

## Shantanu Bhattacharya (PhD)

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### Personal Information

**Name:** Shantanu Bhattacharya, Abdul Kalam Technology Innovation National Fellow

**Designation:** Dr. Gurumukh T. and Veena M. Mehta Chair, Professor, Mechanical Engineering.

**Date of birth:** 23/03/1974

### Education:

2003-2006	PhD	Bio Engineering	University of Missouri, Columbia, USA
2002-2003	MS	Mechanical Engineering	Texas Tech University, Lubbock, Texas, USA
1992-1996	BS	Industrial and Production Engineering	Delhi College of Engineering, University of Delhi

### Professional / research experience:

Date	Position	Organization
Jul 2018 Onwards	GVMC Chair and Professor	Department of Mechanical Engineering, Indian Institute of Technology Kanpur
Jan, 2017 – February 2020	Head, Design Program	Design program, Indian Institute of Technology Kanpur
July 2016 onwards	Professor	Department of Mechanical Engineering, Indian Institute of Technology, Kanpur.
2012-July, 2016	Associate Professor	Department of Mechanical Engineering, Indian Institute of Technology, Kanpur.
2013-2015	Institute appointed Faculty Coordinator	TA202 core undergraduate manufacturing laboratory, Indian Institute of Technology, Kanpur.
2013	Institute appointed Faculty Coordinator	4-i Industrial Laboratory, Indian Institute of Technology, Kanpur.
2013	Department appointed Convenor	Manufacturing Science and Technology Stream, Indian Institute of Technology, Kanpur.
2013	Institute senate appointed committee member	P.K. Kelkar Library, Indian Institute of technology, Kanpur.
2013	Institute appointed committee member	Institute space planning and allocation committee, Indian Institute of Technology, Kanpur.
2011	Visiting Assistant Professor	College of Engineering, University of Missouri, Columbia, USA.
2011	Visitor	World Class University Program at Yeungnam University, Daegu, Dae-dong, Gyeongsangbuk-do, South Korea.
2009	Visitor (27 <sup>th</sup> Sept-12 <sup>th</sup> October, 2009)	University of Missouri, Columbia, University of Illinois at Urbana Champaign, University of California at Irvine, USA.
2008	Institute Appointed Boeing Focal for Undergraduate activities	Office of Dean of Research and Development, Indian Institute of Technology Kanpur.
2008	Faculty Coordinator	Microsystems Fabrication Laboratory, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur.
2007-2012	Assistant Professor	Department of Mechanical Engineering, Indian Institute of Technology, Kanpur.
2006-2007	Post Doctoral Research Fellow	Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, USA.
1996-2002	Senior Manager	Suzuki Motors India Limited, Gurgaon, Harayana, India.

**Current Research:**

1. Integrated detection of food borne pathogens on a single microchip platform. **(Department of Biotechnology funded, DBT)**
2. Design and development of nanostructured gas sensors for automotive applications. **(National program on micro and smart structures, NPMASS Funded)**
3. Surface Electrophoresis of ds-DNA across nano-structured surfaces **(Department of Science and Technology funded, DST).**
4. Design and development of a novel miniaturized polymeric micropumps for drug delivery applications. **(NPMASS funded)**
5. Design and development of a completely autonomous ground vehicle under the Boeing University Relations Program. **(Funded by Boeing corporation)**  
**Details available at <http://www.iitk.ac.in/dord/boeing/>**
6. Development of 3-Dimensional microchannel arrays by using a novel method and use of these arrays as vibration pads, micro-solenoid valves etc.
7. Development of Label free detection schemes for DNA amplification. **(DST funded)**
8. Liquid core waveguide based immunoassays for capture of food borne pathogens. **(DBT funded)**
9. Nano-engineered energetic composite development for gene delivery applications. **(DST funded)**
10. Design and Development of paper microfluidic platforms for early diagnosis of dengue. **(Design Innovation Center funded)**
11. Design and Development of a 10 KLD water filtration system using nanotechnology solutions for dye remediation applications. **(DST, WTI funded)**
12. Design and development of 3-D printed structures for acoustic damping for aerospace applications. **(Boeing funded)**
13. Design and development of a impedance biochip for labeled PCR detection. **(DST, Biomedical Instrumentation Funded)**
14. Design and development of gas sensors for space applications in inflatable antenna systems. **(ISRO, Funded)**
15. Process design for joining PEEK composites in aerospace manufacture **(Boeing Funded)**
16. Inkjet printed electrodes of Graphene Oxide- Metal Oxide hierarchical nanostructured nano-composites for improved energy density and power density thin flexible super-capacitors **(Funded, DST, Materials for Energy Storage)**

**Past Research Experience:**

1. Extensive surface characterization studies for polymer surfaces after exposure to gas plasma and their application to development of novel electrode materials for electrochemical measurements. **(NPB, NIH funded)**
2. Designing and Developing of a MEMS based (on-chip) diagnostic setup to study flame propagation velocity in Nanothermites and on chip blast pressure measurements of nanosynthesized energetics. **(DOD funded)**
3. Design, fabrication and testing of on chip PCR based DNA microanalyzer. **(National Pork Board, NPB and NIH funded)**. Patent being licensed to Park Technologies.
4. Design and development of Impedance recognition and PCR based identification of food micro-organisms. **(USDA funded)**
5. Development and standardization of micro-fabrication protocols for Silicon, Glass and PDMS. **(NSF, CRCD funded)**.
6. Micro mixer design and development. **(NSF, CRCD funded)**

**Publications****International Journal Papers**

S. No.	Author(s)	Year	Title	Complete Reference of Journal
1.	Shantanu Bhattacharya, J.M. Berg, S. Gangopadhyay	2005	Studies on surface wettability of PDMS and glass under oxygen plasma treatment and correlation with bond strength.	<b>Journal of Microelectromechanical Systems</b> , Vol. 14, No.3, June 2005.

2.	<b>Shantanu Bhattacharya</b> , Yuanfang Gao, Steve Apperson, Rajesh Shende, S. Gangopadhyay	2006	A novel on-chip diagnosis method to detect flame velocity of nanoscale thermites	<b>Journal of Energetic materials</b> , Vol. 24, pp. 1-15, Jan. 2006.
3.	<b>Shantanu Bhattacharya</b> , Venumadhav Korampally, Yuanfang Gao, Maslina Othman, Sheila A. Grant, Keshab Gangopadhyay, Shubhra Gangopadhyay	2007	Optimization of design and fabrication process for realization of a PDMS-Silicon DNA amplification chip	<b>Journal of Microelectromechanical systems</b> , Vol.16, pp.401-410, 2007.
4.	<b>Shantanu Bhattacharya</b> , Yuanfang Gao, Venumadhav Korampally, M.T. Othman, Sheila Grant, Keshab Gangopadhyay, Shubhra Gangopadhyay	2007	Mechanics of plasma exposed spin-on-glass (SOG) and polydimethyl siloxane (PDMS) surfaces and their impact on bond strength	<b>Applied Surface Science</b> , Vol. 253, No. 9, pp.4220-4225, 2007
5.	<b>Shantanu Bhattacharya</b> , Jaesung Jang, Liju Yang, Demir Akin and Rashid Bashir	2007	BioMEMS and Nanotechnology based approaches for rapid detection of Biological entities- <b>Invited Review</b>	<b>The Journal of Rapid methods and automation in microbiology</b> , Vol.15, pp.1-32, 2007.
6.	Maruf Hossain, Senthil Subramaniam, <b>Shantanu Bhattacharya</b> , Yuanfang Gao, Steve Apperson, Rajesh Shende, Suchi Guha, Shubhra Gangopadhyay	2007	Crystallization of amorphous silicon by self propagation of nanoenergetic thermites	<b>Journal of applied physics</b> , Vol. 101, pp. 054509-1~6, 2007
7.	<b>Shantanu Bhattacharya</b> , Shuaib Salamat, Dallas Morrisette, Padmapriya Banada, Yishao Liu, Demir Akin, A.K. Bhunia, Michael Ladisch and Rashid Bashir	2008	PCR-based detection in a micro-fabricated platform	<b>Lab on chip</b> , Vol.8, pp. 1130-1136, 2008.
8.	<b>Shantanu Bhattacharya</b> , Nripen Chanda, Deb Gangopadhyay, Keshab Gangopadhyay and Shubhra Gangopadhyay,	2008	Low voltage capillary electrophoresis using high conductivity agarose nano-platinum composites.	<b>Sensor Letters</b> , Vol.6, pp. 1-6, 2008.
9.	<b>Shantanu Bhattacharya</b> , Nripen Chanda, Yi Shao Liu, Sheila A. Grant, Keshab Gangopadhyay, Rashid Bashir, Paul Sharp and Shubhra Gangopadhyay	2008	Enhanced DNA separation rates on nano-platinum doped agarose	<b>Journal of Bionanosciences</b> , Vol. 2, pp. 1-8, 2008.
10.	Yi-Shao Liu, Padmapriya Banada, <b>Shantanu Bhattacharya</b> , Arun K. Bhunia and Rashid Bashir	2008	Electrical characterization of DNA molecules in solutions using DNA measurements	<b>Applied Physics Letters</b> , Vol. 92, pp. 143902, 2008.
11.	Sangho Bok, Arnold A. Lubguban, Yuanfang Gao, <b>Shantanu Bhattacharya</b> , Kevin Gillis, Sanju Gupta, Paul R. Sharp and Shubhra Gangopadhyay	2008	Synthesis of electrochemically active Silica matrix bound carbon based electrode materials via Sol-Gel process	<b>Journal of Electrochemical Society</b> , Vol. 155, No. 5, K91-K95, 2008.
12.	Ok Kyng Koo, YiShao Liu, Shuaib Salamat, <b>Shantanu Bhattacharya</b> , Michael R. Ladisch, Rashid Bashir and Arun K. Bhunia,	2009	Targetted capture of pathogenic bacteria using a mammalian cell receptor coupled with dielectrophoresis on a biochip	<b>Analytical Chemistry</b> , Vol. 81, No. 8, pp. 3094–3101, 2009.
13.	Anil Ghubade, Swarnasri Mandal, Rahul Chaudhury, Rajeev Kr. Singh and <b>Shantanu Bhattacharya</b>	2009	Dielectrophoretic Assisted Concentration of Micro-particles and their rapid quantitation based on optical means.	<b>Biomedical Microdevices</b> , Vol. 11, No. 5, pp. 987-995 2009.
14.	Yuanfang Gao, <b>Shantanu Bhattacharya</b> , Xiaohui Chen, Syed Barizuddin, Shubhra Gangopadhyay,	2009	A microfluidic cell trap device for automated measurement of quantal	<b>Lab on chip</b> , Vol. 9, pp. 3442 - 3446, 2009.

	Kevin D. Gillis		catecholamine release from cells	
15.	<b>Shantanu Bhattacharya</b> , R.K. Singh, Swarnasri Mandal, Sangho Bok, Venumadhav Korampally, Keshab Gangopadhyay, Shubhra Gangopadhyay	2010	Plasma modification of polymer surfaces and their utility in building Biomedical microdevices. <b>(Invited Review)</b>	<b>Journal of Adhesion Science and Technology</b> , Vol. 24, No. 15-16, pp. 2707-2739(33), 2010.
16.	Rahul Chaudhury, R.K. Singh, Anil B. Ghubade, Swarnasri Mandal, <b>Shantanu Bhattacharya</b>	2010	Bilayered staggered Herringbone micromixers with Symmetric and Assymetric geometries	<b>Microfluidics nanofluidics</b> , Vol. 4, pp. 419-425, 2010.
17.	Arnab Ghosh, Tarak K. Patra, Rishi Kant, Rajeev Kr. Singh, Jayant K. Singh, <b>Shantanu Bhattacharya</b>	2011	Surfaces electrophoresis of ds-DNA across orthogonal pair of surfaces.	<b>Applied Physics Letters</b> , Vol. 98, No. 1, pp. 1-4, 2011.
18.	Rishi Kant, Himanshu Singh, Monalisha Nayak, <b>Shantanu Bhattacharya</b>	2012	Optimization of design and characterization of a novel micro-pumping system with peristaltic motion	<b>Microsystems Technologies</b> , DOI: 10.1007/s00542-012-1658-y, 2012.
19.	Rajeev Kumar Singh, Rishi kant, Mohammad Asfer, Bishakh Bhattacharya, Pradipta K. Panigrahi & <b>Shantanu Bhattacharya</b>	2012	Passive vibration damping using polymer pads with micro-channel arrays	<b>Journal of Microelectromechanical Systems</b> , DOI: 10.1109/JMEMS.2013.2241392, 2012.
20.	Rajeev Kumar Singh, Ankur Gupta, <b>Shantanu Bhattacharya</b>	2013	Design and fabrication of 3-dimensional helical structures in polydimethylsiloxane for flow control applications	<b>Microsystems Technologies</b> , DOI: 10.1007/s00542-013-1738-7, 2013.
21.	Monalisha Nayak, Deepak Singh, Himanshu Singh, Rishi Kant, Ankur Gupta, Shashank Shekhar Pandey, Swarnasri Mandal, Gurnath Ramanathan & <b>Shantanu Bhattacharya</b>	2013	Integrated sorting, concentration and realtime PCR detection system for sensitive detection of Micro-organisms	<b>Nature Scientific Reports</b> , 20/11/2013, DOI:10.1038/srep03266, 2013.
22.	Avinash Kumar , Ankur Gupta , Rishi Kant , Syed Nadeem Akhtar , Nachiketa Tiwari , J. Ramkumar , <b>Shantanu Bhattacharya</b>	2013	Optimization of LASER machining process for the preparation of photo masks and its application to Micro-systems fabrication	<b>J. Micro/Nanolith. MEMS MOEMS</b> , Vol. 12, No. 4, pp. 041203, 2013.
23.	Ankur Gupta, Shashank Shekhar Pandey, Monalisha Nayak, Arnab Maity, Subhashish Basu Majumder, <b>Shantanu Bhattacharya</b>	2014	Hydrogen sensing based on nanoporous silica-embedded ultra dense ZnO nanobundles	<b>RSC Adv.</b> , Vol. 4, No. 15, pp. 7476-7482, 2014.
24.	Ankur Gupta, Abhinav Srivastava, Cherian Joseph Mathai, Keshab Gangopadhyay, Shubhra Gangopadhyay, <b>Shantanu Bhattacharya</b>	2014	Nanoporous Palladium sensor for sensitive and rapi detection of Hydrogen	<b>Sensor letters</b> , Vol. 12, pp. 1279-1285 , 2014.
25.	Akshay Atwe, Ankur Gupta, Rishi Kant, Shayandev Sinha, Ishan Sharma, <b>Shantanu Bhattacharya</b>	2014	A novel microfluidic switch for pH control using Chtosan based Hydrogels.	<b>Microsystems Technology</b> , DOI 10.1007/s00542-014-2112-0, 2014.
26.	Vinay Kumar Patel, <b>Shantanu Bhattacharya</b>	2013	High-Performance Nanothermite Composites Based on Aloe-Vera-Directed CuO Nanorods	<b>ACS Applied Materials and Interfaces</b> , Vol. 5, No. 24, pp. 13364-13374, 2014.
27.	Brindan Tulachan, Sunil Meena, Ratan Rai, Chandrakant Mallick, Tejas Kusurkar, Arun	2014	Electricity from the Silk Cocoon Membrane	<b>Nature Scientific Reports</b> , Vol. 4, pp. 5434, DOI: 10.1038/srep05434, 2014.

