maes, "Adding Proprioceptive Feedback to Virtual Reality Experiences Using Galvanic Vestibular Stimulation", CHI-2019, Glasgow
- Guillermo Bernal, Tao Yang, **Abhinandan Jain**, Pattie Maes, "PhysioHMD: a conformable, modular toolkit for collecting physiological data from head-mounted displays", ISWC-2018
- M. Tausif, **Abhinandan Jain**, Ekram Khan, Mohd Hasan, "Efficient Architectures of Fractional Wavelet Filter (FrWF) for Visual Sensors and Wearable Devices", IEEE Sensors 2018
- Mohd. Mohsin Ikram, **Abhinandan Jain**, S.J.A. Rizvi, "Design and Development of Ionic Polymer Metal Composite (IPMC) based Light Weight Flexible and Low Cost Artificial Finger", Humanizing Work and Work Environment (HWWE-2017), Aligarh
- Sameer Hasan, **Abhinandan Jain**, Faisal Anwar, Saleem Anwar Khan, "Concept Design of an Autonomous Underwater Vehicle with Integrated Ice Penetrating system", AIAA Space Forum and Exposition 2017, Orlando
- **Abhinandan Jain**, Baqar A. Rizvi, Omar Farooq, Shashank K. Garg, "Fatigue Detection and Estimation using Auto-Regression analysis in EEG", 5th IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI-2016), Jaipur
- **Abhinandan Jain**, M.A. Husain, Abu Tariq, "A Novel Fast and Accurate Temperature tolerant PV Maximum Power Point Tracking System", IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems (ICPEICES-2016), New Delhi
- Bhanu Pandey, **Abhinandan Jain**, "Self-Sustaining WBAN Implants for Biomedical Applications", 2nd IEEE International Conference on Applied and Theoretical Computing and Communication Technology (ICATCCT-2016), Bangalore
- M.A. Husain, **Abhinandan Jain**, Abu Tariq, "A novel Fast Alterable Duty (FAD) MPPT procedure for Solar PV Hybrid Vehicles", International Conference on Recent Trends in Engineering and Material Sciences (ICEMS-2016), Jaipur
- M. A. Husain, Asif Khan, Abu Tariq, Z. A. Khan and **Abhinandan Jain**, "Aspects Involved in the Modeling of PV System, Comparison of MPPT Schemes and Study for Different Ambient Conditions Using P&O Method", Computer Society of India (CSI-2015), New Delhi

Others

- **Abhinandan Jain**, Pattie Maes, Misha Sra, "Adaptive Virtual Neuroarchitecture", Springer WEVR Book Chapter, In Review
- Sang-won Leigh, **Abhinandan Jain**, Pattie Maes, "Encountered, Habituated, Estranged and Overridden by Machines", TEI 2020 Arts Exhibition
- Adam Horowitz, **Abhinandan Jain**, João Costa, Rodney Mullen, Pattie Maes, "Body-Borne Reality: Risky Disembodiment in VR" CHI 2020 Ethics of MR Workshop

PATENTS

- "Novel Maximum Power Point Tracking Method For PV Panels"
Indian Patent Office, No 201611001525
- "Barefoot Detection Sensor"
Indian Patent Office – 3035/DEL/2015
- "System For Assisting Visually Impaired"
Indian Patent Office – 2010/DEL/2015

HONORS AND AWARDS	<p>Analog Devices Anveshan Fellowship, 2017 Granted Anveshan IOT Fellowship, supported by Analog Devices for the development of Low Power Visual Sensor Nodes for surveillance applications in remote locations, Mentioned in Top 3 Projects.</p> <p>Best Poster Award, 2017 “Actuator Based on Ionic Polymer Metal Composite (IPMC) and its Applications”. ThinkNano 2017, IISC Bangalore.</p> <p>Sir Syed Emerging Scholar Award, 2016 Awarded SSESAs Scholarship by Sir Syed Education Society of North America.</p> <p>Product Development and Innovation Award, 2015 “System for Assisting Visually Impaired”, Awarded \$500 By ZHCET Alumni Association of North America.</p> <p>Best Paper Award, 2014 “A Proposed Model of Fully Autonomous Underwater Vehicle System, by making use of only Three Thrusters”. 2nd Unmanned Systems Conference and Exhibition India 2014, Air Force Auditorium, New Delhi.</p> <p>Best Paper Presentation Award, 2015 “A Novel Advance Cane System for Assisting Visually Impaired”. Workshop on Information Technology – Prospects and Challenges (ITPC-2015), Aligarh.</p> <p>Certificate of Merit, GIAN Course on Biomedical Signal Processing , 2017 1st Rank Candidate in the course of Biomedical Signal Processing by GIAN under MHRD held at AMU. Received Certificate of Merit.</p>
SELECTED MEDIA COVERAGE	<p>MIT News: A new way to control experimentation with dreams, 2020</p> <p>Business Insider: A wearable sleep-tracker designed by an MIT team could give people the power to shape their own dreams, 2020</p> <p>The Scientist: Scientists engineer dreams to understand the sleeping brain, 2020</p> <p>MIT News: Designing humanity’s future in space, 2019</p> <p>Forbes India: Fresh off the (MIT Media) lab, 2019</p>
REVIEWER	CHI, IMWUT, ISWC, DIS, VRST, ISMAR
SKILLS	<p>Programming: C, C++, C#, JAVA, Python, Verilog, VHDL</p> <p>Applications: MATLAB, SolidWorks, OpenFrameworks, Xilinx ISE, Xilinx Vivado, NI Multisim, CST, Altium Designer, Proteus, ADS, NI Labview, HSPICE</p>
OTHER	<p>Badminton: Competed In All India Junior Badminton Tournament-Mumbai. Captain, NRSC, AMU Badminton Team, 2016. Won Inter Hall Badminton Tournament-AMU, 2015. College Representative at IIT-BHU Spardha.</p> <p>Music: Instrumentalist - Guitar.</p>