G. K. Ananthasuresh

Professor, Mechanical Engineering
Indian Institute of Science, Bangalore, 560 012, INDIA
Tel: +91 (080) 2293 2334 FAX: +91 (080) 2360 0648
E-mail: suresh@mecheng.iisc.ernet.in
URL: http://www.mecheng.iisc.ernet.in/~suresh

Academic Preparation

Post-doc Research Associate, Microsystems Technology Laboratories, Electrical Engineering and Computer Science Dept., Massachusetts Institute of Technology, Cambridge, MA, February 1995 – September 1996.

Adviser: Prof. Stephen D. Senturia

PhD Mechanical Engineering, University of Michigan, Ann Arbor, MI, December, 1994.

Thesis: A New Design Paradigm for Micro-Electro-Mechanical Systems and Investigations on Compliant Mechanism Synthesis.

Adviser: Prof. Sridhar Kota

MS Mechanical Engineering, University of Toledo, Toledo, Ohio, March 1991.

Thesis: Geometry Based Analysis and Optimal Synthesis of the RSCR Spatial Mechanism.

Adviser: Prof. Steven N. Kramer

BTech Mechanical Engineering, Indian Institute of Technology, Chennai (Madras), India, May 1989.

Adviser: Prof. K. Lakshiminarayana (for the final-year project)

Synopsis

- Post-doctoral advisees: 8 (past 7; and present 1);
- Doctoral advisees: 26 (past 19; and 7 present); 6 in academia and 13 in the industry
- Master's degree advisees: 34 (past 32; and present 2)
- Project staff trained in IISc: More than 75
- Start-up (from the research group) companies mentored: 2
- Products deployed by student entrepreneurs from the group: 5
- Companies consulting: 5
- 11 best paper awards and 9 design prizes in national and international conferences.
- 87 journal; 157 conference; 2 textbooks; 4 edited books; 14 book-chapters;
- 6 granted patents and 5 in process.
- New courses developed and taught: 4 in UPenn, 4 in IISc and 3 NPTEL courses
- Distinguished lectures: 12
- Served on editorial boards of four international and four national journals of repute.
- Significant service to IISc: Centre for BioSystems Science and Engineering, IIScPress, reviving the Journal of IISc, and IISc website

Research Interests

Compliant Mechanisms	Design Optimization
Micro-Electro-Mechanical Systems	Micro/meso Scale Fabrication
Protein Design	Biomechanics of Cells
Kinematics of Mechanisms	Development of sensors and devices

Appointments

2009 Jul. – Present	Professor, Department of Mechanical Engineering, Indian Institute of Science, Bengaluru, India.
2015 Oct.-Jul. 2016	Associate Faculty, Robert Bosch Centre for Cyber Physical Systems, IISc
2014 Nov.- Present	Associate Faculty, Centre for Nano Science and Engineering, IISc
2007 Aug. - Present	Associate Faculty, Centre for Product Design and Manufacturing, IISc
2004 Aug.- Jun. 2009	Associate Professor, Department of Mechanical Engineering, IISc
2002 Jul.- Jul. 2004	Associate Professor, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, USA
1996 Sep.-2002 Jun.	Assistant Professor, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, USA
1995 Feb.-1996 Sep.	Postdoctoral Research Associate, Microsystems Technology Laboratories, Electrical Engineering and Computer Science Dept., Massachusetts Institute of Technology, Cambridge, MA, USA
1991 Jan. -1994 Dec.	Research and Teaching Assistant, Department of Mechanical Engineering and Applied Mechanics, University of Michigan, Ann Arbor, MI, USA

Administrative Appointments

2015 June-Present	Founding Co-chair, Centre for BioSystems Science and Engineering, IISc
2012 Aug.-Jun. 2015	Coordinator, Bioengineering PhD Programme, Indian Institute of Science, Bangalore, India
2011 May -Jun. 2013	Associate Chair, Robert Bosch Centre for Cyber Physical Systems, IISc.
2001 Jul.-Jul. 2004	MEAM Graduate Group Chair, University of Pennsylvania, USA

Visiting Appointments

2013 Aug.-Dec.	Visiting Professor, Mechanical Engineering, Indian Institute of Technology, Kanpur, India
2003 Oct.-Dec.	Visiting Professor, ESAT-MICAS (Microelectronics and Sensors, Electrical Engineering), Katholieke Universiteit, Leuven, BELGIUM.
2003 Jul.-Sep.	Visiting Professor, Mechanical Engineering, Indian Institute of Science, Bangalore, INDIA.
2003 Jan.-Jun.	Academic Visitor, Division of Mechanics, Materials, and Design, Engineering Department, University of Cambridge, Cambridge, UK.
1997 Jul. 1-31	Visiting Scholar at the Center for Computational Design, Rutgers University, Piscataway, NJ, USA.

Academic Recognitions

As a faculty member

- Shanti Swarup Bhatnagar Prize for 2010 in Engineering Sciences given by Council for Scientific and Industrial Research (CSIR), the Government of India.
- Fellow of the Indian National Academy of Engineers (INAE), 2010.
- Swarnajayanthi Fellowship (2007-2012) of the Department of Science and Technology (DST) of the Government of India.
- National Science Foundation (NSF) Faculty Early Career *(CAREER)* Award, 1998-2002 from the Design, Manufacture and Industrial Innovation (DMII) division, USA.
- Ralph R. Teetor Educational Award given by the Society of Automotive Engineers (SAE), 2000.