	Kumar Teotia, Niroj Sethy, Kalpana Bhargava, <b>Shantanu Bhattacharya</b> , Ashok Kaul, Raj Kishore Sharma, Neeraj Sinha, Sushil Singh, and Mainak Das			
28.	Seema D. Yardi, Ankur Gupta, Poonam Saundriyal, Geeta Bhatt, Rishi Kant, D. Boolchandani, <b>Shantanu Bhattacharya</b>	2016	High efficiency coupling of optical fibres with SU8 micro-droplet using laser welding process	<b>Laser in Manufacturing and Materials Processing</b> , DOI: 10.1007/s40516-016-0027-6 , 2016.
29.	Rishi Kant, <b>Shantanu Bhattacharya</b>	2017	Digitally controlled portable micropump for transport of live microorganism	<b>Sensors and Actuators-A Physical</b> , Vol. 265, pp. 138-151, 2017.
30.	Vinay Kumar Patel, Jayant Raj Saurav, Keshab Gangopadhyay, Shubhra Gangopadhyay, <b>Shantanu Bhattacharya</b>	2015	Combustion Characterization and Modeling of Novel Nanoenergetic Composites of Co <sub>3</sub> O <sub>4</sub> /nAl	<b>RSC Adv.</b> , 2015,5, 21471-21479 <b>DOI:</b> 10.1039/C4RA14751K.
31.	Vinay Kumar Patel, Anurup Ganguli, Rishi Kanta, <b>Shantanu Bhattacharya</b>	2015	Micro-patterning of Nano-energetic Films of Bi <sub>2</sub> O <sub>3</sub> /Al for Pyrotechnics	<b>RSC Adv.</b> , DOI: 10.1039/C4RA15476B, 2015.
32.	Rajeev Kumar Singh, Rishi Kant, Sushant Singh, E. Suresh, Ankur Gupta, <b>Shantanu Bhattacharya</b>	2015	A novel helical micro-valve for embedded micro-fluidic applications.	<b>Microfluid Nanofluid</b> , DOI 10.1007/s10404-015-1543-y, 2015.
33.	Ankur Gupta, Kunal Mondal, Ashutosh Sharma, <b>Shantanu Bhattacharya</b>	2015	Superhydrophobic Polymethylsilisesquoxane pinned one dimensional ZnO nanostructures for water remediation through photocatalysis	<b>RSC Adv., Vol. 5, pp. 45897, 2015.</b>
34.	Ankur Gupta, D. Singh, P. Raj, Himanshu Gupta, S. Verma, <b>Shantanu Bhattacharya</b>	2015	Antimicrobial investigation of ZnO-HAP nanocomposites for biomedical applications	<b>Journal of Bionanoscience</b> , Vol. 9, pp. 190-196, 2015.
35.	Ankur Gupta, Jayant Raj Saurav, <b>Shantanu Bhattacharya</b>	2015	Solar light based degradation of organic pollutants using ZnO nanobrushes for water filtration	<b>RSC Adv., Vol. 5, pp. 71472, 2015.</b>
36.	V.K. Patel, Deepak Singh, Ankur Gupta, Rishi Kant and <b>Shantanu Bhattacharya</b>	2015	Surface functionalization to mitigate fouling of biodevices: A critical review.	<b>Reviews of Adhesion and Adhesives</b> , Vol. 3, No. 4, 2015.
37.	Ankur Gupta, Shubhra Gangopadhyay, Keshab Gangopadhyay, <b>Shantanu Bhattacharya</b>	2016	Palladium functionalized nano structured platforms for enhanced hydrogen sensing	<b>Nanomaterials and nanotechnology</b> , DOI: 10.5772/63987, 2016.
38.	Vinay Patel, <b>Shantanu Bhattacharya</b>	2016	PEG8000/ Aloe-vera assisted synthesis of ZnO nanorods and its relative catalytic thermal decomposition of KClO <sub>4</sub> with CuO nanorods and Co <sub>3</sub> O <sub>4</sub> nanobelts.	<b>Particulate Science and technology</b> , DOI: 10.1080/02726351.2016.1163299, 2016.
39.	Ankur Gupta, Deepak Singh, <b>Shantanu Bhattacharya</b>	2016	Surface modification strategies for nanobiodevices	<b>Reviews of Adhesion and Adhesives</b> , DOI: 10.7569/RAA.2016.097307, 2016.
40.	Thimmappa Shetty Guruprasad, <b>Shantanu Bhattacharya</b> , Sumit Basu	2016	Size effect in microcompression of polystyrene micropillars	<b>Polymers</b> , Vol. 98, pp. 118-128, doi:10.1016/j.polymer.2016.06.010, 2016.
41.	Rishi Kant, Himanshu Singh, <b>Shantanu Bhattacharya</b>	2016	Nanoscale etching of particles in serpentine micromixers	<b>Journal of nanoscience and nanotechnology</b> , doi:10.1166/jnn.2017.1383

				5, Vol. 17, pp. 1–11, 2017.
42.	Kulwant Singh, Rishikant, Anirrudh Kulkarni, Bishakh Bhattacharya, <b>Shantanu Bhattacharya</b>	2016	Directional vibration suppression of viscoelastic dampers using oil filled helical microchannels	<b>Journal of Vibration and control, Accepted, 2016.</b>
43.	Sanjay Kumar, Pulak Bhushan and <b>Shantanu Bhattacharya</b>	2016	Design and fabrication of paper based device for colorimetric detection of uric acid using gold nanoparticles–graphene oxide (AuNPs-GO) conjugates	<b>Analytical Methods, DOI: 10.1039/c6ay01926a, 2016.</b>
44.	Poonam Sundriyal, <b>Shantanu Bhattacharya</b>	2017	Polyaniline- Silver nanoparticle- coffee waste extracted porous graphene nanocomposite structures as novel supercapacitor materials	<b>Material Research Express, Vol. 43, No.03, pp. 035501, 2017.</b>
45.	Pankaj Singh Chauhan, <b>Shantanu Bhattacharya</b>	2017	Highly sensitive $V_2O_5 \cdot 1.6H_2O$ nanostructures for sensing of Helium gas at room temperature	<b>Material Letters, doi.org/10.1016/j.matlet.2018.01.056, 2018.</b>
46.	Pankaj Singh Chauhan, <b>Shantanu Bhattacharya</b>	2017	Vanadium Pentoxide Nanostructures for Sensitive Detection of Hydrogen Gas at Room Temperature	<b>Journal of Energy and Environmental Sustainability, Vol. 2, pp. 69-74, 2017.</b>
47.	Pankaj Singh Chauhan, Ashutosh Rai, Ankur Gupta, <b>Shantanu Bhattacharya</b>	2017	Enhanced Photocatalytic performance of vertically grown ZnO nanorods with doping of noble metal (Al, Ag, Au, and Au-Pd) nanoparticles for degradation of industrial dye	<b>Material Research Express, Vol. 4, No. 5, pp. 055004, 2017.</b>
48.	Geeta Bhatt, Rishi Kant, Kuldeep Yadav, Keerti Mishra, Deepak Singh, R. Gurunath, <b>Shantanu Bhattacharya</b>	2017	Impact of surface roughness on dielectrophoretically assisted concentration of microorganisms over PCB based platforms	<b>Biomedical Microdevices, Vol. 19, doi: 10.1007/s10544-017-0172-5., 2017.</b>
49.	Sanjay Kumar, Pulak Bhushan, <b>Shantanu Bhattacharya</b>	2017	Facile Synthesis of Au@Ag-Hemin Decorated Reduced Graphene Oxide Sheets: A Novel Peroxidase Mimetic for Ultrasensitive Colorimetric Detection of Hydrogen Peroxide and Glucose	<b>RSC advances, Vol. 7, 37568, 2017.</b>
50.	Vinay Kumar Patel, <b>Shantanu Bhattacharya</b>	2017	in situ green synthesis and catalytic activity of CuO nanorods in thermal decomposition of potassium periodate.	<b>Material Research Express, Vol. 4, No. 9, doi: https://doi.org/10.1088/2053-1591/aa8822, 2017.</b>
51.	Vinay Kumar Patel, Pradyumna Kumar <b>Shantanu Bhattacharya</b>	2017	Mechanical, Micro-structural and Sliding Wear Properties of Friction Stir Welded AA6063-T6 and AA5052-H32 Aluminium Alloys.	<b>Material Focus, Vol. 7, No. 1, pp. 50-58, 2018.</b>
52.	Poonam Sundriyal, <b>Shantanu Bhattacharya</b>	2017	Jet printed graphene/ MnO <sub>2</sub> super-capacitors on flexible substrates	<b>ACS applied materials and interfaces, DOI: 10.1021/acsami.7b11262, 2017.</b>
53.	Kant, Rishi, Himanshu Singh, and <b>Shantanu Bhattacharya.</b>	2017	Nanoscale Etching of Particles in Continuous Flow Reactor.	<b>Journal of Nanoscience and Nanotechnology, Vol. 17, No. 8, pp. 5241-5251, 2017.</b>
54.	V. K.Patel, P. Sundriyal, and <b>Shantanu Bhattacharya.</b>	2017	Aloe vera vs. poly (ethylene) glycol-based synthesis and relative catalytic activity investigations of ZnO nanorods in thermal decomposition of potassium perchlorate.	<b>Particulate Science and Technology, Vol. 35, No. 3, pp. 361-368, 2017.</b>
55.	Kant, Rishi, Deepak Singh, and <b>Shantanu Bhattacharya.</b>	2017	Digitally controlled portable micropump for transport of live micro-organisms.	<b>Sensors and Actuators A: Physical, Vol. 265, pp. 138-151, 2017.</b>

56.	Kumar, Sanjay, Pulak Bhushan, Om Prakash, and <b>Shantanu Bhattacharya.</b>	2018	Double negative acoustic metastructure for attenuation of acoustic emissions.	<b>Applied Physics Letters</b> Vol. 112, No. 10: 101905, 2018.
57.	Chauhan Pankaj S., <b>Shantanu Bhattacharya,</b>	2018	Detection of Hydrogen upto PPB level- A Comprehensive Review	<b>International Journal of Hydrogen Energy</b> , Vol. 44, pp. 26076-26099, 2018.
58.	Basu, Aviru, Chauhan, Pankaj S., <b>Shantanu Bhattacharya,</b>	2018	$\alpha$ -Fe <sub>2</sub> O <sub>3</sub> loaded rGO nanosheets based fast response/recovery CO Gas sensor at Room Temperature	<b>Applied Surface Science</b> , In Press, 2018.
59.	Kumar, Sanjay, Pulak Bhushan, Vinay Krishna and <b>Shantanu Bhattacharya,</b>	2018	Tapered lateral flow immunoassay based point-of-care diagnostic device for ultrasensitive colorimetric detection of dengue NS1	<b>Biomicrofluidics</b> , Vol. 12, 034104 2018.
60.	Kumar, Sanjay, Pulak Bhushan and <b>Shantanu Bhattacharya,</b>	2018	Ultrathin Ashoka Chakra like acoustic metastructure as a sound absorber	<b>The Journal of the Acoustical Society of America</b> , Vol. 143, 1714, 2018.
61.	Rishi Kant, Vinay Kr. Patel. Madhusudan Painully and <b>Shantanu Bhattacharya,</b>	2018	Performance Characterization of Bi <sub>2</sub> O <sub>3</sub> /Al Nanoenergetics Blasted Micro-forming System	<b>Defense Technologies</b> , doi: 10.1016/j.dt.2018.07.005, 2018.
62.	Gupta Ankur and <b>Shantanu Bhattacharya,</b>	2018	On the growth mechanism of ZnO nano structure via aqueous chemical synthesis	<b>Applied Nanoscience</b> , DOI: doi.org/10.1007/s13204-018-0782-0, 2018.
63.	A.K. Basu, A. Saha, A. Pradhan, <b>Shantanu Bhattacharya</b>	2018	rGO-MWCNT- $\alpha$ -Fe <sub>2</sub> O <sub>3</sub> based chloroform detection at room temperature upon polymeric cantilever	<b>Sensors and Actuators-B Chemical</b> , DOI: 10.1016/j.snb.2019.127457, 2019.
64.	Jitender Singh and <b>Shantanu Bhattacharya</b>	2018	Fabrication of Micro-mixer on printed circuit board using Electrochemical Micromachining	<b>Journal of Micromanufacturing</b> , doi.org/10.1177/2516598419838660, 2019.
65.	Sanjay Kumar, Pulak Bhushan, <b>Shantanu Bhattacharya</b>	2019	Investigation of structure-mechanical property relationship in fused filament fabrication of the polymer composites	<b>Journal of Micromanufacturing</b> , doi.org/10.1177/2516598419843687, 2019.
66.	Sanjay Kumar, Pulak Bhushan, <b>Shantanu Bhattacharya,</b>	2019	Additive Manufacturing as an Emerging Technology for Fabrication of Microelectromechanical Systems (MEMS): A Review	<b>Journal of Micromanufacturing</b> , doi.org/10.1177/2516598419843688, 2019.
67.	P. S. Chauhan, R. Kant, A. Rai, A. Gupta, <b>S. Bhattacharya</b>	2019	Facile synthesis of ZnO/GO nano flowers over Si substrate for improved photocatalytic decolorization of MB dye and industrial wastewater under solar irradiation.	<b>Materials Science in Semiconductor Processing</b> , Vol. 89, pp. 6-17, 2019.
68.	Sundriyal, Poonam, and <b>Shantanu Bhattacharya.</b>	2019	Scalable Micro-fabrication of Flexible, Solid-state, Inexpensive and High-Performance Planar Micro-supercapacitors through Inkjet Printing Method	<b>ACS Applied Energy Materials</b> , DOI: 10.1021/acsaem.8b02006, 2019.
69.	Bhatt, Geeta, Keerti Mishra, Gurunath Ramanathan, and <b>Shantanu Bhattacharya.</b>	2019	Dielectrophoresis assisted impedance spectroscopy for detection of gold-conjugated amplified DNA samples	<b>Sensors and Actuators B: Chemical</b> , DOI: doi.org/10.1016/j.snb.2019.02.081, 2019.
70.	Bhatt, Geeta and <b>Shantanu Bhattacharya.</b>	2019	Biosensors on chip: A critical review from an aspect of micro/nano-scales.	<b>Journal of Micromanufacturing</b> , doi.org/10.1177/2516598419847913, 2019.
71.	Rishi Kant, Geeta Bhatt, Vinay K. Patel, Anurup Ganguly, Deepak Singh, Monalisha Nayak, Keerti Mishra, Ankur Gupta, Keshab Gangopadhyay,	2019	Synchronized electro-mechanical shock wave induced bacterial transformation.	<b>ACS Omega</b> , doi.org/10.1021/acsomega.9b00202, 2019

