

# SAXENA Anupam

UPDATED: 12th Day of March, 2021

## DEGREES

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- 1997-2000 Ph. D. in Mechanical Engineering, **University of Pennsylvania**, PA, USA  
Advisor: Prof. G. K. Ananthasuresh  
Dissertation: Topology Optimization of Compliant Mechanisms for Flexibility, Stiffness and Strength
- 1995-1997 M. S. in Mechanical Engineering, **The University of Toledo**, OH, USA  
Advisor: Prof. Steven N. Kramer  
Thesis: A New Pseudo Rigid Body Model for Flexible Beams in Compliant Mechanisms
- 1991-1995 B. Tech in Mechanical Engineering, **Indian Institute of Technology**, Bombay  
Advisors: Prof. S. Chinchalkar and Prof. P. Seshu  
Topic: Automatic Mesh Generation on Surfaces

## LANGUAGES

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- ENGLISH First Language in Primary and Secondary schooling from Missionary school  
Language of training throughout in undergraduate and graduate studies
- DEUTSCH A1-A2 level from Göthe Institute, Bad Godesberg, Bonn
- HINDI Mother tongue

## CURRENT EMPLOYMENT

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<i>July 2016 - Current</i>	<i>Professor, INDIAN INSTITUTE OF TECHNOLOGY KANPUR</i>
CAREER STAGE:	Stage IV
ADDRESS:	(Office) Faculty Building, #361 (Lab) Compliant and Robotic Systems, Faculty Building, #369 Indian Institute of Technology Kanpur 208016
PHONE:	+91 512 259 7205(O), 7397 (L)
EMAIL:	<a href="mailto:anupams@iitk.ac.in">anupams@iitk.ac.in</a>
URL:	<a href="http://home.iitk.ac.in/~anupams">home.iitk.ac.in/~anupams</a>

## PREVIOUS WORK EXPERIENCE

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<i>May 2019 - June 2019</i>	<i>Visiting Professor, RWTH-AACHEN UNIVERSITY, GERMANY</i>
<i>June 2018 - July 2018</i>	<i>Visiting Professor, RWTH-AACHEN UNIVERSITY, GERMANY,</i>
<i>May 2017 - July 2017</i>	<i>Visiting Professor, RWTH-AACHEN UNIVERSITY, GERMANY, <b>Renewed research stay, Alexander von Humboldt Foundation</b></i>
<i>May 2009 - July 2016</i>	<i>Associate Professor, INDIAN INSTITUTE OF TECHNOLOGY KANPUR</i>
<i>Dec 2014- May 2015</i>	<i>Visiting Associate Professor, INDIAN INSTITUTE OF TECHNOLOGY, GUWAHATI</i>
<i>June 2014- July 2014</i>	<i>Visiting Associate Professor, RWTH-AACHEN UNIVERSITY, GERMANY</i>
<i>May 2012- Dec 2012</i>	<i>Visiting Associate Professor, RWTH-AACHEN UNIVERSITY, GERMANY, <b>Alexander von Humboldt Fellowship</b></i>
<i>May 2010- June 2011</i>	<i>Visiting Associate Professor, RWTH-AACHEN UNIVERSITY, GERMANY, <b>Alexander von Humboldt Fellowship</b></i>
<i>July 2005 - June 2006</i>	<i>Visiting Assistant Professor, CORNELL UNIVERSITY</i>
<i>Mar 2001 - May 2009</i>	<i>Assistant Professor, INDIAN INSTITUTE OF TECHNOLOGY, KANPUR</i>
<i>June 1997 - Sep 2000</i>	<i>Research Assistant, UNIVERSITY OF PENNSYLVANIA, PA</i>
<i>June 1996 - May 1997</i>	<i>Teaching Assistant, ENGINEERING COLLEGE COMPUTING, UNIVERSITY OF TOLEDO, OH</i>