As a student

- A citation for top ten *Distinguished PhD Dissertations* by the Graduate School of University of Michigan in 1994.
- *Horace H. Rackham Pre-Doctoral Fellowship*, University of Michigan, 1993-1994

Best paper awards

1. Best Paper award at the 2nd International and 17th National Conference on Machines and Mechanisms, Dec. 16-18, 2015, Kanpur, India.
2. Best Application Paper Award at the 2015 IFToMM World Congress, Oct. 25-30, 2015, Taipei, Taiwan.
3. Best Paper Award at the 6th International Conference on Computational Methods, Auckland, New Zealand, 14-17 July, 2015.
4. *Best Paper Award* at the National Conference on Mechanisms and Machines (NaCoMM-13) held in Roorkee, India, December, 18-20, 2013.
5. *Best Paper Award* at the National Conference on Mechanisms and Machines (NaCoMM-11) held in Chennai, India, December, 1-2, 2011.
6. Second best paper among the papers published in the IEEE Transactions on Robotics in 2010.
7. *Best Paper Award* at the National Conference on Mechanisms and Machines (NaCoMM-09) held in Durgapur, India, December, 17-18, 2009.
8. Mechanisms and Robotics Committee's *Best Paper Award* at the 28th Mechanisms and Robotics Conference at the ASME 2004 International Design Engineering and Technical Conferences, Salt Lake City, Utah, USA.
9. Two finalist papers out of six for the *Best Paper Award* at the 27th Mechanisms and Robotics Conference at the ASME 2002 International Design Engineering Technical Conferences, Montreal, Canada.
10. *Best Paper Award* at the International Applied Mechanisms & Robotics Conference, Cincinnati in 1999.
11. *Best Paper award* at the International Applied Mechanisms & Robotics Conference, Cincinnati in 1993.

Design prizes

As a student

1. *First Prize* in the *1994 ASME Student Mechanism Design Competition* (Graduate Category with Laxman Saggere) [**A One-piece Compliant Stapler**]

Student advisees

2. Adviser of the second prize-winning mechanism in ASME Mechanisms and Robotics Design Contest, 2016. R. Harisankar and Chaitanya Karwa. [**A Compliant Mechanism for Grasping and Rolling Rigid and Elastic Objects**]
3. Adviser of the prize-winning Mechanism Simulation at the 2014 Inaugural ASME Challenge contest in the Best Impact Simulation for Product Design category. Darshan Sarojini, Akshay Varik, and Anirudh Katti [**A Bistable Compliant Chair for the Elderly**]
4. Adviser of the prize-winning Mechanism Design Contest (graduate category) entry (third prize) at the ASME International Design Engineering Technical Conferences, Portland, OR, USA, August 4-13, 2013. Santosh D. B. Bhargav [**A Compliant Device to Stretch an Elastic Object**]
5. Adviser of the Best Student-Paper Award (undergraduate category) at the sixth ISSS Conference on MEMS held in Pune, India, Sep., 2013. Jagjeet Singh [**A Mind-controlled Toy-car Navigated by Thinking and Blinking**]
6. Adviser of the Best Student-Paper Award (post-graduate category) at the sixth ISSS Conference on MEMS held in Coimbatore, India, Sep., 2012. Sambuddha Khan [**A Two-degree-of-freedom Micromachined Accelerometer with Mechanical Amplification**]
7. Adviser of the prize-winning entry (undergraduate category) at the ASME Student Mechanism Contest, International Design Engineering Technical Conference, Philadelphia, USA, Sep., 2006. First prize: Jiten Patel [**A Circumferentially Actuated Radially Deploying Mechanism**]
8. Adviser of the prize-winning entry (graduate category) at the ASME Student Mechanism Contest, International Design Engineering Technical Conference, Philadelphia, USA, Sep., 2006. Second prize: Girish Krishnan [**A Force Sensor using a Displacement-amplifying Compliant Mechanism**]
9. Adviser of the prize-winning entry in the mechanism design contest (undergraduate category), Applied Mechanisms and Robotics Conference, Cincinnati, OH, USA, 2000. [**An Automating Mechanism for Changing Compact Disks in a Backup System**]

Distinguished Lectures

1. GIAN Lectures on “Compliant Robotics” at IIT-Kharagpur, Dec. 17-18, 2015.
2. “Design, Materials, and Manufacturing: the Intersection:Compliant Mechanisms,” Keynote talk at the Conference on Precision Engineering, Dec. 11, 2015, Mumbai, India.
3. “Grasping Biological Cells,” Plenary Lecture at the 2015 Annual Meeting of the Society for Mathematical Biology, June 30 – July 2015, Atlanta, GA, USA.
4. “Mechanics of a Click-clack Tin Lid,” R. S. Pande Distinguished Lectureship, March 28th, 2015, Indian Institute of Technology, Kanpur, Kanpur, India.
5. “Judicious Use of Materials for Bending,” MRSI Distinguished Lecture 2014-2015, Feb. 10, 2015, Jaipur, India.
6. “Compliant Robotics”, Keynote Lecture at the Aerospace and Related Mechanisms Conference, Dec. 31, 2014, Bengaluru, India.

7. "Non-dimensionality in Nonlinear Mechanics of Slender Elastic Objects," B. Karunes Memorial Lecture at the Annual Meeting of the Indian Society for Theoretical and Applied Mechanics, Bengaluru, India, Dec. 18, 2014.
8. "Small, Smart, Magical Innovations," Plenary Lecture at the 5th ISSS National Conference on MEMS, Smart Materials, Structures and Systems, Sep. 21-22, 2012, Coimbatore, India.
9. Ananthasuresh, G. K., "Bridging the Gap between Compliant Mechanisms and Structures and Rigid-body Linkages," Closing Plenary, Second International Symposium on Compliant Mechanisms, May 19-20, 2011, Delft, the Netherlands.
10. "Interplay among Design, Manufacture, and Materials," Keynote lecture at the National Conference on Design and Manufacturing, Indian Institute of Information Technology, Design, and Manufacturing-Kancheepuram, IIT-Madras campus, Chennai, May 27, 2011.
11. "Function, Form, and Structure in Microsystems", National Technology Day distinguished lecture to Naval Science and Technology Laboratory, Visakhapatnam, May 11, 2011.
12. "Life is very mechanical", CSIR Foundation Day Eminent Lecture, Central Mechanical Engineering Research Institute, Durgapur, West Bengal, October 26th, 2010.