	Shubhra Gangopadhyay, R. Gurunath, <b>Shantanu Bhattacharya</b>			
72.	Gupta Ankur, Poonam Sundriyal, Aviru Basu, Kapil Manoharan, Rishi Kant and <b>Shantanu Bhattacharya,</b>	2019	Nano-finishing of MEMS-based platform for better optical sensing application	<b>Journal of Micro-manufacturing,</b> doi.org/10.1177/2516598419862676, 2019.
73.	Kapil Manoharan, <b>Shantanu Bhattacharya,</b>	2019	Super-hydrophobic Surfaces Review: Functional Application, Fabrication Techniques and Limitations	<b>Journal of Micro-manufacturing,</b> doi.org/10.1177/2516598419836345, 2019.
74.	Aviru Basu, A Sah, A Pradhan and <b>Shantanu Bhattacharya</b>	2019	Poly-L-Lysine functionalised MWCNT-rGO nanosheets based 3-d hybrid structure for femtomolar level cholesterol detection using cantilever based sensing platform	<b>Scientific Reports,</b> Vol. 9, 3686, 2019
75.	Ankur Gupta, Geeta Bhatt and <b>Shantanu Bhattacharya,</b>	2019	Novel Dipstick model for Portable Bio-sensing Application	<b>Journal of Energy and Sustainability,</b> Vol. 7, pp. 36-41, 2019.
76.	Eshan Sadasivan, <b>Shantanu Bhattacharya</b>	2020	Product Innovation Fostering Rural Livelihood Opportunities: Development of A Low Cost Paper Bag making machine	<b>Asia Pacific Journal of Innovation and Entrepreneurship,</b> In Press, 2022.
77.	Aviru Basu, <b>Shantanu Bhattacharya</b>	2020	Geometry and thickness dependant anomalous mechanical behavior of fabricated SU-8 thin film micro-cantilevers	<b>Journal of Micromanufacturing,</b> doi.org/10.1177/2516598420930988 , 2020.
78.	Shreyansh Tatiya, <b>Shantanu Bhattacharya</b>	2020	Nanoparticles containing boron and its compounds: synthesis and applications - A review	<b>Journal of Micromanufacturing,</b> doi.org/10.1177/2516598420965319, 2020.
79.	<b>Shantanu Bhattacharya,</b> Sanjay Kumar, Sanjeev Kumar Singh, Pulak Bhushan, Megha Sahu, Om Prakash	2020	Ashok chakra-structured meta-structure as a perfect sound absorber for broadband low-frequency sound	<b>Applied Physics Letters,</b> Vol. 117, 2020.
80.	Poonam Sundriyal, Mohit Pandey, <b>Shantanu Bhattacharya</b>	2020	Plasma-assisted surface alteration of industrial polymers for improved adhesive bonding	<b>International Journal of Adhesion and Adhesives,</b> Vol. 101, 2020.
81.	Aviru Kumar Basu, <b>Shantanu Bhattacharya</b>	2020	Micro/Nano fabricated cantilever based biosensor platform: A review and recent progress	<b>Enzyme and Microbial Technology,</b> Vol. 139, 2020.
82.	Shailendra Singh, <b>Shantanu Bhattacharya,</b> Venkataramanaiah Saddikuti	2020	An application of AHP and fuzzy AHP with sensitivity analysis for selecting the right process to impart knowledge	<b>International Journal of Knowledge Management Studies,</b> Vol. 11, pp. 258-277, 2020.
83.	Shailendra Singh, <b>Shantanu Bhattacharya,</b> Venkataramanaiah Saddikuti	2020	Application and Analysis of Artificial Neural Network Backpropagation Algorithm's in Knowledge Management	<b>Educational Alternatives,</b> Vol 18, 2020.
84.	Poonam Sundriyal,	2020	Textile-based supercapacitors	<b>Scientific Reports,</b> Vol.



	<b>Shantanu Bhattacharya</b>		for flexible and wearable electronic applications	10, 2020.
85.	Shreyansh Tatiya, Mohit Pandey, <b>Shantanu Bhattacharya</b>	2020	Nanoparticles containing boron and its compounds— synthesis and applications: A review	<b>Journal of Micromanufacturing, Vol. 3,</b> pp. 159-173, 2020.
86.	Aviru Kumar Basu, Amar Nath Sah, Mayank Manjul Dubey, Prabhat K. Dwivedi, Asima Pradhan, <b>Shantanu Bhattacharya</b>	2020	MWCNT and $\alpha$ -Fe <sub>2</sub> O <sub>3</sub> embedded rGO-nanosheets based hybrid structure for room temperature chloroform detection using fast response/recovery cantilever based sensors	<b>Sensors and Actuators, B: Chemical, Vol. 305,</b> 2020.
87.	Geeta Bhatt, Swati Gupta, Gurunath Ramanathan, <b>Shantanu Bhattacharya</b>	2021	Integrated DEP assisted detection of PCR products with metallic nanoparticle labels through impedance spectroscopy	<b>IEEE Transactions on Nanobioscience,</b> doi: <b>10.1109/TNB.2021.3127111, 2021</b>
88.	Meenaxi Sharma, Bidisha Bhatt, Geeta Bhatt, Krishnacharya Khare, <b>Shantanu Bhattacharya</b>	2021	Anisotropic Motion of Aqueous Drops on Lubricated Chemically Heterogenous Slippery Surfaces	<b>Advanced Materials Interfaces, Vol. 8,</b> 2021.
89.	Anubhuti Saha, A. Bajpai, Vinay Krishna, <b>Shantanu Bhattacharya</b>	2021	Evolving paradigm of prothrombin time diagnostics with its growing clinical relevance towards cardio-compromised and COVID-19 affected population	<b>Sensors, Vol. 21,</b> 2021.
90.	Poonam Sundriyal, Megha Sahu, Om Prakash <b>Shantanu Bhattacharya</b>	2021	Long-term surface modification of PEEK polymer using plasma and PEG silane treatment	<b>Surfaces and Interfaces, Vol. 25,</b> 2021
91.	Kapil Manoharan, Mohd Tahir Anwar, <b>Shantanu Bhattacharya</b>	2021	Development of hydrophobic paper substrates using silane and sol-gel based processes and deriving the best coating technique using machine learning strategies	<b>Scientific reports, Vol. 11,</b> pp. 1-12, 2021.
92.	Pankaj Singh Chauhan, Aniket Mishra, Geeta Bhatt, <b>Shantanu Bhattacharya</b>	2021	Enhanced He gas detection by V <sub>2</sub> O <sub>5</sub> -noble metal (Au, Ag, and Pd) nanocomposite with temperature dependent n-to p-type transition	<b>Materials Science in Semiconductor Processing, Vol. 123,</b> pp. 105528, 2021.
93.	Eshan Sadasivan, <b>Shantanu Bhattacharya</b> , Mainak Das, Kapil Manoharan,	2021	Sustainable product development through innovation for social impact	International Journal for sustainable design, Vol 4 (2), pp. 1, 2021
94.	Pankaj Singh Chauhan, Kuldeep Kumar, Kirtiman Singh, <b>Shantanu Bhattacharya</b>	2022	Fast decolorization of rhodamine-B dye using novel V <sub>2</sub> O <sub>5</sub> -rGO photocatalyst under solar irradiation	<b>Synthetic Metals, Vol. 283,</b> pp. 116981, 2022.

**Refereed Conference Papers:**

1. A Flow Visualization Experiment for a First Course in Micro-fluidics, Proc. ASEE (2003), University of Texas at Arlington, TX, United States of America, 2003.
2. Self- assembled Ordered Energetic Composites of CuO nanorods and nanowells and Aluminum nanoparticles with High Burn rates, Proc. MRS (2005), Vol. 896E, Boston, MA, United States of America, 2005.
3. On-Chip Initiation and Burn Rate Measurements of Thermite Energetic Reactions, Proc. MRS (2005), Vol. 896H, Boston, MA, United States of America, 2005.
4. Optimization of fabrication process for a PDMS-SOG-Silicon based PCR microchip through system identification techniques Proc. 19th IEEE Symposium on Computer-Based Medical Systems (CBMS'06), pp. 329-334, Salt lake city, Utah, May 2006.
5. Detection of Foodborne Pathogenic Bacteria By Dielectrophoresis Enhanced Immunoassay in Biochips Proc. MicroTAS, The 11th international conference for chemistry and lifesciences, 7-11 October, 2007 , Paris, France, 2007.
6. A novel replica molding process for realizing three dimensional microchannels within soft materials Proc. , ICMEMS-2009, Indian Institute of Technology-Chennai, India. 2009
7. Bio-chip for fluorescence based quantitation of fluorescent microbeads Proc. , ICMEMS-2009, Indian Institute of Technology-Chennai, India. 2009
8. Dielectrophoretic Separation of Nano-Particle Conjugated Bacterial Cells within Micro-Scale Architecture Proc. AICHE-2009, 72H , Annual Meeting of the American Electrophoresis Society, Nashville, Tennessee, United States of America. 2009
9. Electrophoretic Transport of Nucleic Acids through Nano Structured Surfaces Proc. AICHE-2009, 306C, Electrokinetic Behavior of Micro and Nanoparticles: Fundamentals and Applications, Nashville, Tennessee, United States of America. 2009
10. Flow rotation due to Bilayer staggered herringbone structures with symmetric and asymmetric geometries across micro-channels.Proc. COMSOL-2010, held at Bangalore, India. 2010
11. A novel replica molded solenoidal microvalve for control of miniaturized flow volumes Proc. RAMEMS-2011, held at IT-BHU, Banaras, India, pp 122-125, March 7-9, 2011.
12. A novel soft lithography based peristaltic micro-pump. Proc. RAMEMS-2011, held at IT-BHU, Banaras, India, pp 126-128, March 7-9, 2011.
13. Passive vibration damping with microstructured viscoelastic laminates. Proc. RAMEMS-2011, held at IT-BHU, Banaras, India, pp 138-140, March 7-9, 2011.
14. A novel microchip platform to perform real time Polymerase Chain Reaction Proc. ISSS-2012, held at IISC-Bangalore, India, January 4-7th, 2012.
15. Fabrication and Optimization of CO<sub>2</sub> Laser Machined Photo Mask for Photo lithography process Proc. International Conf. on Innovations in Design and Manufacturing, Jabalpur, India, (December 5-7,2012).
16. High aspect ZnO nano structures based Hydrogen sensing Proc. Internationalconference on recent trends in Applied Physics and material Science, Bikaner, India (February 1-3, 2013).
17. Effect of Oxidizer Morphology on Combustion Characteristics of Nanoenergetic Materials of CuO/Al Proc. Internationalconference on recent trends in Applied Physics and material Science, Bikaner, India (February 1-3, 2013).
18. Polymer Waveguide and Optical Fiber Coupling Using Whispering Gallery Modes in an Elliptical Micro-Sleeve Optical Trapping Applications Waikoloa Beach, Hawaii United States, The Optical Society, April 14-18, 2013 ISBN: 978-1-55752-966-4, 2014.
19. Studies on CO<sub>2</sub> laser micromachining on PMMA to fabricate micro channel for microfluidic applications, Proc. AIMTDR to be held in IIT Guwahati, India 2014.
20. Antibody immobilization over ZnO nanobundles for biosensing applications Materials research society (MRS) spring Proceedings, San Francisco, California, USA, (April 21st -25th , 2014), 1675, mrs14-1675-k14-09 doi:10.1557/opl.2014.848, 2014.
21. Porous Polydimethyl Siloxane (PDMS)- Acrydine Orange (AO) as a biomaterial in opto-bio-sensing International symposium on metallurgy, material science and engineering, ISRS-2014, Dec. 2014, IIT Madras, 2014.
22. Antimicrobial investigation of ZnO-HAP nanocomposites Proceeding of the 2nd international material, industrial and manufacturing conference, February 2015, Bali, Indonesia.
23. Synthesis and characterization of energetic nano-materials and their utility in gene delivery applications Proceedings of International Conference on advances in Micro/nano technologies, August 2015, PSG Tech, Coimbatore, India.
24. Fabrication and resilience measurement of thin aluminium cantilevers using scanning probe microscopy Proceedings of 3rd International Conference C2E2, IEEE, Mankundu, West Bengal, India, 15th-

16th January, 2016 .

25. Design for Communities: An entrepreneurial approach to solve the problems of society and environment fuelled by product design ICORD-2016, Accepted, to be held in South Africa, Cape Town, October 2016.
26. Enhancement of photocatalysing of water having organic impurities using gold and platinum plated ZnO nanofibres. Proceedings of AIMTDR-2016, Presented in College of Engineering, Pune, December 2016, pg: 1620-1623.
27. Design and Development of a study companion for rural students in India IEEE Region 10 Humanitarian Technology Conference, Dayalbagh, Agra. December -2016.
28. Influence of MnC<sub>2</sub>O<sub>4</sub> microadditives on combustion characteristics of CuO/Al nanoenergetics Proceedings of International conference on condensed matter and applied physics (ICC), May-2016, DOI: 10.1063/1.4946171.
29. Positively Charged Silver Nano-particles as Labels for Paper-Based Colorimetric Detection of Heparin, Proceedings of International Conference for Innovation in Biomedical Engineering and Life Sciences, Singapore, December, 2017, pg. 235-240.
30. Synthesis, Characterization and Gas Sensing study for Different Shapes of V<sub>2</sub>O<sub>5</sub> Nanostructures International conference on advanced materials, Trivendrum India, December 2017.
31. Fabrication and Resilience measurement of thin Aluminium cantilevers using scanning probe microscopy, IEEE, C2E2 2016, Kolkata, CRC Press, Taylor and Francis, 2016
32. Grey scale Lithography based fabrication of thin polymeric cantilevers for MEMS/NEMS Applications ( FMFP, IIT Bombay, 2018)
33. BSA detection on Polymeric Nanocantilevers, Flame, Amity University, Noida ( Springer, 2019)
34. pH induced conformational changes on polymeric nanocantilevers, ICNMS, AIP Conference Proceedings, San Francisco, USA, 2019.
35. Electrochemical Analysis of the Printed NiCo<sub>2</sub>O<sub>4</sub>//Reduced Graphene Oxide Solid-State Hybrid Supercapacitors on Fabric Substrates for Wearable Applications. The Electrochemical Society, USA, 2019.
36. Inkjet Printing based Micro-manufacturing of the Thin-film Electrodes for Flexible Supercapacitor Applications, AIMTDR, Chennai, India, December- 2018.
37. Hemin (Fe<sup>+3</sup>-porphyrin) anchored V<sub>2</sub>O<sub>5</sub> nanowires for solar light based photocatalytic decolourization of MB dye and Industrial wastewater', International Conference on Advances in Functional Materials, University of California, Los Angeles Campus, 2019.
38. An inexpensive and robust PCB platform for molecular diagnostics, Advances in Functional Materials Conference AAAFM-UCLA, 19-22 Aug, 2019, Los Angeles, USA
39. Dielectrophoretic particle separation on inexpensive PCB platform, International Conference on Applied Surface Science, 17-20 June, 2019, Pisa, Italy
40. Microfabricated PCB Platform for the Sensitive Concentration of Bacterial Cells Using Chemical Etching, Proceedings of the 7th International and 45th National Conference on Fluid Mechanics and Fluid Power (FMFP) December 10-12, 2018, IIT Bombay, Mumbai, India.
41. Enhanced fluorescence based detection of Vibrio cells over nanoporous silica substrate, International Conference on Future Learning Aspects of Mechanical Engineering (FLAME - 2018) 3-5 October, 2018, Amity University, Noida, India.
42. Inkjet printing- assisted growth of Ni<sub>2</sub>CO<sub>3</sub> nanorods over fabric substrates for flexible and wearable supercapacitor applications, International Conference on Advances in Functional Materials, University of California, Los Angeles Campus, 2019.
43. Gas sensors for strategic applications, International Conference on Energy Environment and Sustainability, NEERI Nagpur, India, 2019.
44. Invited Award talk (for NASI Reliance Platinum Jubilee Award 2019) at 89<sup>th</sup> Annual Session of the National Academy of Sciences, India (NASI), ICAR-NAARM, Hyderabad, 2019.
45. Invited Talk, "Semiconductor materials and their use as Photocatalyst" presented at MIPP (A), Conference at University of Melbourne, Australia, 2019.