## RESEARCH FUNDING AND GRANTS

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11-2001–03-2002	Development of Topology Design Software for Compliant Mechanisms, Initiation Bridge Grant, IIT Kanpur, INR 50, 000 ( <b>Project Investigator</b> )
09-2002–03-2005	Design for Optimal Failure-free MEMS Topologies, Min. Human. Res and Dev., GoI, INR 10, 00, 000 ( <b>Project Investigator</b> )
09-2003–09-2006	Topology Design of Compliant Mechanisms with Nonlinear Deformation, Dept. Sci. Tech. (Fast Track Scheme), GoI, INR 3, 12, 000 ( <b>Project Investigator</b> )
01-2006-01-2009	Reconstruction of 3D Solids from Single near Parallel Projections, All Ind. Council. Tech. Edu., INR 10, 50, 000 ( <b>Project Investigator</b> )
04-2006–04-2009	Topology Design of Compliant MEMS for Path Generation, Dept. Sci. Tech., India, INR 13, 20, 000 ( <b>Project Investigator</b> )
05-2006–05-2009	Automated Modular Fixture Planning for Minimum Tolerances, Dept. Sci. Tech. India, INR 19, 00, 000 ( <b>Co Project Investigator</b> )
04-2012-03-2015	An Innovation in Distraction Osteogenesis for Mandibular Regeneration using a Refined Transport Distractor, Dept. Sci. Tech. India, INR 14, 73, 000 ( <b>Co Project Investigator</b> )
07-2014–07-2016	Seed Funding To Host The International Conference On Machines And Mechanisms (under the aegis of IFFToM and AMM), December 16-19, 2015, IIT Kanpur, INR 2, 00, 000 ( <b>Conference Chair</b> )
02-2014–08-2016	A BCI Operated Hand Exoskeleton based Neurohabilitation System for Movement Restoration in Paralysis, Dept. Sci. Tech. India and UK-India Edu. Res. Initiative INR 30, 10, 000 ( <b>Co Project Investigator</b> )
01-2017–Current	Design of Robotic Dragonflies, Visvesvaraya PhD Scheme, GoI INR 28, 60, 000 ( <b>Project Investigator</b> )

## RESEARCH OUTPUT

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### Summary

<i>Total Number of Publications</i>	<i>Journals– Published/in press/arXiv:</i> 49 (Page 10 for complete list) <i>Peer Reviewed Conferences:</i> 61 (Page 12 for complete list) <i>Books and Book Chapters:</i> 1+5 (Page 17 for complete list)
<i>Methods, Software and Tools</i>	<ol style="list-style-type: none"><li>1. Topology Synthesis of path generating contact-aided large displacement compliant mechanisms (CCMs) with hexagonal cells and material masks. All (self and mutual) contact modes permitted.</li><li>2. Topology Synthesis of CCMs with initially curved frames.</li><li>3. Material Mask Overlay Strategy (MMOS) for topology optimization with hexagonal tessellation and circular/elliptical/rectangular positive/negative masks.</li><li>4. Unified synthesis of planar, path generating mechanisms involving rigid and compliant members undergoing large deformation.</li><li>5. HexSyn/ PennSyn: Topology Design Software with hexagonal cells/ frame elements</li><li>6. Analysis of a Tendon Pulley System (TPS) of human finger flexors using the Pseudo-Rigid-Body Model approach. Most aspects including joint locking considered.</li><li>7. Design/Realization of a 3-kink CCM Switch.</li><li>8. A displacement delimited CCM gripper to manipulate very soft objects.</li><li>9. A four-bar mechanism based three-finger hand exoskeleton for cooperative manipulation (translation/rotation) of slender objects.</li><li>10. Functional Inference of complex anatomical tendinous networks using Estimation-Exploration (Co-evolution).</li><li>11. Realtime, Projective Path Planning for multi-agents for arrest and guidance of a moving object under a dynamic environment.</li></ol>