Teaching Experience

Indian Institute of Science

BE 205	*Introduction to Biomechanics of Solids* (Jan. - . Apr., 2013-2016) www.mecheng.iisc.ernet.in/~suresh/be205
ME 237	*Introduction to MEMS.* (Jan.-Apr., 2005, Aug.-Dec., 2009-14) www.mecheng.iisc.ernet.in/~suresh/me237
ME256	*Variational Methods and Structural Optimization*. (Aug.-Dec., 2005; May-Jun., 2006; Jan.-May, 2007-2016) www.mecheng.iisc.ernet.in/~suresh/memscourse/me256
ME260	*Topology Optimization*. (Jan.-Apr.., 2006; Aug.-Dec., 2007; May-Jun., 2008; Aug.-Dec., 2009; Aug. – Dec., 2012,2014, 2015) www.mecheng.iisc.ernet.in/~suresh/memscourse/me260

University of Pennsylvania

MEAM / EE 550	*Modeling and Design of Micro-Electro-Mechanical Systems (MEMS)*. New graduate level course. (Fall 1998, Fall 2001, Spring 2004) www.seas.upenn.edu/~meam550
MEAM 540	*Optimal Design of Mechanical Systems*. New graduate level course. (Fall 1997, Fall 2000, Fall 2002) www.seas.upenn.edu/~meam540
MEAM 535	*Advanced Dynamics*. Graduate level course. (Fall 1999) www.seas.upenn.edu/~meam535/fall99
MEAM 690	Special Topics: *Microfabrication and Micromachining* (w/ laboratory). (Spring 1998)
MEAM 310	*Design of Mechanical Systems*. Undergraduate course. (Spring 1997-2002) www.seas.upenn.edu/~meam310

MEAM 347	Two labs on the *Design and Manufacture of a Compliant Mechanism.* (Spring 1998-2000), and one lab (2001-2002).
MEAM 247	Two labs on Computer Aided Design and Computer Aided Manufacturing (CAD/CAM). (Spring 1999-2002).

Advising

Post-Docs and Visiting Scholars

University of Pennsylvania

1.	Jun Li	1999-2000	Micro-manufacturing in silicon, polymers, and metals
2.	Dr. Luzhong Yin	2000-2002	Topology optimization using multiple materials in multiple energy domains; compliant and strong design using an energy formulation

Indian Institute of Science

1. Dr. Hemaraju Pollayi	2010-11
2. Dr. Charanjeet Malhi	2015-16
3. Dr. Sambuddha Khan	2016-17

PhD students

PhD students at the University of Pennsylvania

			Thesis Title/Topic
1	Venkat Krovi Professor, SUNY-Buffalo, NY	Co-advisee with Dr. Vijay Kumar. Graduated in 1998 Sep.	Design and Virtual Prototyping of Assistive Devices
2	Anupam Saxena Professor, IIT-Kanpur, India	Graduated in 2000 Sep.	Topology Optimization of Geometrically Nonlinear Compliant Mechanisms for Flexibility, Stiffness, and Strength

3	Moon Kim, TRW, USA	Graduated in August 2001. Co-advisee with Dr. Haim Bau	Electromagnetic Actuation in Ceramic Tape and Kapton Based Meso-scale Electromechanical Systems
4	Xiaoye Wang	Graduated in May 2002. Co-advisee with Dr. Jim Ostrowski	Vision-Based Noninvasive Force sensing and Manipulation of Micro Objects
5	Nilesh Mankame GM, Warren, MI	Graduated in May 2004	Contact-Aided Compliant Mechanisms
6	Sung Koh	Graduated in May 2005	Protein design using continuous models and deterministic optimization methods

PhD students at the Indian Institute of Science

7	Annem Narayana Reddy Assistant Professor, IIT-Guwahati	2005-10	Inverse mechanics problems in micromanipulation and characterization of biological cells
8	Kiran Akella co-advised under ERP with Dr. Makarand Joshi, R&DE(E), Pune.	2006-15	Bio-mimetic materials for armor design
9	Sudarshan Hegde (Bosch-India)	2006-12	Tissue modeling for minimally invasive surgery
10	Saurav Rakshit Assistant Professor, IIT-Madras	2006-11	Protein design using coarse-grained models
11	Sangamesh R. Deepak Assistant Professor, IIT-Guwahati	2006-12	Static balancing of rigid-body and compliant mechanisms
12	Sambudha Khan, Interdisciplinary student co-advised with Prof. H.S. Jamadagni, CEDT.	2006-14	High-resolution micromachined accelerometers (submission in 2013)
13	Sudhanshu Shekhar, Interdisciplinary PhD student co-advised with Prof. K.J. Vinoy, ECE.	2007-15	Micromachined RF Switches (submission in 2013)
14	Santosh Bhargav D. B., Entrepreneur with a start-up “BendFlex Pvt. Ltd.”	2008-13	Biomechanics of Cells
15	Biplab Sarkar Interdisciplinary student co-advised with Prof. Amaresh Chakrabarti, CPDM.	2009-15	Creative synthesis of microsystems
16	T. J. Ramanath Babu, Entrepreneur with a start-up “BendFlex Pvt. Ltd.”	2009-14	Biomechanics of leaves
17	N. Nandhini Devi, Assistant Professor, Vellore Institute of Technology, Vellore, India	2010-15	Material selection maps
18	Shantanu Chakravarthy, Entrepreneur with a start-up “Mymik Pvt. Ltd.”	2010-15	Bio-micromanipulation with haptics
19	Sreenath Balakrishna (Interdisciplinary PhD student co-advised by S. Das, Microbiology and Cell Biology)	2012-	Biomechanics of hepatocytes
20	A. Rinku (Government lab registrant, NAL, Bengaluru)	2013-	Optimal wings for aircraft
21	Avinash Kumar (Industry registrant, Honeywell, Bengaluru)	2014-	Mode-shape synthesis
22	Safvan P.	2014-	Bistable arches and shells
23	Rahul Singh Interdisciplinary PhD Student with Prof. Prasenjit Sen (CeNSE)	2014-	Microfluidics for Micromanipulation
24	Nireekshit Addanki (with Dr. Vaishnavi Ananthanarayanan)	2015-	Mechanics of Dynein
25	Akshay Desai	2015-	Designing for Anisotropy of solids
26	Prasenjit Ghosh (with Prof. C. S. Jog)	2015-	Computational Mechanics