**Citations as per google scholar:**

<i>Independent research</i>	<i>International Peer Reviewed Journal Papers</i>	<i>H-index as per google scholar</i>	<i>Citations as per google scholar</i>	<i>I-10 Index as per google scholar</i>	<i>International peer reviewed conference papers</i>
2004-2022	94	31	4223	101	45
<i>Last Five Years</i> (2017-2022)	52	28	2995	94	15

**Complete list of Books:**

<b>Book Name</b>	<b>Authors/ISBN no.</b>	<b>Year</b>	<b>Publisher</b>
Economies of advanced trainings, basics, concepts and methods (Miniaturized nucleic acid analysis)	Bhattacharya, Shantanu (Ed.), ISBN9783836437684	2008	VDM Verlag, Starbuckken, Germany
Water Remediation	Bhattacharya, Shantanu, Akhilen Bhushan Gupta, Ankur Gupta, and Ashok Pandey (Eds.) ISBN9789811075506	2018	Springer
Environmental, Chemical and Medical Sensors	Bhattacharya, Shantanu, Avinash Kumar Agarwal, Nripen Chanda, Ashok Pandey, and Ashis Kumar Sen, (Eds.) ISBN9789811077500	2018	Springer
Nanoenergetic Materials	Bhattacharya, Shantanu, Avinash Kumar Agarwal, T. Rajgopalan, Vinay Kumar Patel (Eds.) ISBN 978-981-13-3289-0	2018	Springer
Sensors for aerospace and automotive applications	Bhattacharya, Shantanu, Avinash Kumar Aggarwal, Shailendra Singh, Om Prakash (Eds.) ISBN 978-981-13-3269-2	2018	Springer
Paper Microfluidics: Theory and practice	Bhattacharya, Shantanu, Avinash Kumar Agarwal, Sanjay Kumar (Eds.) ISBN 978-981-15-0489-1	2019	Springer
MEMS applications in Biology and Healthcare	Basu, Aviru Kumar, Basu, Adreeja, Ghosh, Sagnik, Bhattacharya, Shantanu (Eds.) ISBN (Online): 978-0-7354-2395-4	2021	American Institute of Physics
Carbon nanostructures for energy harvesting	Rajagopalan Thiruvengadathan, Somnath Chanda Roy, Poonam Sundriyal and Shantanu Bhattacharya (Eds.) ISBN (Online): 978-0-7354-2311-4	2021	American Institute of Physics
Trends in Fabrication of Polymers and Polymer Composites	Vinay Kumar Patel, Rishi Kant, Pankaj Singh Chauhan, and Shantanu Bhattacharya (Eds.) ISBN (Online): 978-0-7354-2391-6	2022	American Institute of Physics

**Books under production:**

Trends in applications of Polymers and Polymer Composites	Vinay Kumar Patel, Rishi Kant, Pankaj Singh Chauhan, and Shantanu Bhattacharya (Eds.)	2022 (In production)	American Institute of Physics
MEMS applications in electronics and Engineering	Basu, Aviru Kumar, Basu, Adreeja, Ghosh, Sagnik, Bhattacharya, Shantanu (Eds.)	2022 (In production)	American Institute of Physics

Gas Sensors: Manufacturing, Materials, and Technologies	Gupta, Ankur, Kumar. Mahesh, Singh, Rajeev Kumar, Bhattacharya, Shantanu (Eds.)	2022 (In production)	CRC Press Taylor and Francis
Impedance Spectroscopy and its application in biological detection	Bhatt, Geeta, Bhatt, Manoj Kumar, Bhattacharya, Shantanu (Eds.)	2022 (Under Review)	CRC Press Taylor and Francis

#### List of Book Chapters:

1. Pandey M., M. Rashiku, S. Bhattacharya, 2021, Recent progress in the development of printed electronic devices, in: Chemical Solution Synthesis for Materials Design and Thin Film Device Applications, S. Das and S. Dhara (Eds.), pp. 349-368, Elsevier.
2. Chauhan P. S., P. Sundriyal, S. Bhattacharya, 2021, Carbon-based materials for hydrogen storage, in: Carbon Nanostructures: Fundamentals to Applications, Thiruvengadathan R., S.C. Roy, P. Sundriyal, S. Bhattacharya (Eds.), American Institute of Physics.
3. Manoharan K., P. Sundriyal, A. Saha, S. Bhattacharya, 2021, Fabrication and Application of Carbon Nanoscale Materials and Surfaces in Energy Storage, in: Carbon Nanostructures: Fundamentals to Applications, Thiruvengadathan R., S.C. Roy, P. Sundriyal, S. Bhattacharya (Eds.), American Institute of Physics.
4. Thiruvengadathan R., S.C. Roy, P. Sundriyal, S. Bhattacharya, 2021, From Fundamentals to Applications of Carbon Nanostructures: An overview, in: Carbon Nanostructures: Fundamentals to Applications, Thiruvengadathan R., S.C. Roy, P. Sundriyal, S. Bhattacharya (Eds.), American Institute of Physics.
5. Pandey M., S. Tatiya, S. Bhattacharya, 2021, Design and Development of MEMS-Based Sensors for Wearable Diagnostic Applications, in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
6. Basu A.K., A. Basu, S. Bhattacharya, 2021, Recent Trends and Progress in MemBased Bioinspired/Biomimetic sensors, in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
7. Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya, Introduction to MEMS in Biology and Healthcare, in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
8. Chauhan P.S., A. Choudhary, K. Saxena, S. Bhattacharya, 2021, MEMS Devices for the Measurement of Wastewater Parameters, in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
9. Bhatt G. and S. Bhattacharya, 2021, Application of Various Detection Platforms for Sensitive Detection of Biological Entities, in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
10. Rashiku M. and S. Bhattacharya, 2021, BioMEMS-Based Sensors for Future Diagnostic Applications, , in: MEMS applications in Biology and Healthcare, Basu A.K., A. Basu, S. Ghosh, S. Bhattacharya (Eds.), American Institute of Physics.
11. Bhattacharya Shantanu, Agarwal A.K., Patel, V.K., Rajgopalan T., Basu A.K., Saha Anubhuti, "Introduction to Nanoenergetic materials", In Nanoenergetic Materials, pp. 3-7, Springer, Singapore, 2019.
12. Sundriyal Poonam, Bhattacharya Shantanu, "Recent Advancement in the Fabrication of Energy Storage Devices for Miniaturized Electronics", In Nanoenergetic Materials, pp. 215-240, Springer, Singapore, 2019.
13. Patel V.K., Katiyar J., Bhattacharya Shantanu, "Solid energetic materials based microthrusters for space applications" In Nanoenergetic Materials, pp. 241-250, Springer, Singapore, 2019.
14. Bhattacharya Shantanu, Agarwal A.K., Omprakash, Singh Shailendra, Pandey Mohit and Rishi Kant, "Introduction to sensors for Aerospace and Aerospace applications", In Sensors for automotive and aerospace applications, pp. 1-6., Springer, Singapore, 2019.
15. Kant Rishi, Chauhan Pankaj Singh, Bhatt Geeta and Bhattacharya Shantanu, "Corrosion Monitoring and control in aircraft: A Review", In Sensors for automotive and aerospace applications, pp. 39-54. Springer, Singapore, 2019.
16. Sundriyal Poonam and Bhattacharya Shantanu, " Energy Harvesting Techniques for powering wireless sensor networks in aircraft applications: A Review", In Sensors for automotive and aerospace applications, pp. 55-76, Springer, Singapore, 2019.
17. Manoharan Kapil and Bhattacharya Shantanu, "Sensors used in flying", In Sensors for automotive and aerospace applications, pp. 93-106, Springer, Singapore, 2019.

18. Basu Aviru Kumar, Tatiya Shreyansh and Bhattacharya Shantanu, "Overview of electric vehicles and EV sensors", In *Sensors for automotive and aerospace applications*, pp. 107-122, Springer, Singapore, 2019.
19. Basu Aviru Kumar, Tatiya Shreyansh and Bhattacharya Shantanu, "Fabrication processes for sensors for automotive applications: A review", In *Sensors for automotive and aerospace applications*, pp. 123-142, Springer, Singapore, 2019.
20. Pandey Mohit, Tatiya Shreyansh, Bhattacharya Shantanu, Singh Shailendra, "Sensors in assembly shop in automobile manufacture"., In *Sensors for automotive and aerospace applications*, pp. 193-208, Springer, Singapore, 2019.
21. Chauhan Pankaj Singh, Bhatt Geeta and Bhattacharya Shantanu, "Leakage Monitoring in Inflatable Space Antennas: A perspective to sensitive detection of Helium and Nitrogen Gases", In *Sensors for automotive and aerospace applications*, pp. 209-222, Springer, Singapore, 2019.
22. Bhatt Geeta, Manoharan Kapil, Chauhan Pankaj Singh, Bhattacharya Shantanu, "MEMS Sensors for automotive Applications: A review", In *Sensors for automotive and aerospace applications*, pp. 223-240, Springer, Singapore, 2019.
23. Pandey Mohit, Tatiya Shreyansh, Bhattacharya Shantanu and Singh Shailendra, "Sensors in the joining and welding process in automobile manufacturing", In *Sensors for automotive and aerospace applications*, pp. 241-256, Springer, Singapore, 2019.
24. Tatiya Shreyansh, Pandey Mohit, Bhattacharya Shantanu, Singh Shailendra, "Sensors used in automotive paint shops", In *Sensors for automotive and aerospace applications*, pp. 257-264, Springer, Singapore, 2019.
25. Rai, Ashutosh, Pankaj Singh Chauhan, and Shantanu Bhattacharya, "Remediation of Industrial Effluents." In *Water Remediation*, pp. 171-187. Springer, Singapore, 2018.
26. Kumar, Sanjay, Pulak Bhushan, and Shantanu Bhattacharya. "Fabrication of Nanostructures with Bottom-up Approach and Their Utility in Diagnostics, Therapeutics, and Others." In *Environmental, Chemical and Medical Sensors*, pp. 167-198. Springer, Singapore, 2018.
27. Sundriyal, Poonam, and Shantanu Bhattacharya. "Inkjet-Printed Sensors on Flexible Substrates." In *Environmental, Chemical and Medical Sensors*, pp. 89-113. Springer, Singapore, 2018.
28. Bhattacharya, Shantanu, Akhilendra Bhushan Gupta, Ankur Gupta, and Ashok Pandey. "Introduction to Water Remediation: Importance and Methods." In *Water Remediation*, pp. 3-8. Springer, Singapore, 2018.
29. Bhattacharya, Shantanu, Avinash Kumar Agarwal, Nripen Chanda, Ashok Pandey, Ashis Kumar Sen, Sanjay Kumar, and Poonam Sundriyal. "Introduction to Environmental, Chemical, and Medical Sensors." In *Environmental, Chemical and Medical Sensors*, pp. 3-6. Springer, Singapore, 2018.
30. Manoharan, Kapil, Anubhuti Saha, and Shantanu Bhattacharya. "Nanoparticles-Based Diagnostics." In *Environmental, Chemical and Medical Sensors*, pp. 253-269. Springer, Singapore, 2018.
31. Bhatt, Geeta, and Shantanu Bhattacharya. "DNA-Based Sensors." In *Environmental, Chemical and Medical Sensors*, pp. 343-370. Springer, Singapore, 2018.
32. Kant, Rishi, and Shantanu Bhattacharya. "Sensors for Air Monitoring." In *Environmental, Chemical and Medical Sensors*, pp. 9-30. Springer, Singapore, 2018.
33. Kumar, Sanjay, Pulak Bhushan, and Shantanu Bhattacharya. "Coatings on Surgical Tools and How to Promote Adhesion of Bio-Friendly Coatings on Their Surfaces." *Adhesion in Pharmaceutical, Biomedical, and Dental Fields (2017)*: 207.
34. Gupta, Ankur, Vinay Kumar Patel, Rishi Kant, and Shantanu Bhattacharya. "Surface Modification Strategies for Fabrication of Nano-Biodevices." *Progress in Adhesion and Adhesives (2017)*: 161-185.
35. Kant, Rishi, Geeta Bhatt, Poonam Sundriyal, and Shantanu Bhattacharya. "Relevance of Adhesion in Fabrication of Microarrays in Clinical Diagnostics." *Adhesion in Pharmaceutical, Biomedical, and Dental Fields (2017)*: 257.
36. Guruprasad, Thimmappa Shetty, Shantanu Bhattacharya, and Sumit Basu. "Investigation of Size Effect Through In-Situ SEM Testing of Polystyrene Micropillars." In *Micro and Nanomechanics, Volume 5*, pp. 33-39. Springer, Cham, 2017.
37. Kumar, Sanjay, Pulak Bhushan, and S. Bhattacharya. "Diagnosis of communicable diseases using paper micro-fluidic platforms." *Point-of-care diagnostics—new progresses and perspectives. IAPC Open Book and Monograph Platform (OBP)*, Zagreb Google Scholar (2016).
38. Bhatt, Geeta, Sanjay Kumar, Poonam Sundriyal, Pulak Bhushan, Aviru Basu, Jitendra Singh, and Shantanu Bhattacharya. "Microfluidics Overview." In *Microfluidics for Biologists*, pp. 33-83. Springer, Cham, 2016.
39. Kant, Rishi, Ankur Gupta, and S. Bhattacharya. "Studies on CO<sub>2</sub> laser micromachining on PMMA to fabricate micro channel for microfluidic applications." In *Lasers Based Manufacturing*, pp. 221-238. Springer, New Delhi, 2015.