## SELECTED PUBLICATIONS (IN ORDER OF NUMBER OF CITATIONS, SOURCE: GOOGLE SCHOLAR)

1. SAXENA A. ANANTHASURESH G K. 2000. On an Optimality Property of Compliant Topologies. *Structural and Multidisciplinary Optimization*. 19 (1). pp. 36-49.
2. SAXENA. A. ANANTHASURESH. G. K. 2001. Topology Synthesis of Compliant Mechanisms for Nonlinear Force-Deflection and Curved Output Path. *ASME Journal of Mechanical Design*. March 2001. Vol. 123. pp 33-42.
3. SAXENA A. KRAMER S N. 1998. A Simple and Accurate Method for Determining Large Deflections in Compliant Mechanisms subjected to End Forces and Moments. *ASME Journal of Mechanical Design*. 120(3). pp. 392-400.
4. SAXENA A. 2005. Synthesis of Compliant Mechanisms for Path Generation using Genetic Algorithm. *ASME Journal of Mechanical Design*. Vol. 127 (4). pp 745-752.
5. SAXENA A. 2005. Topology Design of Large Displacement Compliant Mechanisms with Multiple Materials and Multiple Output Ports. *Structural and Multidisciplinary Optimization*. Vol. 30 (6). pp. 477-490.
6. Saxena A. Sahay B. 2005. *Computer Aided Engineering Design*. Anamaya Publishers (INDIA) and Springer, PO BOX 322, 3300 AH Dordrecht, The Netherlands.
7. SAXENA A. ANANTHASURESH. G. K. 2003. A Computational Approach to the Number Synthesis of Linkages. *ASME Journal of Mechanical Design*. Vol. 125. pp 110-118.
8. SAXENA A. ANANTHASURESH G K. 2001. Topology Design of Compliant Mechanisms with Strength Considerations. *Mechanics of Structures and Machines*. 29(2). pp. 199-221
9. SAXENA A. 2008. A Material-Mask Overlay Strategy for Continuum Topology Optimization of Compliant Mechanisms using Honeycomb Discretization. *ASME Journal of Mechanical Design*. Volume 130 (8). pp. 823041-823049
10. RAI A K. SAXENA A. MANKAME N D. 2007. Synthesis of Path Generating Compliant Mechanisms using Initially Curved Frame Elements. *ASME Journal of Mechanical Design*. Vol. 129. pp. 1056-1063
11. JIMSON N GEO. TOMOYA TAMEI. TOMOHIRO SHIBATA. M F FELIX ORLANDO. LAXMIDHAR BEHERA. ANUPAM SAXENA. ASHISH DUTTA. 2013. Control of an optimal finger exoskeleton based on continuous joint angle estimation from EMG signals. *Annu Int Conf IEEE Eng Med Biol Soc*.338-341. doi: 10.1109/EMBC.2013.6609506.
12. SAXENA R. SAXENA A. 2007. On Honeycomb Representation and SIGMOID Material Assignment in Optimal Topology Synthesis of Compliant Mechanisms. *Finite Elements in Analysis and Design*. Volume 43. Issue 14. Pages: 1082-1098
13. VALERO-CUEVAS F J. ANAND V. SAXENA A. LIPSON H. 2007. Beyond parameter estimation: Extending biomechanical modeling by the explicit exploration of model topology. *IEEE Transactions of Biomedical Engineering*. Nov;54(11):1951-64.
14. REDDY BVS NAGENDRA. NAIK SUJITKUMAR V. SAXENA A. 2012. Systematic Synthesis of Large Displacement Contact Aided Monolithic Compliant Mechanisms. *ASME Journal of Mechanical Design*. 134(1). pp.011007-1-12
15. SAXENA A. 2011. Topology Optimization with Negative Masks using Gradient Search. *Structural and Multidisciplinary Optimization*. 44 (5). pp. 629-649
16. SAXENA A. VALERO-CUEVAS F J. LIPSON H. 2012. Functional inference of complex anatomical tendinous networks at a macroscopic scale via sparse experimentation. *PLOS Computational Biology*. 8(11): p.1-17 (e1002751)

## RESEARCH SUPERVISION AND LEADERSHIP EXPERIENCE

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### Ongoing Doctoral Students