Master's students

Masters students at the University of Pennsylvania

1	Elizabeth Lai	Graduated in June 1998	Research topic: Design of Bars and Beams for Desired Mode Shapes
2	Timothy Moulton, IDEO	Graduated in March 2000	Microfabrication and Design of Electro-Thermal-Compliant MEMS
3	Nilesh Mankame Currently a PhD student	MS in June 2000	Comprehensive Electro-Thermal-Elastic Modeling of ETC Micro Devices
4	Xu Dong, Wharton Computing	Graduated in June 2000	Shape Optimization of Skeletal Frames of Compliant Mechanisms
5	Andy Perrin	Graduated in June 2002	Topology Optimization Compatible with Surface Micromachining

MSc students at the Indian Institute of Science

6	Girish Krishnan	2004-2006	High-resolution micromachined accelerometer
7	V. S. S. Srinivas	2005-2007	Topology Optimization of Passive heat Sink with Phase-Change Material
8	M. Dinesh	2006-2008	Compliant XY stage for precision applications
9	Shyamsananth Madhavan	2008-2010	Force-amplifying compliant mechanisms for resonant microsensors
10	Harish Varma	2009-2012	Feasibility and Intrinsic Kinetoelastostatic Curves for Compliant Mechanisms
11	Jagdish Pratap Singh	2011-2014	Micro-scale Mechanical Suspensions
12	Saurabh Mittal	2012-2014	Compliant Mechanisms
13	Vishal Bagade	2011-2015	Circuit breakers
14	Vikranth Kumar Reddy	2016-	A statically balanced robot for neurosurgery

ME students at the Indian Institute of Science

1	Saurav Rakshit	2005-2006	Simultaneous Material Selection and Geometry Design of Trusses
2	Siva Nagendra	2005-2006	Geometrically Nonlinear Elastic Analysis of Frames with Application to Vision-Based Force-Sensing and Mechanics of Plant Stems
3	M. Agrawal	2006-2007	On Including Manufacturing Constraints in the Topology Optimization of Micromachined Structures and Mechanisms
4	M. Rajesh	2006-2007	Mechanisms and Optics for Enahnced Stereo-Vision for Laparoscopic Surgery
5	Deepak Sahu	2007-2008	Micro-grippers for manipulation and force-estimation using spring steel
6	G. Bhargav	2007-2008	Compliant bicycle wheel
7	V. Mallikarjuna Rao	2008-2009	Haptic Interface for Micro and Nano Manipulation
8	Padmanabh Limaye	2008-2009	SMA-actuated Control Surfaces for Aircraft
9	Meenakshi Sundaram	2008-2009	Inverse Eigenmodeshape Problem
10	Pakeeruraju Podugu	2009-2010	Synthesis of shape-morphing compliant mechanisms

11	Subhajit Banerjee	2010-2011	Design and Simulation of an RF-MEMS switch
12	Nirmit Dave	2010-2011	Micromechanical frequency translator
13	Gaurav Nair	2011-2012	Dynamic Simulation and Design of RF-MEMS Switches made of Spring Steel
14	Rakesh Kumar Pathak	2011-2012	Simulations and Experiments in Punching Spring-steel Devices with sub-millimeter Features
15	Navaneet Krishna	2012-2013	Tensegrity Modeling of Biological Cells
16	P. Sandeep	2012-2013	Modeling meso-scale punching
17	Mohit Mathur	2013-2014	Mechanical advantage of compliant mechanisms
18	Shuvrangsu Das	2014-2015	Designing Anisotropy for Unusual Behaviour of Elastic Objects
19	Akshay Desai	2014-2015	A Compliant Mechanism for Applying Tension on Slender Objects
20	Vinit Kumar	2015-2016	Beam-based micro-speakers
21	Niharika Gupta	2016-	Optimal width-profiles for bistable arches

Project assistants at the Indian Institute of Science

Project assistants	2004-2016	G. Balaji, Shantanu Chakravarthy, B. Manjunath, M. S. . Deepika, B. K. Deepthi, P. Dinesh, B. Pradeep, A. Singh, A. Alwan, M. Kulkarni, R. Ganesh, K. Girish, Siddharth Sanan, K. Manjunath, Vinod Kumar, Vedanandan, A. Ravi Kumar, Manoj Raj, Chetan Kumar, G. Ramu, Duely Rakshit, Vijay Prakash, G. Ramu, A. Sajeesh Kumar, M. S. Suma, Meenakshi Sundaram, Vishwaman Malaviya, R. Genesh, Krishna Pavan, B. Varun, Mukund Madhav Nath, Puneet Singh, Shilpa, Ashwin Rao, Gaurah Singh, Gautham Kumar, Gautham Baichapur, Nikhil Jorapur, Avinash Kumar, Kunal Patil, Aditya Nittala, Anirudh Katti, Darshan Sarojini, Ananya, Viswanath Meenkakshidundaram,*Adhiti Raman, Sarayu Govind, Ramesh Sarangamath, Mayank Gupta, Ravi Kumar Thakur,*
	Current	*Geetanjali, Vikram Somanna, Mythra*