40. Panda, Siddhartha, Mukesh Sharma, Shantanu Bhattacharya, Ashok Kumar, Arnab Bhattacharya, S. K. Katiyar, and Shivesh Prakash. "Progression of M tuberculosis from Latency to Disease: In vitro and in vivo Tracking of Iron Content in Alveolar Macrophages."
41. Rajeev Kumar Singh, Anil Ghubade, Rahul Chaudhury and Shantanu Bhattacharya. "Fabrication technology for biomedical systems using non-conventional micromachining" in Introduction to Micromachining.
42. Kant, Rishi, Ankur Gupta, and S. Bhattacharya. "Studies on CO<sub>2</sub> laser micromachining on PMMA to fabricate micro channel for microfluidic applications." In Lasers Based Manufacturing, pp. 221-238. Springer, New Delhi, 2015.
43. Panda, Siddhartha, Mukesh Sharma, Shantanu Bhattacharya, Ashok Kumar, Arnab Bhattacharya, S. K. Katiyar, and Shivesh Prakash. "Progression of M tuberculosis from Latency to Disease: In vitro and in vivo Tracking of Iron Content in Alveolar Macrophages."
44. Rajeev Kumar Singh, Anil Ghubade, Rahul Chaudhury and Shantanu Bhattacharya. "Fabrication technology for biomedical systems using non-conventional micromachining" in Introduction to Micromachining.

**Patents granted (Reverse Chronological Order)**

S. No.	Details of Patent	Patent File No. (Year)	Status	International/National
1.	"Method for enhanced bonding of thermoplastic composites", Megha Sahu, Om Prakash, Shantanu Bhattacharya, Poonam Sundriyal	US 2021/026960 8 A1, Pub. 02/09/2021	Technology transferred to Boeing	US Patent in collaboration with Boeing
2.	"Sound attenuation panel and methods of constructing and installing the same", Om Prakash, Shantanu Bhattacharya, Sanjay Kumar, Pulak Bhushan	US 2022/112143 50 B2, Pub. 04/01/2022	Technology transferred to Boeing	US Patent in collaboration with Boeing
3.	"Composite sound absorption panel assembly", Om Prakash, Shantanu Bhattacharya, Sanjay Kumar, Pulak Bhushan	US 2019/010308 9A1 (2019)	Technology transferred to Boeing	US Patent in collaboration with Boeing
4.	"Carry Bag Making Machine", Eshan Sadasivan, Mainak Das, Shantanu Bhattacharya.	03/2018 (2018)	Technology transferred to Prosoc Innovators	National
5.	"An Efficient Writing", Sachin NP, Vimal C., Satyaki Roy, Shantanu Bhattacharya	2017110264 11 (2017)	Technology Won GYTI award 2017	National
6.	An Integrated Microchip for the Detection of a Biological Cell", Shantanu Bhattacharya, Gurunath Ramanathan, Monalisa Nayak, Deepak Singh, Rishi Kant.	28/2016 (2016)	Technology commercialized by TCIP, Incubated @IIT Kanpur for PCR based diagnostic system development	National
7.	"Micropump for Fluidic Applications", Rishi Kant, Shantanu Bhattacharya, Abhijit Verma, Naman Kumar Rawal.	2016110057 50 (2016)	None	National
8.	"A process for the production of high surface area nano metal oxides", Shantanu Bhattacharya, Ankur Gupta, Shashank Shekhar Pandey.	34/2015 (2015)	Technology being commercialized for textile effluent remediation	National
9.	"School Bag Convertible to Study Table", Eshan Sadasivan, Shantanu Bhattacharya, Mainak Das.	287945 (2015)	Technology transferred to Prosoc Innovators	National
10.	"Design for disability: A waist wearable for	277650	None	National

	visually challenged for Indoor Navigation”, Shantanu Bhattacharya, Jhumkee Iyenger, Charu	(2014)		
11.	“Agarose Nanoplatinum Composites”, Shantanu Bhattacharya, Shubhra Gangopadhyay, Keshab Gangopadhyay, Keshab Gangopadhyay, Nripen Chanda, Paul Sharp.	8747637B2 (2014)	None	US Patent
12.	“Reusable PCR amplification system and method”, Shantanu Bhattacharya, Venumadhav Korampally, Shubhra Gangopadhyay, Keshab Gangopadhyay, Keshab Gangopadhyay, Sheila A. Grant, Steven B. Kleiboeker, Yuanfang Gao.	8173077 (2012)	Technology Negotiated with M/S Fluidigm by University of Missouri Columbia	US Patent
13.	“Shock wave and power generation using onchip nanoenergetic materials”, Shubhra Gangopadhyay, Steven Apperson, Keshab Gangopadhyay, Andrey Bezmelnitsyn, Rajagopalan Thiruvengadathan, Michael Kraus, Rajesh Shende, Maruf Hossain, Senthil Subramanian, Shantanu Bhattacharya, Yuangang Gao.	8066831 (2011)	Technology being commercialized by Nanos LLC., Columbia, Missouri	US Patent
14.	“A method for creation of 2 and 3-dimensional micro channels of varied dimensions using replication and molding around a wire”, Bikramjeet Basu, Shantanu Bhattacharya, Rajeev Kumar Singh.	295640 (2008)	None	National

#### Patents filed (Reverse Chronological Order)

S. No.	Details of Patent	Patent File No.	Status (filed)	International/National
1.	Industrial Wastewater remediation technique by integrated pretreatment and photocatalysis” Pankaj Singh Chauhan, Aditya Choudhury, S.K. Singh, Urmila Bhrigu, Shantanu Bhattacharya	Patent application no. to be granted (2021)	Filed	Indian Patent
2.	“Lateral Flow Immunoassay based Point of Care Diagnostic Device for Ultrasensitive colorimetric detection of Dengue”, Geeta Bhatt, Md. Rashiku, Poonam Sundriyal, and Shantanu Bhattacharya	202111024379 (2021)	Filed Technology Commercialized by company incubated at IIT Kanpur through the BIRAC, BIG program	National
3.	“A device for detecting one or more fragments of DNA”, Geeta Bhatt, and Shantanu Bhattacharya	202011056963 (2020)	Filed	National
4.	“Acoustic metamaterials with discreet band absorption through planar fractal geometries” Sanjeet Kumar, Om Prakash, Megha Sahu, Shantanu Bhattacharya	Application No. to be granted (2022)	Filed	US Patent in collaboration with Boeing
5.	“Commode on wheels”, Shantanu Bhattacharya, Akshay Purwar, Sandip Kumar, Kuldeepak Mahto, Nishant Kumar, Swagatam Mitra, Shishir Kumar, Virendra Singh.	301001	Filed 04/01/2018	National

#### Student Mentoring

**Undergraduate students:** Mentoring through Boeing Abhyast Activities, Surge Program and Laboratory activities

1. Gajendra Nagar, (AE), Year of mentoring-2017-18
2. Madhukant, (CSE), Year of mentoring-2017-18
3. Saurabh Ranjan, (ME), Year of mentoring-2017-18
4. Tushar Gupta (CSE), Year of mentoring-2017-18



5. Akash Jain, (AE), Year of mentoring-2017-18
6. Harshvardhan, (EE), Year of mentoring-2017-18
7. Manish Kumar, (AE), Year of mentoring-2017-18
8. Rithwik Patibandla, (EE), Year of mentoring-2017-18
9. Mayank Mittal,(EE), Year of mentoring-2016-17
10. Vikulp Bansal,(EE), Year of mentoring-2016-17
11. Ritwik Bera (ME), Year of mentoring-2016-17
12. Tushar Agarwal (ME), Year of mentoring-2016-17
13. Divyanshu Narayan (ME), Year of mentoring-2015-16
14. Dipendra (ME), Year of mentoring-2015-16
15. Elle Atma Vidya Prakash (EE), Year of Mentoring 2013-15
16. Preksha Gupta (AE), Year of mentoring 2013-15.
17. Sanny Kumar (ME), Year of mentoring 2013-14.
18. Rahul Gurjar (CS), Year of mentoring 2013-14.
19. Shehzad Hathi (EE), Year of mentoring 2013-14.
20. Shivam Aggarwal (ME), Year of mentoring 2013-14.
21. Nitish Kumar (EE), Year of mentoring 2013-14.
22. Sidhant Khatri (EE), Year of mentoring 2013-14.
23. Dhruval Shah (ME), Year of mentoring 2012-14.
24. Deepali Mittal (AE), Year of mentoring 2012-14.
25. Harshad Sawhney (CSE), Year of mentoring 2012-14.
26. Vineet Garg(ME), Year of mentoring 2012-14.
27. Abhijeet Verma(EE),Year of mentoring 2011-12.
28. Ajinkya Kumar Jain (ME), Year of mentoring 2011-12.
29. Anuj(ME), Year of mentoring 2011-12.
30. Ajaypal Singh(ME), Year of mentoring 2010-12.
31. Anubhav (ME), Year of mentoring 2011-12.
32. Farid Ahsan, Year of mentoring 2011-12.
33. Mudit, Year of mentoring 2011-12.
34. Omanshu Thapliyal, Year of mentoring 2011-12.
35. Sachin Aggarwal, Year of mentoring 2011-12.
36. G. Sriram, Year of mentoring 2011-12.
37. Varun Bhatt, Year of mentoring 2011-12.
38. Ayush Varshney, Year of mentoring 2011-12.
39. Govind Saria, Year of mentoring 2011-12.
40. Naman Kumar, Year of mentoring 2011-12.
41. Rajat Arora, Year of mentoring 2011-12.
42. Siddharth, Year of mentoring 2011-12.
43. Subhojit Ghosh, Year of mentoring 2011-12.
44. Vipul Chaudhury, Year of mentoring 2011-12.
45. Mayank Baranwal, Year of mentoring 2009-11.
46. Faez Ahmed,Year of mentoring 2009-11.
47. Abhilash Jindal, Year of mentoring 2009-11.
48. Ankur Jain, Year of mentoring 2009-11.
49. Pranay Sharma, Year of mentoring 2010-11.
50. Sagar Setu, Year of mentoring 2010-11.
51. Ankur Agarwal, Year of mentoring 2010-11.
52. Ashish Bajpai, Year of mentoring 2010-11.
53. Mohit, Year of mentoring 2010-11.
54. Kamal Sahni, Year of mentoring 2010-11.
55. Tarun Baranwal, Year of mentoring 2010-11.
56. Anki Gupta, Year of mentoring 2010-11.
57. Kartikey Asthana, Year of mentoring 2010-11.
58. Akshay Mittal, Year of mentoring 2010-11.
59. Subhranshu Baranwal, Year of mentoring 2010-11.
60. Gaurav Dhama, Year of mentoring 2009-10.
61. Shishir Pandya, Year of mentoring 2009-10.
62. Palash Soni, Year of mentoring 2009-10.

**Masters Students (Completed)**

<i>Sl No.</i>	<i>Name</i>	<i>Thesis Title</i>	<i>Programme</i>	<i>Completion Year</i>	<i>Co-Supervisor (s)</i>
1	Kuldeep Yadav	Fabrication of micro-fluidic based platform for Dielectrophoresis (DEP) assisted capture of pathogenic bacteria on a printed circuit board	M.Tech.	2017	None
2	Ashutosh Rai	Enhancement in photo-catalytic activity of Zinc Oxide nanorods through coating of metals	M. Tech.	2017	None
3	Ankit Belchandani	Design intervention for developing a low cost dental loupe to increase the effect of visualization of oral cavity in Indian Dental Practices	M. DES.	2016	Satyaki Roy
4	Haripada Soren	Development of Water Purifier by using Red Mud	M.DES.	2016	None
5	Pradeep Verma	Application of smart parking in development of smart cities in India	M.DES.	2016	None
6	Sachin N.P.	Designing and prototyping of efficient writing tools for the visually impaired	M.DES.	2016	None
7	Aditya Singh Bhisht	Design and fabrication of a rapid Styrofoam prototyping machine.	M.DES.	2016	None
8	Shweta Gautam	Designing of a Photocatalytic Filter for Remediation of industrial waste water	M.DES.	2016	None
9	Mohit Tewari	Making Dental Facility Accessible to Mass Population In India : Designing a Low Cost Dental Chair for India	M.DES.	2015	Deepu Philip
10	Charu	Design for Disability- Indoor Navigation for visually challenged	M.DES.	2015	Jhumkee Sengupta Iyer
11	Himanshu Singh	Size reduction of nano-particles through micromixing with etchants in a micro-channel	M.Tech.	2015	Niraj Sinha

12	Eshan Sadasivan	Design and development of newspaper carry bag making machine	M.DES.	2015	Mainak Das
13	Jayant Raj Saurav	Solar light based degradation of organic pollutants by ZnO nanostructures for water filtration system	M Tech	2015	Niraj Sinha
14	Sushant Singh,	A novel solenoidal valve for embedded microfluidics application	M Tech	2014	None
15	Anurag Govind Meher	Velocity measurement technique of shock waves generated through combustion of nano-energetic composites through schlieren imaging	M Tech	2015	None
16	Abhinav Srivastava	Development of Nano-Porous Palladium film for enhanced hydrogen sensing	M. Tech.	2013	None
17	Deepak Arya	Design and fabrication of an electronic thermo-cycler with microfluidic cooling capabilities for performing quantitative Polymerase Chain Reaction	M. Tech.	2013	Prabhat Munshi
18	Kislay Kaushal	NanoPatterning Approaches, Zinc Oxide Nano Structures Synthesis and their Application to ds DNA Surface Electrophoresis	M. Tech.	2013	None
19	Akshay Pravin Atwe	Design and Fabrication of a Microvalve Based on pH Sensitive Hydrogel	M. Tech.	2012	Ishan Sharma
20	Manoj Kumar Gupta	Microfabrication of Metallic Cantilever Structures and Investigation of their Mechanical behavior at Microscopic Length Scale.	M. Tech.	2012	Sumit Basu
21	Avinash Kumar	Optimization of Machining Processes for preparation of Photomasks a	M. Tech.	2012	None

22	Suresh, E	Design Optimization of a Novel Solenoid Micro Valve	M. Tech.	2011	None
23	Arnab Ghosh	Surface Electrophoresis of dsDNA across Orthogonal Surfaces	M.Tech.	2010	None
24	Rahul Choudhary	Bilayer Staggered Herringbone Micro-mixers	M.Tech.	2009	Sounak Kumar Choudhury
25	Suresh Jha	Design, fabrication and testing of a novel peristaltic micro-pumping system.	M.Tech.	2009	None
26	Anil Ghubade	Dielectrophoresis assisted concentration of micro-particles and their rapid quantitation based on optical means.	M. Tech.	2009	None
27	Gajendra Raikwar	Intervention of Industrial Design in agricultural farm equipments; a new design for farming practices in small landholdings	M.Des.	2018	None
28	Shashank Chaudury	Design and development of a system of stacking surgical blades	M.Des.	2020	None
29	Anutosh Nimesh	Development of ECM process on vert. surfaces	M.Tech (report opt)	2020	None