- D8. Nikhil Singh, On 3D Topology Optimization, Principal Supervisor: Anupam Saxena
- D7. Vitthal Khatik, On design of Hand Exoskeletons, Principal Supervisor: Anupam Saxena
- D6. Shyam Sunder Nishad, On Systematic Design of Robotic Dragonflies, Principal Supervisor: Anupam Saxena
- D5. BVS Nagendra Reddy, On Design of Large Deformation Compliant Topologies for special deformation characteristics, Principal Supervisor: Anupam Saxena

### Graduated Doctoral Students

- D4. Kumar, Prabhat, 2017, Synthesis of Large Deformable Contact-aided Compliant Mechanisms using Hexagonal cells and Negative Circular Masks. Principal Supervisor: Anupam Saxena, Co-supervisor: Roger Sauer, RWTH-Aachen
- D3. Mayank Goswami, 2014, On Tomography reconstruction techniques. Principal supervisor: Prabhat Munshi, IIT Kanpur, Co-supervisor: Anupam Saxena
- D2. Orlando, Felix, 2013, Cooperative Human Finger motion analysis and Optimal design of a three finger exoskeleton: Principal supervisor: Laxmidhar Behera, IIT Kanpur, Co-supervisors: Anupam Saxena and Ashish Dutta, IIT Kanpur
- D1. Khan, A, 2010, Numerical Study of Thermo-Elastohydrodynamic Lubrication of Infinite Line Contact Rough Surfaces. Principal supervisor: Prawal Sinha, IIT Kanpur, Co-supervisor: Anupam Saxena

### Graduated Masters Students

- M24. Abhishek Sharma, 2017, On Design of Knee, Foot and Ankle Orthotic Exoskeleton. Principal Supervisor: Anupam Saxena
- M23. Ajay Bajaj, 2017, Soft hand exoskeleton. Principal Supervisor: Anupam Saxena
- M22. Amul Agarwal, 2017, Structural/Functional Inference of a Nonlinear 2D Continua Using Predator Prey Estimation Exploration. Principal Supervisor: Anupam Saxena
- M21. Anuj Agarwal, 2016, A Novel Mechanism for Flapping Wing Flight. Principal Supervisor: Anupam Saxena
- M20. Hrishikesh Raste, 2014, Optimal Design for a Flapping Wing Mechanism and Wing Profile Capturing Unsteady Flow Characteristics. Principal Supervisor: Anupam Saxena
- M19. Shyam Sundar, 2014, On design and control of a three finger exoskeleton. Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta.
- M18. Sharad Singhanian, 2011, Design and Control of Multi-Agents for Transportation of Object in Extended 2D Terrain. Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta
- M17. Ved Prakash Chowdhary, 2011, Optimal Design and Control of Leg Exoskeleton. Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta
- M16. Pranay Sharma, 2011, Topology optimization of Electrothermally Compliant MEMS using a hybrid approach. Principal Supervisor: Anupam Saxena
- M15. Sujit Kumar V. Naik, 2010, How to Choose from a Synthesized set of Mechanisms, Principal Supervisor: Anupam Saxena
- M14. BVS Nagendra Reddy, 2010, Synthesis of Non-smooth path generating Fully Compliant Mechanisms using Self Contact, Principal Supervisor: Anupam Saxena
- M13. Amit Srivastava, 2010, Electric Pulse Aided Single Point Incremental Forming, Principal Supervisor: N. V. Reddy, Co-supervisors: Anupam Saxena
- M12. Mayank Goswami, 2009, On Tomography using Finite Element like field approximations and Optimization, Principal Supervisor: P. Munshi, Co-supervisors: M. S. Kalra, Anupam Saxena