Varun, Navaneet Krishna, Hari Shankar, Nithish K., Anoosha Pai, and Shamanth Hampalli

Undergraduates (outreach effort as IISc does not have an undergraduate program in engineering)

2005: Two groups from Sidhaganga Institute of Technology, Tumkur; Project titles: (i) Micromechanical filter (ii) Micromachined pressure sensor

2006: One group from K. S. R. Institute of technology, Thiruchengode; Project title: A temperature controlled miniature chamber for polymerese chain reaction (PCR)

2007: Six summer interns from different colleges in India. Two students have published journal papers based on their work at IISc in two summers and winters.

2008: Five summer interns from different colleges in India. Two have written conference papers.

2009: Nine summer interns from different colleges in India. One has written a conference paper and one more a journal paper.

2010: Ten summer interns from different colleges in India.

2011: Six summer interns.

2012: Harshita Bhat and Himani

2013: Vishnu Swaroop, Bhaskar, Jagjeet Singh, Shubham Saini

2014: Four summer interns

2015: Five summer interns

2016: Six summer interns

Undergraduates at the University of Pennsylvania

2004: William Rivera (U. Puerto Rico)

2002: Sebastian Von Berg, Christopher Bremmer (Colarado School of Mines), Robert Jankura, Jamina Lee, John Manning, Daniel Marcus, Spencer Szczesny, and Brenda Trembath

2001: Ted Allen, Benjamin Benulis, Dane Carswell, Andrew Perrin, and Ryan Stovall

2000: Ravi Jain, Courtney Grow, Andrew Perrin, and Matt Robusto

1999: Wade Bennett, Ravi Jain, Yoonjung Jang, Dennis Kim, Charles Nappen, and Matt Robusto

1998: Chris Gahring, Ravi Jain, Yoonjung Jang, Dennis Kim, Sameer Mungur, and Rachman Yahya.

1997: Matt Julian, Ellen Long, Leo Medalla, Timothy Moulton, Scott Saltzman, and Kenrick Waithe.

Administrative Service

Indian Institute of Science

Chair, IISc Webpage Faculty Committee (2016-)

Founding Co-chair, Centre for BioSystems Science and Engineering (2015-)

Chair, IIScPress Committee (2014-2016)

Coordinator, Interdisciplinary Programme in Bioengineering, IISc (2012-2015)

Associate Chair, Robert Bosch Centre for Cyber Physical Systems, IISc (2011-2013)

Senate Curriculum Committee (2010-2013)

Centenary Conference Publications Sub-committee (2008-2009)

Institute Advertising Committee (2008-2010)

Convener, The IIScPress Committee (2008-2014)

Archives and Publications Committee (2008-present)

Core committee of the Center for Nanoelectronics and Nanoengineering (2006-2010)

Math-Biology Initiative (2007-present)

Senate Library Committee (2004-2005)

DCC-Mechanical Engineering, IISc (2006-2011)

Editorial Committee of the Journal of the IISc (2007-present)

University of Pennsylvania

MEAM Graduate Group Chair (July 2001 – July 2004)

Academic Performance Committee, School of Engineering and Applied Science (1999-2001).

School of Engineering and Applied Science Library Committee (1998-1999).

Coordinated the creation of a new website for the Mechanical Engineering and Applied Mechanics department at the University of Pennsylvania.

Editorial Boards

Indian

1. Associate Editor, *Journal of ISSS*, Institute of Smart Structures and Systems (2012-present)
2. Editorial Board, *Sadhana*, Indian Academy of Science. (2012-2013).
3. Associate Editor, *Resonance*, A Science Education Journal of the Indian National Academy of Science, Bangalore. (2012-2014).
4. Editorial Board, *Journal of The Institution of Engineers (India): Series C* (2012-present).
5. Editorial Board, *Current Science*, Indian National Science Academy, Bangalore. (2008-2012).
6. Editorial Board, *Resonance*, A Science Education Journal of the Indian National Academy of Science, Bangalore. (2008-2012).

7. Editorial Board, *The Journal of the Indian Institute of Science: A Multi-disciplinary Reviews Journal* published by the IISc Press. (2007-present)
8. Guest Editor, *The Journal of the Indian Institute of Science–A Multidisciplinary Reviews Journal*, Jan.-Mar., 2007 and Jul.-Sep., 2007.
9. Founding Editor, *Sūkshma*, the quarterly newsletter of the Institute of Smart Structures and Systems (ISSS) about the micro and smart systems activities in India, (2006-2013).

International

10. Associate Editor, ASME *Journal of Mechanisms and Robotics*. (2008-2011)
11. Associate Editor, *Mechanics Based Design of Structures and Machines*, Taylor and Francis, Inc. (2006-2013).
12. Associate Editor, *Robotica*, international journal published by Oxford University Press (2006-2012).
13. Editorial Board, International Journal of Structural Changes in Solids, Serial Publications (2008-2011)
14. Associate Editor, *Journal of Mechanical Design, Transactions of the ASME* (2003-2006).
15. Guest Editor, ASME *Journal of Mechanical Design*, July 2005, 127(4), "Special Issue on Mechanical Design in Nano, Micro, and Biogically Oriented Systems."

Membership and activities in Professional Societies

Chair, Technical Committee on Micromachines, International Federation for the Theory of Machines and Mechanisms (IFToMM) (2009-2013).