### PhD Supervision

#### Ph.D. (completed/ submitted) Students:

Sl. No.	Name	Thesis Title	Completion Year	Co-Supervisor	Status
1	Kapil Manoharan	Surface Nano-engineering through Digital manufacturing and Decision-making tools	2021	None	Working as a post doctoral Research staff in TCIP incubated compaby @IITK
2	Pankaj Singh Chauhan	Fabrication of metal oxide semiconducting nanomaterials and composites for gas sensing and water remediation applications	2020	Niraj Sinha	Working as a Post Doctoral Research Associate, Microsystems Fabrication Laboratory, IIT Kanpur
3	Geeta Bhat	Utilization of electro-kinetic forces to develop electronic PCR / Gene-delivery devices	2020	None	Working as a senior scientist in TCIP Pvt. Ltd., Incubated @ SIIC IIT Kanpur
4	Poonam Sundriyal	Fabrication of nano-scale	2019	None	Working as a senior

		<i>materials and surfaces for energy storage and adhesion improvement applications</i>			<i>scientist in TCIP Pvt. Ltd., Incubated @ SIIC IIT Kanpur</i>
5	<i>Mukta Ramchandani</i>	<i>Embodied Cognition: Research directions in persuasion, consumer behavior and retailing</i>	2019	None	<i>Working as Visiting Lecturer, Skema Business School, Nice France</i>
6	<i>Aviru Kumar Basu</i>	<i>Design and development of MEMS based sensors for rapid detection of trace analytes</i>	2019	<i>Ashima Pradhan</i>	<i>Working as Post Doctoral Research Associate, National University of Singapore</i>
7	<i>Sanjay Kumar</i>	<i>Design and development of engineered functional materials for point-of-care diagnostics &amp; noise mitigation applications</i>	2019	None	<i>Joined as a Post Doctoral Research Associate, National University of Singapore, 2019.</i>
8	<i>T. Guruprasad</i>	<i>Size effect in mechanical properties of materials at micron scale</i>	2018	<i>Sumit Basu</i>	<i>Working as Post Doctoral Research Associate, Khalifa University, Abu Dhabi</i>
9	<i>Ankur Gupta</i>	<i>Fabrication, Characterization and Application of Various Nanostructures in Sensing and Remediation</i>	2015	None	<i>Joined as Assistant Professor at the Department of Mechanical Engg, Indian Institute of Technology Bhubaneswar, 2016.</i>
10	<i>Vinay Kumar Patel</i>	<i>Nanofabrication and Combustion Characterization of Highly Energetic Metal Oxides/Nano-Aluminum Composites for Pyrotechnics and Gene Transfection Applications</i>	2015	None	<i>Joined as Associate Professor at G.B. Pant Engineering College, Pauri, 2015</i>

11	Rishi Kant	Miniaturized fluid/ particle manipulation in hybrid micro-devices fabricated with laser micromachining for fluid delivery, mixing and diagnostic applications.	2016	None	Microsystems Laboratory, IIT Kanpur, India, 2016.
12	Rajeev Kumar Singh	Micro-manufacturing of 2/3 dimensional structures in polymers and impact of fluid structure interplay within them.	2014	None	Joined PSG TECH, Coimbatore in 2014 at Dept. of Mech. Engg. as Assistant Professor
13	Seema Deepak Yardi	A Novel technique for using polymers as optical interconnects and as sensors for biological recognition.	External PhD candidate, 2016	Dr. Dharmender Boolchandani (MNIT, Jaipur)	Assistant Professor in Electronics, Govt. Polytechnique, Aurangabad, 2015
14	Shailendra Singh	A new cognitive design intervention in Knowledge Management through Innovative skill development approach	External PhD, 2021	Dr. S. Venkatramaniah	Senior DVM, Maruti Suzuki India Ltd.

### **Current Ph.D. Students:**

Sl No.	Name	Department	Year of Joining	Co-supervisor (s)
1	Jitendra Singh	ME	2014	None
2	Eshan Sadasivan	Design	2015	Dr. Mainak Das
3	Anubhuti Saha	Design	2015	Dr. Ritwij Bhowmick
4	Neelima Topno	Design	2017	Dr. Shatarupa Roy
5	Shreyansh Tatia	Design	2017	None
6	Sanjeet Kumar	Design	2018	None
7	Nitish Katiyar	ME	2018	None
8	Sagnik Sarmachaudhury	ME	2018	None
9	Kirtiman Singh	Design	2019	None
10	Hemant Kumar	ME	2022	None
11				
12	Ranmoy Saha	ME	2022	None

### **Knowledge Dissemination**

NPTEL (or similar) courses

### **Online Video Lectures:**

- (1) Shantanu Bhattacharya, NPTEL Lectures on Bio-MEMS and Microsystems, NPTEL, IIT Kanpur (Completed, Jan.-2011).
- (2) Shantanu Bhattacharya, NPTEL Lectures on Microsystems Fabrication by using Advanced Manufacturing processes, (Completed, Jun-2014) .

- (3) Shantanu Bhattacharya, NPTEL MOOCS, Bio-MEMS and Micro-fluidics, (NPTEL, IIT Kanpur (Completed, March-2015).
- (4) Shantanu Bhattacharya, NPTEL MOOCS, Manufacturing Systems Technology (Part-I), NPTEL, IIT Kanpur, (Completed, Sept.-2015). (Offered on regular basis once a semester)
- (5) Shantanu Bhattacharya, NPTEL MOOCS, Manufacturing Systems Technology (Part-II), NPTEL, IIT Kanpur (Completed, Oct.-2015) (Offered on regular basis once a semester)
- (6) Shantanu Bhattacharya, NPTEL MOOCS, Manufacturing process Technology (Part-I), NPTEL, IIT Kanpur (Completed, March-2016) (Offered on regular basis once a semester)
- (7) Shantanu Bhattacharya, NPTEL MOOCS, Manufacturing process Technology (Part-II), NPTEL, IIT Kanpur (Completed, September-2016) (Offered on regular basis once a semester)
- (8) Shantanu Bhattacharya, NPTEL MOOCS, Design Practice (Part-I), NPTEL, IIT Kanpur (Completed, Mar. 2018).
- (9) Shantanu Bhattacharya, NPTEL MOOCS, Design Practice (Part-II), NPTEL, IIT Kanpur (To be Completed, Sept. 2018).

#### **Review Articles:**

1. **Bhattacharya, Shantanu**, Jaesung Jang, Liju Yang, Demir Akin, and Rashid Bashir. "BioMEMS and nanotechnology-based approaches for rapid detection of biological entities." *Journal of Rapid Methods & Automation in Microbiology* 15, no. 1 (2007): 1-32.
2. **Bhattacharya, Shantanu**, Rajeev Kr Singh, Swarnasri Mandal, Arnab Ghosh, Sangho Bok, Venumadhav Korampally, Keshab Gangopadhyay, and Shubhra Gangopadhyay. "Plasma modification of polymer surfaces and their utility in building biomedical microdevices." *Journal of Adhesion Science and Technology* 24, no. 15-16 (2010): 2707-2739.
3. V.K. Patel, Deepak Singh, Ankur Gupta, Rishi Kant and **Shantanu Bhattacharya**, ||Surface functionalization to mitigate fouling of biodevices: A critical review, ||*Reviews of Adhesion and Adhesives*, 3 (4), 2015.
4. Ankur Gupta, Deepak Singh, **Shantanu Bhattacharya**, —Surface modification strategies for nanobiodevices||, *Reviews of Adhesion and Adhesives*, 4(2), 166-191, 2016, DOI: 10.7569/RAA.2016.097307.
5. Kumar, Sanjay, Pulak Bhushan, and **Shantanu Bhattacharya**. "The 4 I's of Innovation." In *Innovation, Incubation and Entrepreneurship*, pp. 31-42. Springer, Singapore, 2017.
6. Kapil Manoharan, Shantanu Bhattacharya, —Super-hydrophobic Surfaces Review: Functional Application, Fabrication Techniques and Limitations, || *Journal of Micro-manufacturing* 2.1 (2019): 59- 78.
7. Sanjay Kumar, Pulak Bhushan, Shantanu Bhattacharya, —Additive Manufacturing as an Emerging Technology for Fabrication of Microelectromechanical Systems (MEMS): A Review||, *Journal of Micromanufacturing*, 2.2 (2019): 175-197.
8. Bhatt, Geeta and Shantanu Bhattacharya, —Biosensors on chip: A critical review from an aspect of micro/nano-scales||, *Journal of Micromanufacturing*, 2.2 (2019): 198-219..
9. Basu, Aviru Kumar and Shantanu Bhattacharya. "Micro/Nano Fabricated Cantilever Based Biosensor Platform: A review and recent progress." *Enzyme and Microbial Technology* (2020): 109558.

10. Chauhan, Pankaj Singh and Shantanu Bhattachary "Hydrogen gas sensing methods, materials, and approach to achieve parts per billion level detection: A review." International Journal of Hydrogen Energy 44.47 (2019): 26076-26099.
11. Sundriyal, Poonam and Shantanu Bhattacharya "Plasma-assisted surface alteration of industrial polymers for improved adhesive bonding." International Journal of Adhesion and Adhesives (2020): 102626.
12. Tatiya Shreyansh et. al., —Nanoparticles containing boron and its compounds: synthesis and applications - A review, Journal of Micro-manufacturing, In Press, 2020.

### **Outreach activities:**

- Published a large number of high quality research papers in distinguished international society journals.
- Conducted a large number of conferences training many students, industry personnel and engineering college faculty and , viz.,
  1. Golden Jubilee International Conference on Environmental Health and Technology, March, 2010. Co-Founder.
  2. Organized a 10 days training workshop at CEERI Pilani for fabrication of MEMS polysilicon Piezo-resistive pressure sensors, July-2010. Founder
  3. National Workshop on MEMS technologies and its applications, IIT Kanpur, Sept.-2009, Founder.
  4. Golden Jubilee International Symposium on Fabrication at Small Scales (FASS) and (e)Indo-US conf. on Fabronics: Science of adv. fabrication, Dec.-2009. Co-Founder
  5. International workshop on futuristic shaping technologies at the Meso, Micro and Nano-scales"October-2007. Co-Founder
  6. QIP programs on CNC (Computer Numeric Control) technology, 5-9th, October 2013, 15-19th, March 2014, 20-22nd, July, 2014 etc.
  7. Organizing the Boeing Engineering Innovations Award workshop (BEIA) for the National Aero-modeling Contest sponsored by Boeing, 30th Nov- 01st Dec, 2013. Founder
  8. Organized the "Advanced Micro/ Nano Technology-2016" TEQUIP workshop at IIT Kanpur. Founder.
- Invited speaker in more than 63 national and international forums (14 international) in areas related to Biomedical Micro-devices, Manufacturing of MEMS sensors, Micro-fluidic MEMS, Nano-structured Gas sensors, Nanotechnology for Clinical Diagnostics, Nano-energetic materials, Water remediation through photo-catalysis CNC machining, Reverse engineering, Quality, Lean Manufacturing, Conventional and Non-conventional machining processes, etc.
- Have completed more than 08 NPTEL courses in subjects related to BioMEMS and Microsystems, Advanced Manufacturing Techniques, Manufacturing process technology, Manufacturing systems technology etc.
  - Associate Editor of "The nanotechnology and nanoscience", 2011.
  - Appointed as Associate Editor of "Journal of Micromanufacturing". 2019.
  - Boeing Outstanding Leadership certificate, 2009-2010, Boeing Corp. USA.
  - Represented the Design Program in Stanford University for the Global Kickoff Event of ME310 course (2014).
  - Nominated as a member of a review panel by the Indo-German Science and Technology Council for reviewing proposals related to water sensing and remediation. (2015).
  - Nominated as Task Force Member of Water Treatment Initiative of Department of Science and Technology (2019).



- Nominated as member of the PAN IIT Team for planning of the setting up of MEGA Lab initiative for detection of COVID-19.
- Currently also directing the channel 11 for Mechanical Engineering in Swayamprabha from IIT Kanpur

## Development

### List development / demonstration of technologies, products:

Professor Shantanu Bhattacharya has done significant and innovative research related to design and development of functional materials and their fabrication processes (at different length scales). His major contributions are as follows:

(i) Functional materials in Healthcare: He has contributed to sensor design and development [1,2,3,4,5,6] with a focus to fundamental science based research in functional materials for bio-detection and diagnostics. He has recently developed a set of unique nanostructured Graphene oxide, gold and CNT composites through which colorimetric detection of blood analytes like Uric acid [7], Peroxides and Glucose [8], Cholesterol on cantilevers [9], etc. and also diseases like dengue [10] can be carried out through paper micro fluidic approaches. He has developed a tapered paper micro- fluidic kit which can perform early detection of the Dengue antigen and can help in restoring supporting therapy early on to patients. He has incubated a startup funded through the BIG, BIRAC scheme for commercializing this technology following the successful field trials and plans to bring this chip to the market by December 2020.