- M11. Vijaysingh R. Shinde., 2009, Experimental Validation of Form Closure Capture and Transportation of Moving Objects using Projective Path Planning, Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta
- M10. Pavan Kumar, 2009, Singularity-free Binary Designs in Topology Optimization, Principal Supervisor: Anupam Saxena
- M9. Ashok Rai, 2006, Topology, Shape and Size Optimization of Compliant Mechanisms Using Curved Frame Elements and Genetic Algorithm, Principal Supervisor: Anupam Saxena
- M8. Pankaj Sharma, 2006, Arrest and Guidance of a Moving Object using Multi-Agents, Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta
- M7. CP Mishra, 2006, Nonlinear, Transient, Thermo-Elastic Analysis for Continua under High Temperature Environment, Principal Supervisor: Anupam Saxena
- M6. Mukul Tuli, 2006, Local Shape Modification of B-Spline Curves, Principal Supervisor: N. Venkat Reddy, Co-supervisor: Anupam Saxena
- M5. Anjul Beohar, 2005, A Hybrid Approach to Reconstruct 3d Solids From 2d Near Isometric Sketches, Principal Supervisor: Anupam Saxena, Co-supervisor: Ashish Dutta
- M4. Maitray Srivastava, 2005, Mathematical Analysis, Design, Development and Experimentation of an 8 DOF Biped Robot, Principal Supervisor: Ashish Dutta, Co-Supervisor: Anupam Saxena
- M3. Prince Malik, 2004, Automated Design of Modular Fixtures to minimize Tolerances, Principal Supervisor: N. Venkat Reddy, Co-Supervisor: Anupam Saxena
- M2. Rajat Saxena, 2003 , A Novel Parameterization for Topology Design of ETC MEMS for Strength, Principal Supervisor: Anupam Saxena
- M1. Gaurav Seth, 2002, Splines based Assessment of Pre and Post Treatments of Dental Fixtures, Co-Supervisor: Anupam Saxena

### Senior Design Projects

- SDP5. Anuj Agarwal, Shaurya Shriyam, 2014, Design, Modeling and Control of a Robotic Fish, with Co-supervisor: Principal Supervisor: Anupam Saxena, Co-Supervisor: Laxmidhar Behera
- SDP4. Sandeep Urankar, Pranjal Jain, Anurag Singh, 2003, Design, Fabrication and Control of a Robo-sloth, a rope climbing Robot, Principal Supervisor: Anupam Saxena
- SDP3. Manish Dwivedi, Ashish Sethi, Amit Pahwa, A. P. Singh, 2002, Design and Fabrication of a Customized Above Knee Prosthesis, Principal Supervisor: Anupam Saxena
- SDP2. Ashish Asthana, Nandeesh Shukla, Bharat Panjwani, 2002, Design, Fabrication and Control of a Four dof Redundant Planar Manipulator, Principal Supervisor: Anupam Saxena, Co-supervisor: Susmit Sen
- SDP1. Abhudyai Singh, Apratim Rajendra, Bipin Kumar, 2002, Adonis: Walking Machine and Biped (**Adjudged the best B. Tech project**), Principal Supervisor: Anupam Saxena, Co-supervisor: Susmit Sen

### TEACHING MERITS

<i>Pedagogical training/expertise</i>	20 years of experience in teaching graduate and undergraduate courses in and related to computer aided engineering design, compliant mechanisms, large deformation analysis, structural (topology) optimization, kinematic and geometric modeling, assistive/ orthotic/ exoskeletal devices, bio-inspired design, and multi-body dynamics of flexible systems.
<i>Open access teaching</i>	<p>Computer Aided Engineering Design (<b>NPTEL/Online</b>)  <a href="https://www.youtube.com/watch?v=dp0vGTUAVPs">https://www.youtube.com/watch?v=dp0vGTUAVPs</a></p> <p>Technical Arts (<b>NPTEL/Online</b>)  <a href="https://www.youtube.com/watch?v=ZIZyQbCX30E">https://www.youtube.com/watch?v=ZIZyQbCX30E</a></p>

*Research based teaching*

ME851A Compliant Mechanisms

2013(II), 2017(II)

Genesis; glimpse of applications; continuum and discrete perspectives: nonlinear finite element analysis and pseudo rigid-body analysis; design of compliant mechanisms based on linkage synthesis and structural optimization methods; function and path generation; static balancing; applications in microsystems, precision engineering, biomedical, automotive, product design, etc.