Executive Council member, Institute for Smart Structures and Systems (ISSS) (2007-present)

Chair, Awards Sub-committee of the Micro and Nao Systems Committee of the ASME (2007)

Member, ASME Micro and Nano Systems Committee (2005-Present).

Chair, Technical subcommittee on MEMS in the Design division of ASME (2003-2006).

Member of the ASME Mechanisms Committee of the Design Engineering Division (2001-2006), Treasurer (2002-2005).

Membership

- American Society of Mechanical Engineers (ASME)
- International Society for Structural and Multidisciplinary Optimization (ISSMO)
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute for Smart Structures and Systems (ISSS), India
- Association of Mechanisms and Machines (AMM), India

Other Professional Activities

Conference co-chair, IFoToMM Workshop on Micromechanisms and Micoactuators, Jan. 20-21, 2012, held in Durgapur, West Bengal, India.

Conference co-chair, IFoToMM Workshop on Micromechanisms and Micoactuators, May 27-28, 2010, held in Aachen, Germany.

Secretary, Conference Committee, ISSS 2008 Conference on Smart Structures, Systems, Materials and MEMS, Bangalore, July 2008.

Program Committee Co-Chair, National Conference on Mechanisms and Machines, 2007, Bangalore.

Coordinator for writing a textbook on Micro and Smart Systems Technologies for Vishveswaraiah Technological University.

Co-organizer, Micro and Smart Systems Workshop for training teachers of Vishvewaraiah Technology University for developing an undergraduate course in this area. January-March 2006.

Technical Program Committee: Chair for International Participation, ASME 2006 International Design Engineering technical Conference, Philadelphia, September, 2006.

Symposium Chair at the 2000 ASME Design Engineering Technical Conferences for “Micro and

Nano-scale Mechanisms and Systems" as part of the 27th Biennial Mechanisms and Robotics Conference, Montreal, Canada, Sep. 28th-Oct. 2nd.

Technical Program Committee, 2002 ASME Biennial Mechanisms Conference held as part of International Design Engineering Technical Conferences, September 2002, Montreal, Canada.

Invited participant at the National Science Foundation Workshop on “Manufacturing and MEMS,” Orlando, FL, Nov. 7, 2000.

Invited participant at the National Science Foundation Workshop on "Next Generation Human-Assist Devices," Baltimore, MD, Sep. 14, 2000.

Tutorial entitled “MEMS from a Mechanical Engineering Perspective,” at the 2000 and 2002 ASME Design Engineering Technical Conferences.

Chair, Student Mechanism Design Competitions, 2000 ASME Design Engineering Technical Conferences.

Special Session Organizer at the 2000 ASME Design Engineering Technical Conferences. Special session on the "Manipulation at Micro Scale using MEMS" as part of the 26th Biennial Mechanisms Conference.

Special Session Organizer at the 1998 ASME Design Engineering Technical Conferences. Special session on the "Mechanical Design Issues in MEMS" as part of the 25th Biennial Mechanisms Conference.

Member of the ad-hoc committee of the Mechanisms Division of the ASME appointed to explore the future directions for research in the mechanisms area (1997-98).

Invited participant at the National Science Foundation Workshop on "Structured Design for MEMS," CalTech, Pasadena, February, 1996.

Referee for:

- *ASME Journal of Mechanical Design*
- *Mechanism and Machine Theory*

- *ASME/IEEE Journal of Microelectromechanical Systems*
- *Sensors and Actuators A Physical*
- *International Journal of Numerical Methods in Engineering*
- *Research in Engineering Design*
- *Journal of Micromechanics and Microengineering*
- *ASME Journal of Dynamics, Measurements and Control*
- *Mechanics of Machines and Structures*
- *Experimental mechanics*
- *AIAA Journal*
- *Structural and Multidisciplinary Optimization*
- *Finite Elements in Analysis and Design,*
- *Computers and Structures*
- And **many others**

Patents, technology transfer, and commercialization

S. No.	*Title of the invention*	*Inventors*	*Status*	*Commercialized?*
1	Microtubomachinery	Alan H. Epstein, Stephen D. Senturia, Ian A. Waitz, Jeffrey H. Lang, Stuart A. Jacobson, Fredric F. Ehrich, Martin A. Schmidt, G. K. Ananthasuresh, Mark S. Spearing, Kenneth S. Breuer, Steven F. Nagle	Patent number: 5932940 Filing date: Nov 15, 1996 Issue date: Aug 3, 1999	No
2	Microturbomachinery (Enhanced claims of an earlier patent)	Alan H. Epstein, Stephen D. Senturia, Ian A. Waitz, Jeffrey H. Lang, Stuart A. Jacobson, Fredric F. Ehrich, Martin A. Schmidt, G. K. Ananthasuresh, Mark S. Spearing, Kenneth S. Breuer, Steven F. Nagle	Patent number: 6392313 Filing date: Jul 15, 1999 Issue date: May 21, 2002	No
3	Percutaneous heart valve	Howard C. Herrmann, Nilesh Mankame, G. K. Ananthasuresh	United States Patent number: US 7,621,948 B2 Issue date: Nov. 24, 2009	Commercialized by Endovalve, USA
4	MEMS Latchng High Power Switch	James Melvin Slicke and , G. K.	Application number: US12101659	No