(ii) Functional materials in water remediation: He has carried out extensive fundamental research in development of nanostructured semiconductor materials [11,12,13,14,15,16] with ability to photo-catalyze textile dyes from industrial effluents using visible wavelengths. He has demonstrated this technology on a pilot scale filtration unit with 10 kilo-liter per day capacity at the Combined Effluent Treatment plant (CETP), Jodhpur that produces an output commensurate with the Inland Water Discharge standards. Studies carried out by him in this domain have been utilized in framing the regional environmental policy of compulsory pretreatment plants at the basic industry level as ordered by the state pollution control board and the National Green Tribunal jointly. (Attached certificate from industrial partner in page 32)

(iii) Functional materials for aerospace applications: The nominee has carried out extensive fundamental research in the area of functional structures which can serve as Acoustic meta-materials. These newly designed micro-structures developed by the nominee through an unique 3-D printing process show one of the best attenuation levels so far (upto 56 dB) of low frequency acoustic emissions [17,18,19,20,21] and the physics of these structures relate to multiple frequency bands with negative mass density or bulk modulus. He has transferred this technology to Boeing where such structures will be used in cabin and engine spaces for passive noise damping. Several international patents have been jointly filed by Professor Bhattacharya and Boeing Corporation for these structured materials and their development process through 3-D printing techniques. (Attached certificate in page 33)

(iv) Functional energetic materials: He has contributed significantly in the development of nano-energetic composite materials [22,23,24,25,26,27,28], structural customization of these materials to generate pulse power, ignition sensitivity, patterning capability [29] etc. He has developed a protein based nano-assembly process where the functional energetic composites yield a microsecond level pulse of 65 MPa pressure [22]. The composites are currently utilized for preparing a de-icing tape for aircraft wings by Boeing. (Attached certificate in page 34)

(v) Development of micro/ nano sensors and actuators, printing processes for sensors and charge storage devices: He has developed nano-structured sensing materials and fabrication processes for sensitive detection of helium, hydrogen and nitrogen gases within inflatable antenna systems and also for lab level cryogenics.[In collaboration with ISRO] In this work he has developed sensors with one dimensional nanostructures like Vanadium Pentoxide [30], Zinc Oxide [31], Porous Palladium [32], Ferrous Oxide-GO composites [33] etc. He has also pioneered many projects development of MEMS sensors and actuators [34] for a variety of flow-control and micro/nanoparticle alignment

applications[35,36,37,38,39] as well as functional GO–MnO<sub>2</sub> composite inks for for high speed inkjet printing of charge storage systems and sensors [40,41,42]

#### References:

- (1) Geeta Bhatt, Keerti Mishra, Gurunath Ramanathan, and Shantanu Bhattacharya, "Dielectrophoresis assisted impedance spectroscopy for detection of gold-conjugated amplified DNA samples." *Sensors and Actuators-B Chemical*, Vol. 288, 442-453, 2019. (Impact Factor=5.667)
- (2) Nayak, Monalisha, Deepak Singh, Himanshu Singh, Rishi Kant, Ankur Gupta, Shashank Shekhar Pandey, Swarnasri Mandal, Gurunath Ramanathan, and Shantanu Bhattacharya. "Integrated sorting, concentration and real time PCR based detection system for sensitive detection of microorganisms." *Scientific reports* 3: 3266, 2013. (Impact Factor=4.122, Cited 15 times)
- (3) Shantanu Bhattacharya, Venumadhav Korampally, Shubhra Gangopadhyay, Keshab Gangopadhyay, Keshab Gangopadhyay, Sheila A. Grant, Steven B. Kleiboeker, Yuanfang Gao. "Reusable PCR amplification system and method", US Patent no. 8173077, Granted 5/8/2012.
- (4) Shantanu Bhattacharya, Shubhra Gangopadhyay, Keshab Gangopadhyay, Keshab Gangopadhyay, Nripen Chanda, Paul Sharp, "Agarose Nanoplatinum Composites", US Patent no.8747637, Granted 10/06/2014.
- (5) Shantanu Bhattacharya, Gurunath Ramanathan, Monalisa Nayak, Deepak Singh, Rishi Kant. "An integrated microchip for the detection of a Biological Cell", *Indian Patent Journal* No. 28/2016, Granted 08/07/2016.
- (6) Shantanu Bhattacharya, Avinash Kumar Agarwal, Nripen Chanda, Ashok Pandey, and Ashis Kumar Sen, (Eds.) "Environmental, Chemical and Medical Sensors", ISBN9789811077500 Springer, Book Published on 23 January 2018.
- (7) Sanjay Kumar, Pulak Bhushan and Shantanu Bhattacharya, "Design and fabrication of paper based device for colorimetric detection of uric acid using gold nanoparticles–graphene oxide (AuNPs-GO) conjugates", *Analytical Methods*, DOI: 10.1039/c6ay01926a, 2016. (Impact Factor=2.073, Cited 11 times)
- (8) Sanjay Kumar, Pulak Bhushan, Shantanu Bhattacharya, "Facile Synthesis of Au@Ag-Hemin Decorated Reduced Graphene Oxide Sheets: A Novel Peroxidase Mimetic for Ultrasensitive Colorimetric Detection of Hydrogen peroxide and glucose", *RSC advances*, 7, 37568, 2017. (Impact Factor=3.096, Cited 9 times)
- (9) Aviru Basu, A Sah, A Pradhan and Shantanu Bhattacharya, "Poly-L-Lysine functionalised MWCNT-rGO nanosheets based 3-d hybrid structure for femtomolar level cholesterol detection using cantilever based sensing platform, *Scientific Reports* 9(1), 3686, 2019. (Impact Factor=4.122)
- (10) Sanjay Kumar, Pulak Bhushan and Shantanu Bhattacharya, "Tapered lateral flow devices for ultrasensitive colorimetric detection of dengue NS1", *Biomicrofluidics*, 12, 034104 (2018); doi: 10.1063/1.5035113. (Impact Factor=2.571)
- (11) Ankur Gupta, Shantanu Bhattacharya, "A process for production of high surface area nano-metal oxides", *Indian Patent Journal* No. 34/2015, Granted on 21/08/2015.
- (12) Ankur Gupta, Kunal Mondal, Ashutosh Sharma, Shantanu Bhattacharya, "Superhydrophobic Polymethylsiloxane pinned one dimensional ZnO nanostructures for water remediation through photo-catalysis", *RSC Adv.*, 5, 45897, 2015. (Impact Factor=3.096, Cited 17 times)
- (13) Ankur Gupta, Jayant Raj Saurav, Shantanu Bhattacharya, "Solar light based degradation of organic pollutants using ZnO nanobrushes for water filtration", *RSC Adv.*, 5, 71472, 2015. (Impact Factor=3.096, Cited 18 times)
- (14) Pankaj Singh Chauhan, Ashutosh Rai, Ankur Gupta, Shantanu Bhattacharya, "Enhanced Photocatalytic performance of vertically grown ZnO nanorods with doping of noble metal (Al, Ag, Au, and Au-Pd) nanoparticles for degradation of industrial dye", *Material Research Express*, Vol. 4(5), 055004, 2017. (Impact Factor=1.151, Cited 5 times)
- (15) Pankaj Singh Chauhan, Rishi Kant, Ashutosh Rai, Ankur Gupta, Shantanu Bhattacharya, "Facile synthesis of ZnO/GO nano flowers over Si substrate for improved photocatalytic

- decolorization of MB dye and industrial wastewater under solar irradiation”, *Material Science in Semiconductor Processing* 89, 6–17, 2019. (Impact Factor=2.593)
- (16) Shantanu Bhattacharya, Akhilen Bhushan Gupta, Ankur Gupta, and Ashok Pandey (Eds.). “Water Remediation”. Springer, ISBN9789811075506, Book Published on 23 January 2018.
- (17) Sanjay Kumar, Pulak Bhushan, Om Prakash, Shantanu Bhattacharya, “Double negative acoustic metastructure for attenuation of acoustic emissions”, *Applied Physics Letters*, 112, 101905, 2018; <https://doi.org/10.1063/1.5022602>. (Impact Factor=3.495)
- (18) Sanjay Kumar, Pulak Bhushan, Om Prakash, Shantanu Bhattacharya, “Acoustic meta-material and manufacturing process”, US Patent application no. 15/719854, filed by Boeing on 29<sup>th</sup> September, 2017.
- (19) Sanjay Kumar, Pulak Bhushan, Om Prakash, Shantanu Bhattacharya, “Embedded wheel and spokes acoustic metastructures with perfect sound absorption capacity”, US Patent application no. 18/800312 filed by Boeing on 18<sup>th</sup> January, 2019.
- (20) Sanjay Kumar, Pulak Bhushan and Shantanu Bhattacharya, “Ultrathin Ashoka Chakra like acoustic metastructure as a sound absorber”, *The Journal of the Acoustical Society of America* 143, 1714, 2018.
- (21) Shantanu Bhattacharya, Avinash Kumar Aggarwal, Om Prakash, Sanjay Kumar (Eds): “Acoustic Meta-materials for Aerospace applications”, Springer, Ongoing book assignment, 2019.
- (22) Vinay Kumar Patel, Shantanu Bhattacharya, “High-Performance Nanothermite Composites Based on Aloe-Vera-Directed CuO Nanorods”, *ACS Applied Materials and Interfaces*, 5 (24), 13364-13374, 2014. (Impact Factor=8.096, Cited 39 times)
- (23) Vinay Kumar Patel, Jayant Raj Saurav, Keshab Gangopadhyay, Shubhra Gangopadhyay, Shantanu Bhattacharya, “Combustion Characterization and Modeling of Novel Nanoenergetic Composites of Co<sub>3</sub>O<sub>4</sub>/nAl”, *RSC Adv.*, 2015, 5, 21471-21479, DOI: 10.1039/C4RA14751K. . (Impact Factor=3.096, Cited 24 times)
- (24) Vinay Kumar Patel, Anurup Ganguli, Rishi Kanta, Shantanu Bhattacharya, “Micro-patterning of Nano-energetic Films of Bi<sub>2</sub>O<sub>3</sub>/Al for Pyrotechnics”, *RSC Adv.*, 2015, 5, 14967-14973, DOI: 10.1039/C4RA15476B. (Impact Factor=3.096, Cited 19 times)
- (25) Rishi Kant, Vinay Kr. Patel. Madhusudan Painully and Shantanu Bhattacharya, “Performance Characterization of Bi<sub>2</sub>O<sub>3</sub>/Al Nanoenergetics Blasted Micro-forming System”, *Defense Technologies*, doi: 10.1016/j.dt.2018.07.005, 2018.
- (26) Vinay Kumar Patel, and Shantanu Bhattacharya. "Solid state green synthesis and catalytic activity of CuO nanorods in thermal decomposition of potassium periodate." *Materials Research Express* 4(9), 095012, 2017. (Impact Factor=1.151, Cited 2 times)
- (27) Rishi Kant, Geeta Bhatt, Vinay Patel, Anurup Ganguli, Deepak Singh, Monalisha Nayak, Keerti Mishra, Ankur Gupta, Keshab Gangopadhyay, Shubhra Gangopadhyay, Gurunath Ramanathan, and Shantanu Bhattacharya. “Synchronized electro-mechanical shock wave induced bacterial transformation.” In Press, *ACS Omega*, 2019.
- (28) Shantanu Bhattacharya, Avinash Kumar Agarwal, T. Rajgopalan, Vinay Kumar Patel (Eds.) “Nanoenergetic Materials”, ISBN 978-981-13-3289-0, Springer, Book published on 19/12/2018.
- (29) Shubhra Gangopadhyay, Steven Apperson, Keshab Gangopadhyay, Andrey Bezmelnitsyn, Rajagopalan Thiruvengadathan, Michael Kraus, Rajesh Shende, Maruf Hossain, Senthil Subramanian, Shantanu Bhattacharya, Yuangang Gao, “Shock wave and power generation using onchip nanoenergetic materials”, US patent no. WO 2007/054543, Granted on 30/04/2009.
- (30) Pankaj Singh Chauhan, Shantanu Bhattacharya, “Highly sensitive V<sub>2</sub>O<sub>5</sub>•1.6H<sub>2</sub>O nanostructures for sensing of helium gas at room temperature”, *Materials Letters*, <https://doi.org/10.1016/j.matlet.2018.01.056>, 2018. (Impact Factor=2.687, Cited 4 times)
- (31) Ankur Gupta, Shashank Shekhar Pandey, Monalisha Nayak, Arnab Maity, Subhashish Basu Majumder, Shantanu Bhattacharya, “Hydrogen sensing based on nanoporous silica-embedded ultra-dense ZnO nanobundles”, *RSC Adv.*, 4 (15), 7476 – 7482, 2014. . (Impact Factor=3.096, Cited 19 times)

- (32) Ankur Gupta, Abhinav Srivastava, Cherian Joseph Mathai, Keshab Gangopadhyay, Shubhra Gangopadhyay, Shantanu Bhattacharya, "Nanoporous Palladium sensor for sensitive and rapid detection of Hydrogen", *Sensor letters*, 12, 1279-1285, 2014.
- (33) Aviru Basu, Pankaj S. Chauhan, Mohit Awasthi, Shantanu Bhattacharya, "α-Fe<sub>2</sub>O<sub>3</sub> loaded rGO nanosheets based fast response/recovery CO Gas sensor at Room Temperature", *Applied Surface Science*, DOI: 10.1016/j.apsusc.2018.09.123, 2019. (Impact Factor=4.439)
- (34) Shantanu Bhattacharya, Avinash Kumar Aggarwal, Shailendra Singh, Om Prakash [Eds.], "Sensors for aerospace and automotive applications", ISBN 978-981-13-3269-2, Springer, Book published on 19/12/2018.
- (35) Rishi Kant, Deepak Singh, and Shantanu Bhattacharya. "Digitally controlled portable micropump for transport of live micro-organisms." *Sensors and Actuators A: Physical* 265, 138-151, 2017. (Impact Factor=2.311)
- (36) Rishi Kant, Himanshu Singh, and Shantanu Bhattacharya. "Nanoscale Etching of Particles in Continuous Flow Reactor." *Journal of Nanoscience and Nanotechnology* 17(8), 5241-5251, 2017. . (Impact Factor=1.351)
- (37) Geeta Bhatt, Rishi Kant, Keerti Mishra, Kuldeep Yadav, Deepak Singh, Ramanathan Gurunath, and Shantanu Bhattacharya. "Impact of surface roughness on Dielectrophoretically assisted concentration of microorganisms over PCB based platforms." *Biomedical microdevices* 19(2),28, 2017. (Impact Factor=2.077)
- (38) Rajeev Kumar Singh, Rishi Kant, Sushant Singh, E. Suresh, Ankur Gupta, and Shantanu Bhattacharya, "A novel helical micro-valve for embedded micro-fluidic applications." *Microfluidics and Nanofluidics* 19(1), 19-29, 2015. (Impact Factor=2.384, Cited by 4 )
- (39) Rajeev Kumar Singh, Avinash Kumar, Rishi Kant, Ankur Gupta, E. Suresh, and Shantanu Bhattacharya, "Design and fabrication of 3-dimensional helical structures in polydimethylsiloxane for flow control applications." *Microsystem technologies* 20(1), 101-111, 2014.
- (40) Poonam Sundriyal, Shantanu Bhattacharya, "Inkjet printed graphene/ MnO<sub>2</sub> super-capacitors on flexible substrates", *ACS applied materials and interfaces*, 9(44), 38507–38521, DOI: 10.1021/acsami.7b11262, 2017. (Impact Factor=8.096, Cited 19 times)
- (41) Poonam Sundriyal, Shantanu Bhattacharya, "Scalable Micro-fabrication of Flexible, Solid-state, Inexpensive and High-Performance Planar Micro-supercapacitors through Inkjet Printing Method" *ACS Applied Energy Materials*, DOI: 10.1021/acsaem.8b02006, 2019.
- (42) Sundriyal, Poonam, and Shantanu Bhattacharya. "Polyaniline silver nanoparticle coffee waste extracted porous graphene oxide nanocomposite structures as novel electrode material for rechargeable batteries." *Materials Research Express* 4(3), 035501, 2017. (Impact Factor=1.151)

Prof. Bhattacharya's international journal papers in different areas mentioned above are:

S.No.	Area	Journal Paper Reference Nos. (from Section 16d)	Patents Reference Nos. (from Section 18(a))
1	Biochips and Biodiagnostics	11, 12, 16,18, 21, 25, 40 , 43 , 45, 47,62, 66, 68, 69, 70, 71, 72, 73, 75, 76, 77, 79,	1, 13, 15
2	Micro/Nano fabrication	2,3,4,9, 20, 28, 34, 38, 42, 43, 46, 47, 48, 50, 59, 51, 63, 64, 67, 68, 80, 82	7.8
3	Nanoenergetics	14, 27,30, 53, 55, 61, 78, 81	14
4	Charge Storage Devices	10, 32, 39, 58, 74	
5	Optical Micro-Devices	13, 41, 63	
6	Acoustic Metamaterials	6, 26, 29	5,6
7	Microfluidics	33,35, 36, 40, 45, 50, 57, 59, 64, 65, 66, 67, 69, 70, 71	11
8	Sensors	1, 22, 23, 24,31, 44, 46, 56, 60	9
9	Water Remediation	8, 37, 49, 52, 54	9
10	3-D printing processes and materials	5,7,15	
11	New Product Design and Knowledge management	17,19	2,3,4,10,12

**List of Publication with Cross-continental collaborations:**

1. Gupta, Ankur, Shubhra Gangopadhyay, Keshab Gangopadhyay, and Shantanu Bhattacharya. "Palladium-functionalized nanostructured platforms for enhanced hydrogen sensing." *Nanomaterials and Nanotechnology* 6 (2016): 40.
2. Patel, Vinay Kumar, Jayant Raj Saurav, Keshab Gangopadhyay, Shubhra Gangopadhyay, and Shantanu Bhattacharya. "Combustion characterization and modeling of novel nanoenergetic composites of Co<sub>3</sub>O<sub>4</sub>/nAl." *RSC Advances* 5, no. 28 (2015): 21471-21479.
3. Gupta, Ankur, Abhinav Srivastava, Cherian Joseph Mathai, Keshab Gangopadhyay, Shubhra Gangopadhyay, and Shantanu Bhattacharya. "Nano porous palladium sensor for sensitive and rapid detection of hydrogen." *Sensor Letters* 12, no. 8 (2014): 1279-1285.