**(Received Appreciation for Teaching both times)**

*Other teaching experience*

ME751A Computer Aided Engineering Design

2001(II), 2002(I), 2003(I), 2004(I), 2005(I), 2006(I), 2007(II), 2009(I), 2010(I), 2012 (I), 2014 (I), 2015 (I, IITG), 2017 (I), 2018 (I), 2019 (I), 2020 (II)

Transformations and Projections, Design and Representation of Curves and Surfaces (Ferguson, Bezier and B-Spline), Derivation and comprehension of B-spline basis functions, Solid Modeling (Wire frame, B-rep, CSG and Voxel approaches), Basics of FEM and Optimization.

**(Received Appreciation for Teaching numerous times)**

ME676A Nonlinear Finite Element Methods

2019 (II), 2021 (I)

Introduction with Newton-Raphson's and Arc-Length Methods using truss elements, Snap through and Bifurcations, Co-rotational Beams, Statically balanced configurations, Tensors, Stress and Strain measures, Work Conjugates, Constitutive Relations, Weak form of Governing Equation, Generic Finite Element Modeling with/out contact, Multibody dynamics with flexible members, coding projects/exams with many examples with MATLAB code templates.

ME321A Advance Mechanics of Solids

2008(I), 2009(II), 2016 (II)

Classical Elasticity Equilibrium equations, strain-displacement relations, compatibility and stress-strain relations, Stress function, Solutions with stress functions, Tensors, Analysis of Stress and Strain Tensors, Constitutive Elasticity Tensor, Stress-Strain energy conjugate measures, introduction to FEM.

TA101A Engineering Drawing and Graphics

2013 (I), 2014 (I)

Orthographic (Third and first angle), Isometric, Sectional, Assembly, Oblique, Perspective and Auxiliary views, Lines and lanes, Intersection and Development.

**(Received Appreciation for Teaching both times)**

ME 352A Kinematics of Machines and Mechanisms

2015 (II)

Overview and basics on mobility, degrees of freedom (Grübler's criterion); displacement, velocity and acceleration analysis (analytical and graphical using the instant center method); overview on type, number and dimensional synthesis; linkages; Grashof's criterion; function, path and motion generation using analytical and graphical approaches; Overview on Kempe's linkages and Compliant mechanisms; Gears; Cams and methods for profile design; Balancing of rotors; belt-pulley drives, etc.

ME 251A Engineering Design and Graphics

2018 (II)

Section and Assembly drawings using examples of Belt Roller Assembly, Non-return valve, Feed check valve, Screw Jack Assembly, Couplings, Fuel Injector Assembly, representations of Fasteners, Springs, Gears, Bearings, Fits and Tolerances, and overview of Design Principles.

ME 681A Mathematical Methods in Engineering

2005(II)

Vector and Matrix Algebra, Vector Spaces, Ordinary and Partial Differential Equations, Analysis with Complex Numbers

Other teaching experience  
(contd.)

ESO204A Mechanics of Solids  
Summer, 2003

Stresses, strains, material properties, shear force and bending moment diagrams, deflections of beams, torsion, columns, springs and failure theories

ME 351A Design of Machine Elements  
2003 (II)

Review of Mechanics of Solids, Failure theories, Fatigue failure, Design of fasteners, springs, shafts, spur and helical gears, clutches, brakes and flywheels

ME 685A Programming and Numerical Methods,  
2002(II), 2004(II), 2007 (I)

Curve interpolation and approximation, Numerical integration and differentiation, Single and Multiple Root determination, Solution of Linear and Nonlinear system of equations, Matrices, and ODE and PDEs

ME 399A Communication Skills  
2014 (II)

Various aspects of communication skills including group discussions, public speaking, planning and making presentations, technical writing, non-verbal, verbal and written modes, role of body language etc. covered and emphasized through a number of interactive sessions. *text editing* sessions (using the green board) to demonstrate minimization of verbosity and proper choice of words so that evolving the first draft in a few iterations yields a well composed document.

Pedagogical publications

SAXENA A. 2011. Kempe's Linkages and the Universality Theorem. *Resonance*. 16 (3). pp. 220-237. DOI:10.1007/s12045-011-0028-x.