		Ananthasuresh	Publication sate: 2011-02-22 Grant date: 2011-02-22	
5	Compliant platforms to generate amplified displacements, compliant platform for sensing applied motion and method of designing DaCM	G. K. Ananthasuresh and Dinesh Mana	Application number: 01136/CHE/2008 (India) Publication number: IP08216 Filing date: Prior to Nov. 1, 2008 Issue date: Oct. 2016	Not yet
6	Non-pneumatic tire	G. K. Ananthasuresh and G. Bhargav	Application number: 2204/CHE/2009 Publication number: IPA0361 Filing date: Oct. 9, 2009	Not yet
7	Article holder	G. K. Ananthasuresh and G. Ramu	Application number: 729/CHE/2010 Publication number: IPA0362 Filing date: Oct. 9, 2009	Not yet
8	A method for recognizing gestures using an Accelerometer mounted onto a wearable device	Dhruv Saxena, Hiteshwara Rao, Pragati Mehrotra, Anand Putambekar, G. K. Ananthasuresh	Application number: 5699/CHE/2013 Publication number: Filing date: Dec. 10, 2013	Not yet
9	A device for simulating endoscopy and a system thereof	Shanthanu Chakravarthy, Ashwin M. Rao, and, G. K. Ananthasuresh	Application number: 3439/CHE/2014 Filing date: 11/07/2014 (provisional), 11/07/2015 (complete), PCT/1B2015/055251 Issued date: Dec. 2016 Inventors: PCT granted, Nov. 29, 2016.	Commercialized by Mymik, Bengaluru

10	A Compliant Mechanism for Simulating Endoscopy	Shanthanu Chakravarthy, Anirudh Katti, and G. K. Ananthasuresh	Filing in progress	Commercialization by Mymik, Bengaluru
11	Multi-port Compliant Bistable Arches for circuit breaker mechanisms	Naresh Kumar Kodela, G. K. Ananthasuresh, Pradeep Kumar, Ramesh Sarangamath, Hari Prasad Konka, and Fiaz Shaik	Reference number E2016,0240 AB X (HPM/BP) Patenting in process	To be commercialized by EATON-India, Pune
12	Miniature Perfusion Bioreactor	Sreenath Balakrishnan, Santosh Bhargav, M. S. Suma, G. K. Ananthasuresh	Not patented but published	Commercialized by BendFlex Research Pvt. Limited, Bengaluru
13	Micro-newton Force Sensor	Santosh Bhargav, Gautham Baichapur, Ashwin Mahewsari, Harshala Gugale, G. K. Ananthasuresh	Not patented but published	Commercialized by BendFlex Research Pvt. Limited, Bengaluru

Sponsored Research

Indian Institute of Science

(Rs. 1 lakh = Rs. 100,000 ; Rs. 1 crore = Rs. 100 lakhs)

1. Principal Investigator, “CyberGut; A Bio Cyber Physical Approach to Gut Epithelial Cell Biology,” Robert Bosch Centre for Cyber Physical Systems, IISc, Rs. 135 lakhs, 2016-2019.
2. Principal Investigator, “Mechanical Design and Microfabrication of Electro-thermally Actuated Compliant Bistable RF MEMS Switches,” Space Technology Cell, IISc, Rs. 15.73 lakhs, 2016-2019.
3. Principal Investigator, “Compliant Easy Chair for the Elderly,” DST-Technology Initiative for the Disabled and Elderly,” 2014-2017, Rs. 47 lakhs.
4. Principal Investigator, “Miniature Circuit Breakers,” EATON-India, Pune, 2014-2016; Phase 1: Rs. 5 lakhs; Phase 2: Rs. 14 lakhs; Phase 3: Rs. 6 lakhs.
5. Principal Investigator, “A Pilot Project to Study the Forces of Adhesion in Corneocytes using Miniature Compliant Tools,” L’Oreal, 2015, Rs. 7.5 lakhs.
6. Investigator for a Project, “Soil-moisture sensor”, DEITy, 2012-2017, A multi-investigator project that has 10 major projects, Rs. 50 crores.
7. Co-investigator, “Cyber Surgery”, Robert Bosch Centre for Cyber Physical Systems, IISc, 2012-2014, Rs. 4.08 crores. (PI: Ashitava Ghosal)

8. Principal Investigator, “A Miniature Electromagnet-actuated Plastic Pump,” National Programme on Micro and Smart Systems (NPMASS), 2012-2014, Rs. 76.2565 lakhs.
9. Principal Investigator, “Bioengineering and Biodesign Initiative”, Department of Biotechnology (DBT), (2012-2016), Rs. 14.30 crores.
10. Principal Investigator, “Microfabrication and Packaging of High-resolution Accelerometers”, Space technology Cell, IISc-Bangalore, 2010-2012, Rs.10.4 lakhs.
11. Principal Investigator, “Fabrication of a High-bandwidth Micromachined Accelerometer,” Naval Physical and Oceanographic Laboratory, Kochi, 2010-2011, Rs. 4.1 lakhs.
12. Principal Investigator, “Software Development and Scientific Computing in Nanoengineering,” National Programme on Micro and Smart Systems (NPMASS), 2009-2013, Rs. 4.11 crores.
13. Principal Investigator, “A Microsensor for Intra-cranial Pressure Monitoring”, Society for Biomedical Technology, DEBEL, Bangalore, 2008-2011, Rs. 38 lakhs and Rs. 20 lakhs equipment facilitation.
14. Principal Investigator, “Design and Simulation of a Three-axis High-bandwidth Micromachined Accelrometer,” Naval Physical and Oceanographic Laboratory, Kochi, 2008-2009, Rs. 9 lakhs.
15. Principal Investigator, “A Feasibility Study on using Shape Memory Alloy Actuation for the Leading Edge Vortex Control in Aircraft,” DISMAS program with Aeronautical Development Agency, Bangalore, 2007-08, Rs. 16 lakhs.
16. Co-Principal Investigator, Math-Biology Initiative, Department of Science and Technology, 2007-2012, Rs. ~2 crores.
17. Principal Investigator, “Micromechanical Amplifiers for Inertial Sensors and Signal Processors,” UK-India Education and Research Initiative (UKIERI) grant, 2007-2011, 37,800 British Pounds ~ Rs. 30 lakhs.
18. Principal Investigator, “Bio-micromanipulation and Protein Design by Linking Mechanics and Biology,” Swarnajayanthi Fellowship Award, Department of Science and Technology, 2007-2012, Rs. 1.1 crores.
19. Co-Principal Investigator, “Micromachined and Compliant Tools for Enhancing Minimally Invasive Surgical Tools,” Society for Biomedical Technology, Bangalore, 2006-2009, 38 lakhs.
20. Principal Investigator, “A setup for Mechanical Characterization and Testing of Micro Devices,” Research and Development Establishment (Engineers), Pune, 2006-2008, 43 lakhs.
21. Joint Investigator, (PI: Prof. Anurag Kumar, ECE) “Wireless Sensor Networks,” Centre for Robotics and Artificial Intelligence/DRDO, 2006-2009, Rs. 2.97 crores.
22. Co-principal Investigator, “Fostering National MEMS Design Satellite Centers for NITs,” NPSM, 2005-2006, Rs. 68 lakhs.
23. Principal Investigator, “Miniature Compliant Bistable Valve,” IMI Inc., UK, 2004-2006, Rs. 20 lakhs in two phases.