4. Bhattacharya, Shantanu, Rajeev Kr Singh, Swarnasri Mandal, Arnab Ghosh, Sangho Bok, Venumadhav Korampally, Keshab Gangopadhyay, and Shubhra Gangopadhyay. "Plasma modification of polymer surfaces and their utility in building biomedical microdevices." *Journal of Adhesion Science and Technology* 24, no. 15- 16 (2010): 2707-2739.
5. Koo, Ok Kyung, YiShao Liu, Salamat Shuaib, Shantanu Bhattacharya, Michael R. Ladisch, Rashid Bashir, and Arun K. Bhunia. "Targeted capture of pathogenic bacteria using a mammalian cell receptor coupled with dielectrophoresis on a biochip." *Analytical chemistry* 81, no. 8 (2009): 3094-3101.
6. Gao, Yuanfang, Shantanu Bhattacharya, Xiaohui Chen, Syed Barizuddin, Shubhra Gangopadhyay, and Kevin D. Gillis. "A microfluidic cell trap device for automated measurement of quantal catecholamine release from cells." *Lab on a Chip* 9, no. 23 (2009): 3442-3446.
7. Bhattacharya, Shantanu, Nripen Chanda, Yi-Shao Liu, Sheila A. Grant, Keshab Gangopadhyay, Paul R. Sharp, Rashid Bashir, and Shubhra Gangopadhyay. "Enhanced DNA Separation Rates in Nano-Platinum Doped Agarose." *Journal of Bionanoscience* 2, no. 2 (2008): 67-74.
8. Bhattacharya, Shantanu, Deb Gangopadhyay, Nripen Chanda, Sheila A. Grant, Yishao Liu, Paul R. Sharp, Rashid Bashir, Keshab Gangopadhyay, and Shubhra Gangopadhyay. "Low Voltage Capillary Electrophoresis Using High Conductivity Agarose Nano-Platinum Composites." *Sensor Letters* 6, no. 5 (2008): 778-783.
9. Bok, Sangho, Arnold A. Lubguban, Yuanfang Gao, Shantanu Bhattacharya, Venu Korampally, Maruf Hossain, Rajagopalan Thiruvengadathan, Kevin D. Gillis, and Shubhra Gangopadhyay. "Electrochemical properties of carbon nanoparticles entrapped in a silica matrix." *Journal of the Electrochemical Society* 155, no. 5 (2008): K91-K95.
10. Liu, Yi-Shao, Padmapriya P. Banada, Shantanu Bhattacharya, Arun K. Bhunia, and Rashid Bashir. "Electrical characterization of DNA molecules in solution using impedance measurements." *Applied Physics Letters* 92, no. 14 (2008): 143902.
11. Bhattacharya, Shantanu, Shuaib Salamat, Dallas Morisette, Padmapriya Banada, Demir Akin, Yi-Shao Liu, Arun K. Bhunia, Michael Ladisch, and Rashid Bashir. "PCR-based detection in a micro-fabricated platform." *Lab on a Chip* 8, no. 7 (2008): 1130-1136.
12. Bhattacharya, Shantanu, Yuanfang Gao, Venumadhav Korampally, Maslina T. Othman, Sheila A. Grant, Steven B. Kleiboeker, Keshab Gangopadhyay, and Shubhra Gangopadhyay. "Optimization of design and fabrication processes for realization of a PDMS-SOG-silicon DNA amplification chip." *Journal of microelectromechanical systems* 16, no. 2 (2007): 401-410.

13. Hossain, Maruf, Senthil Subramanian, Shantanu Bhattacharya, Yuanfang Gao, Steve Apperson, Rajesh Shende, Suchi Guha et al. "Crystallization of amorphous silicon by self-propagation of nanoengineered thermite." *Journal of Applied Physics* 101, no. 5 (2007): 054509.
14. Bhattacharya, Shantanu, Jaesung Jang, Liju Yang, Demir Akin, and Rashid Bashir. "BioMEMS and nanotechnology-based approaches for rapid detection of biological entities." *Journal of Rapid Methods & Automation in Microbiology* 15, no. 1 (2007): 1-32.

## Funding

- (1) **Initiation Grant Proposal**, Indian Institute of Technology, Kanpur, "Multiplex assaying of water borne pathogens using a Micro-chip platform", **Funded** (Sep. 2007- Sep. 2008). (Amount: **10,00,000 INR, Equivalent USD \$20,000**). **PI**
- (2) **Department of Biotechnology, Government of India** "Integrated Dielectrophoresis based concentration and real time PCR based identification of food pathogens in a single microchip", **Funded** (August 2008) (Amount: **41,50,000 INR, Equivalent USD \$83,000**). **PI**
- (3) **Proposal Reach Symposium-2008**, Indian Institute of Technology-Kanpur, —Development and validation of a microchip platform based technique to count bacterial, **Funded** (May-2008). (Amount: **5,00,000 INR, Equivalent USD \$10,000**). **PI**
- (4) **CARE 2008 competitively funded proposal**, Office of Dean of Research and Development. Indian Institute of Technology-Kanpur, —Developing a micro-fabrication facility, **Funded** (October-2008). (Amount: **41,00,000 INR, Eq. USD \$82,000**). **PI**
- (5) **EXTENDED CARE 2008 competitively funded proposal**, Office of Dean of Research and Development. Indian Institute of Technology-Kanpur, —Developing a micro-fabrication facility, **Funded** (October-2008). (Amount: **1,50,00,000 INR, Eq. USD \$300,000**). **PI**
- (6) **Boeing Corporation**, competitively funded proposal through the university relations program of Boeing —Design and development of a completely autonomous ground and aerial navigation system, **Funded** (January-2008~ December-2014). (Amount: **1,18,64,946 INR, Eq. USD \$237,299** ). **PI**
- (7) **National Program on Micro and Smart Structures (NPMASS), Government of India** —A novel MEMS based gas-sensor platform for automotive applications, **Funded** (March 2010). (Amount: **44,00,000 INR, Eq. USD \$88,000**). **PI**
- (8) **National Program on Micro and Smart Structures (NPMASS), Government of India**, —Miniaturized polymeric fluidic pumps based on principle of peristalsis, **Funded** (March 2011). (Amount: **52,50,000 INR, Eq. USD \$105,000**). **PI**
- (9) **National Program on Micro and Smart Structures (NPMASS), Government of India**, —MEMS design center at IIT Kanpur, **Funded** (March 2009). (Amount: 3198500 INR, **Eq. USD \$48462**). **PI**
- (10) **Department of Science and technology, Government of India**, —DST unit of Nano-sciences, **Funded** (January 2012). (**Joint proposal of several faculty members**). **Co-PI**
- (11) **Department of Science and Technology, SERB, Government of India** —A novel high efficiency micro-scale gene transfection system using nanoenergetic materials,



- Funded** (August 2012) (Amount **31,00,000INR, Eq. USD \$62,000**). **PI**
- (12) **Department of Biotechnology, Food and Nutrition Security, Government of India.** —Development of Biosensors Using Nano-scale Materials, **Funded** (August 2012) (Amount:**45,00,000 INR, Eq. USD \$ 90,000**). **PI**
- (13) **Sardar patel post graduate institute of dental and medical sciences (SPPGSDMS),** Design and fabrication of a dental chair for rural India. **Funded** (February 2015) (Amount: **5,50,000, INR, Eq. USD \$9000**). **PI**
- (14) **Boeing Corporation, USA,** —Additive Manufacturing of Functionally Engineered Materials. **Funded** (April 2016) (Amount: **59,50,000 INR, Eq. USD 87,500**). **PI**
- (15) **Department of Science and Technology, Water Treatment Initiative,** —Installation of a pilot plant of 10 KLD capacity comprising ZnO-Graphene based sensitive photo catalytic filter for visible light catalysis and carbon nano-mat fiber filter for the treatment of the effluent of CETP, Jodhpur as a replacement of their secondary treatment unit and development of an alternative low cost process for dye adsorption on acid modified soil”, **Funded (Amount: 120,00,000 INR, USD \$ 176470), PI**
- (16) **Indian Space research organization,** —Development of a Gas Sensor to detect leakage of Helium gas from Inflatable Space Structures, **Funded (Amount: 1976000 INR, USD \$29059). PI**
- (17) **Department of Science and Technology, Instrumentation development committee,** "A novel labeled electronic gene identification system using impedance spectroscopy for molecular diagnostics of water and food borne pathogens", **Funded (Amount: 42,00,000 INR, USD \$65625). PI**
- (18) **Department of Science and Technology, Technology Systems Development Platform,** —Inkjet printed electrodes of Graphene oxide- Metal oxide hierarchical nanostructured nanocomposites for improved energy density and power density thin flexible supercapacitors” **Funded (Amount: 40,00,000 INR, USD \$65625).**
- (19) **BIRAC, Department of Biotechnology,** —Lateral Flow Immunoassay based Point-of-Care Diagnostic Device for Ultrasensitive Colorimetric Detection of Dengue — **Funded to TCIP a technology company incubated by PI (Amount: 50,00,000 INR, USD 70,000)**
- (20) **Indian National Academy of Engineering,** —Abdul Kalam Technology Innovation National Fellowship: Disruptive nanotechnology driven innovation for Treatment of Textile Wastewater: Proposal to Scale up existing pilot plant of 10KLD (kilo-liter/day) to real needs of Textile Industry, **(Amount of Fellowship: 19,00,000 INR every Year for 3 year period extendable by two years)**

## Consultancy

1. AUGMENTATION OF WATER SUPPLY OF SAS NAGAR (PHASE V AND VI) FROM KAJAULI HEAD WORKS TO WATER WORKS SAS NAGAR, 20/11/2013-19/12/2013, Amount, INR 224720/-, PI: Pranab Mohapatra, Co\_PI: Shantanu Bhattacharya, Project No.: GMADA /CE /20130264
2. FAILURE OF SPOT WELDING JOINTS IN WAGON-R, 3/1/2012-2/22012, Amount, INR 45000/- PI: Shantanu Bhattacharya, Project No.: MARUTI/ME /20110231 .



3. STUDY OF ENGINE FIRE IN FOOD ICON 1.6 SXICAR LYING AT M/S K N MOTORS FOR CONSUMER COURT, 08/07/2013-14/07/2013, Amount, INR 33465/- PI: Shantanu Bhattacharya Project no.: CF /ME /20130113

## Technology Businesses Setup

1. Techsolvers Communications and Innovative Platforms Pvt. Ltd, A technology company incubated at SIIC, IIT Kanpur for carrying out clinical trials related to lateral flow assay developed for early detection of Dengue, 2019.

## Peer Recognition

### Awards and fellowships:

- a. **Abdul Kalam Technology Innovation National Fellow, Conferred by Indian National Academy of Engineering (INAE), 2020.**
  - b. **Fellow of The Royal Society of Chemistry, 2021.**
  - c. **Dr. R.S. Khandpur Award, Conferred by Institution of Electronics and Telecommunication Engineers (IETE), 2020.**
  - d. **Fellow of Institution of Electronics and Telecommunication Engineers (IETE), 2020.**
  - e. Senior Member, IEEE, 2019.
  - f. NASI Reliance Platinum Jubilee Award, Conferred by National Academy of Sciences of India, 2019.
  - g. Er. M.P. Baya National Award, Conferred by Institution of Engineers of India, 2019.
  - h. Fellow of the International Society of energy , environment and sustainability (ISEES), 2018.
  - i. Fellow of the Institution of Engineers of India (FIEI), 2016.
  - j. NDRF (National Design Research Forum), IEI, Best Mechanical engineering design award-2014.
  - k. ISSS (Institute of Smart Structures and Systems) Young Scientist Award-2013.
  - l. Honorary Fellow of the Institute of High Energetic Materials in Melbourne, 2011.
  - m. IEI (Institute of Engineers of India), Young Engineers Award, 2010 in Mechanical Engineering.
  - n. Selected in Chancellor's list 2005-2006 and 2003-2004.
  - o. Huggins Graduate Fellowship awarded from 2004~2006, at the University of Missouri at Columbia.
  - p. Awarded 3rd place in the college wide research creative activities competition in 2006 at the University of Missouri at Columbia.
  - q. Awarded 2nd place in the research poster contest held as a part of the Life-sciences week 2004 at MU. Won a mini research grant of \$500.
2. **Academic Honors and recognitions:**
    - a. Nominated for the best graduate student award~2005.
    - b. Nominated for the best student entrepreneur award~2006.
  3. **Service Honors and recognitions:**
    - a. Associate Editor of —Journal of Micromanufacturingl, 2019 onwards.
    - b. Associate Editor of —The nanotechnology and nanosciencel, 2011 onwards.
    - c. Boeing Outstanding Leadership certificate, 2009-2010, Boeing Corp. USA.

- d. Best teachers awards (07 times each) from the Senate of the Indian Institute of Technology Kanpur for Courses (1) Advanced manufacturing Techniques and (2) Introduction to Bio-MEMs and Microsystems.
- e. Represented the Design Program in Stanford University for the Global Kickoff Event of ME310 course (2014).
- f. Nominated as a member of a review panel by the Indo-German Science and Technology Council for reviewing proposals related to water sensing and remediation. (2015).

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end.

**03/04/2019**

Signature and date