SAXENA A. 2011. Topology Optimization with Negative Masks using Gradient Search. *Structural and Multidisciplinary Optimization*. 44 (5). pp. 629-649

## RECOGNITION AND MEMBERSHIPS

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2020	<i>In top 2% (Design Practice &amp; Management)</i> — IOANNIDIS J. P. A, BOYACK KEVIN W, BAAS JEROEN, 2020, UPDATED SCIENCE-WIDE AUTHOR DATABASES OF STANDARDIZED CITATION INDICATORS, PLOS BIOLOGY, OCTOBER 16, 2020 <a href="https://doi.org/10.1371/journal.pbio.3000918">https://doi.org/10.1371/journal.pbio.3000918</a>
2010-2006	<i>Alexander von Humboldt Fellowship for Experienced Professors</i>
1997	<i>AICTE Career Award</i>
1997	<i>Procter and Gamble Best Professional Paper Award</i>
1991	<i>Silver Medal. Mathematics Talent Search Examination. Government of INDIA</i>
1992	<i>VivekVir Award. Government of Madhya Pradesh. INDIA</i>
2014, 18	<i>Recipient of Appreciation for Teaching, ME 851A, Compliant Mechanisms</i>
2013, 14	<i>Recipient of Appreciation for Teaching, TA 101A, Technical Arts</i>
2012, 17	<i>Recipient of Appreciation for Teaching, ME 751A, CAD</i>
2015-	<i>Association of Machines and Mechanisms</i> Life Member

## OTHER KEY MERITS (ACADEMIC, ADMINISTRATIVE, NON-ACADEMIC)

<i>December, 2015</i>	<i>Organizing Chair: 2<sup>nd</sup> INTERNATIONAL AND 17<sup>th</sup> NATIONAL CONFERENCE ON MACHINES AND MECHANISMS, DEC 16-19, INDIAN INSTITUTE OF TECHNOLOGY KANPUR. CO-CHAIRS: DR. SHIKHA PRASAD AND DR. NEERAJ SINHA.</i>
<i>2011 - 2015</i>	<i>Associate Editor JOURNAL OF MECHANISMS AND ROBOTICS</i> In four terms, coordinated review of more than 50 manuscripts.
<i>May 2013 - Nov 2014</i>	<i>Faculty Advisor and Associate Dean, INTERNATIONAL RELATIONS, IIT KANPUR</i> Salient Accomplishments: IITK-NUS Joint Degree Programme, MIPP programme with the University of Melbourne (formalized to the Joint Ph. D. programme), Academic MoUs with numerous Overseas Universities including <a href="#">three each from Finland and Norway</a> , MO-SAIC, an International Relations Brochure, initiated the new International Relations website amongst numerous other responsibilities, streamlined the activities of the Office of International Relations and initiated the latter to be a standalone office.
<i>2020-</i>	<i>Advisor, CMDE (COMPLIANT MECHANISMS DESIGN AND ENGINEERING) LABS</i> <a href="https://www.cmdelabs.com">https://www.cmdelabs.com</a>
<i>2020-21</i>	<i>Mentor Advisor, PLUS ROBOTICS</i> Focuses on educating students about Robotics and provides services through online courses and school programs
<i>2009-</i>	<i>Mentor Advisor, TAS (TRIDENT ANALYTICAL SOLUTIONS)</i> Prominent Products from TAS: Shabdnagari, Sociota, Market Reckon, Caller Pay. <a href="http://www.tas.co.in/">http://www.tas.co.in/</a>
<i>2006, 2016</i>	<i>Symposium Coordinator, Compliant Mechanisms ASME IDETC 2006, 2014, 2016</i> Coordinated review of many submissions
<i>2006, 2009</i>	<i>Session Chair, Compliant Mechanisms ASME IDETC 2006, 2009</i>
<i>2012</i>	<i>Co-Convener, International Conference on Microactuators and Micromechanisms MAMM-2012, CSIR-CMERI INDIA</i>
<i>2014-current</i>	<i>Peer Review of Funding applications</i> for Technology Foundation STW, Dutch Research Council, Dept. Sci. Tech, India and others.
<i>2001-Current</i>	<i>Reviewer</i> ASME Journal of Mechanical Design, ASME Journal of Mechanisms and Robotics, Structural and Multidisciplinary Optimization, Computer Aided Design, International Journal for Numerical Methods in Engineering, Finite Elements in Analysis and Design, Computational Methods in Applied Mechanics and Engineering.
<i>2016-Current</i>	<i>Examiner for Doctoral Theses/Viva voce</i> IISc Bangalore, IIT Madras, IIT Guwahati
<i>2011-12, 2002-03</i>	<i>Faculty Advisor, ASSOCIATION OF MECHANICAL ENGINEERS, IIT KANPUR</i>
<i>Invited Talks</i>	<i>COMPLIANT MECHANISMS, DESIGN PRINCIPLES AND TOPOLOGY OPTIMIZATION – VARIOUS ASPECTS</i> Cornell University (Aug, 2006), University of Milwaukee (Sep, 2007), IIT Kanpur (Oct, 2009), RWTH-Aachen University (Nov, 2010), TU Delft (Feb, 2011), IIT Bombay (Oct, 2011), NAIST, Ikoma, Japan (Apr, 2013), IIT, Hyderabad (Mar, 2016), NIT, Suratkal (Mar, 2017) <i>ON FUNCTIONAL INFERENCE USING THE ESTIMATION-EXPLORATION ALGORITHM</i> University of SUNY Buffalo (Mar, 2007) EU REGIONAL SCHOOL, RWTH-AACHEN UNIVERSITY (July, 2016) <a href="#">A 3 hr lecture on Systematic Synthesis of Large Displacement Compliant Mechanisms: A Structural Optimization Approach</a> NERIST, NIRJULI INDIA (Aug, 2014) A three day short term TEQIP course on CAD



*Invited Talks*  
(contd.)

ON CAPTURING UNSTEADY FLOW CHARACTERISTICS AROUND A FLAPPING WING-CHORD USING POTENTIAL FLOW THEORY

IIT Guwahati (April, 2015), IISc, Bangalore (Mar, 2014), RWTH-Aachen University (Jul, 2014), RWTH-Aachen University (June, 2018)

ON KEMPE'S LINKAGES

RWTH-Aachen University (Nov, 2012)

ON THREE-FINGER HAND EXOSKELETON FOR COOPERATIVE TRANSLATION AND ROTATION

RWTH-Aachen University (July, 2017)

BRINGING ENGINEERING DRAWING TO LIFE

TEQIP, IIT Kanpur (Jan, 2018)

*Sep 2008 - Apr 2009*

*Games Counselor*, STUDENT GYMKHANA, IIT KANPUR

SPEC, Sports and Physical Education Committee, got formed in my tenure on the proposal by Prof. CS Upadhyay to the then Dean, Student Affairs, Prof. Partha Chakraborty.

*2002 - 2003*

*Chairman*, STAFF GYMKHANA, IIT KANPUR

Helped draft the new constitution for Staff Gymkhana years later.

*2002-2013*

Represented IIT Kanpur in many Inter IIT Staff Sports Meets in Badminton, Cricket and Table Tennis

*2002-2014*

MUSICAL EXTRAVAGANZA (ME), IIT KANPUR

Performed vocals in a student organized music programme at IIT Kanpur on multiple occasions.

*2002-2012*

GALAXY, ANTARAGNI

Judged various cultural events and personality contests

## COMPREHENSIVE LIST OF PUBLICATIONS

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### Journals (published/in press/arXiv; reverse chronological order)

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- J47. PRABHAT KUMAR. ROGER A. SAUER. ANUPAM SAXENA. 2020. *On topology optimization of large deformation contact-aided shape morphing compliant mechanisms*. Mechanism and Machine Theory. Vol 156, Feb 2021, 104135.
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- C58. Prabhat Kumar. Roger Sauer. Anupam Saxena. 2015. On Synthesis of Contact Aided Compliant Mechanisms using the Material Mask Overlay Method. *ASME Design Engineering and Technical Conference*. Boston, USA. iDETC, 2015, # 47064. **Honorable mention fast forward presentation paper award.**
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