24. Principal Investigator, “Development of an Automated Pipe-Crawling Device,” BRNS, 2005-2006, Rs. 11 lakhs.
25. Principal Investigator, “Compliant One-piece Pump,” Thomas Industries, USA, 2004-2005, Rs. 6 lakhs.
26. Principal Investigator, “Design and Microfabrication of a High-Resolution Accelerometer for Spacecraft Applications,” Space technology Cell, ISRO-IISc, 2005-2006, Rs. 10 lakhs.
27. Principal Investigator, “Magnetically Actuated Miniature Polymer Pump,” National Program on Smart Materials, Rs. 13.94 lakhs. , 2005-2006.

University of Pennsylvania

1. Principal Investigator, “Contact-Aided Compliant Mechanisms to Generate Sophisticated Motions,” National Science Foundation, $327,581 from September 2002 – August 2005.

2. Principal Investigator, "Integrated Synthesis of Mechanical Systems with Unconventional Actuations," National Science Foundation CAREER award, $200,000 for 4 years from 1998 Sep. - 2002 Aug. Additionally, $10,000 equipment grant, $16,425 + $25,000 industrial funding matching grant, and Research Experience for Undergraduate (REU) grants. Total: $298,425.

3. Principal Investigator, “Optimal Mechanical Design by Juxtaposition of Rigidity and Compliance,” National Science Foundation, $189,409 from August 1998 – July 2001. Additionally, $11,000 REU grants. (No-cost extension until 2002)

4. Principal Investigator, “Part to Art: A Comprehensive Geometric Modeling Paradigm for Design of MEMS,” National Science Foundation, $216,719 from May 1999 – April 2002. Additionally, $11,000 REU grants.

5. Principal Investigator, “Vision-Based Mechanical Manipulation and Force Measurement on Single Cells,” University of Pennsylvania Research Foundation, $20,000, Feb. 2001 to Feb. 2002. (with Dr. Ostrowski)

6. Principal Investigator, “Micromanipulation System with Haptic and Teleimmersive environment: A feasibility Study,” Nanotechnology Institute, Ben Franklin Technology Partners, $30,000, Sep. 2001-Aug. 2002. (with Drs. Daniilidis, Kumar, and Ostrowski)

7. Principal Investigator, “Foundations of Synthesis for MEMS”, Defense Advanced Research Projects Agency by way of a subcontract from Carnegie Mellon University, $310,000 for 3 years from 1996 Sep.-1999 Dec.

8. Principal Investigator, “Re-designing the Micro Ring Gyroscope for Desired Mode Shapes,” Delphi/Delco Electronics, Kokoma, Indiana, $16,425 from January 1999 – May 1999.

9. Principal Investigator, “Flexible, flexible Fixtures,” Society of Manufacturing Engineering (SME) Education Foundation, $10,000 from July 1998 to July 1999.

10. Principal Investigator, "Taking MEMS Technology to High Schools to Inspire and to Teach Basic Engineering Skills," W.K. Kellogg Foundation summer course development program, $2,984 from May 1999 - August 1999.

11. Co-Principal Investigator, "Design and Rapid Prototyping of Customized Micro & Macro Compliant Mechanisms," National Science Foundation, $318,686 for 3 years from 1997 Aug. - 1998 July. (with Drs. Bajcsy, Kumar, and Ostrowski)

12. Co-Principal Investigator, “Feasibility Studies on Electro-Thermal-Compliant Wheel for Miniature Spacecraft Applications,” Pathway Technologies, Inc., $51,000 for 1 year from 2000 May – 2001 April. (with Dr. Ayyaswamy).

13. Co-Principal Investigator, "Integrated Microfluidic Systems for Molecular Processing Fabricated in Ceramic Tapes," Defense Advanced Research Projects Agency, $1,332,155, 1997 Aug. - 2000 Aug. (with Drs. Bau, Hu, and Santiago).

Publications

Journal articles

Published/Accepted

J1. Ananthasuresh, G.K. and Kramer, S.N., “Kinematic Synthesis and Analysis of the Rack and Pinion Multi-purpose Mechanism”, *Journal of Mechanical Design, Trans. ASME*, Vol. 114, Sep. 1992, pp. 428-432.

J2. Ananthasuresh, G.K. and Kramer, S.N., “Analysis and Optimal Synthesis of the RSCR Spatial Mechanism”, *Journal of Mechanical Design, Trans. ASME*, Vol. 116, No. 1, March 1994, pp. 174-181.

J3. Kota, S., Ananthasuresh, G.K., Crary, S.B. and Wise, K.D., “Design and Fabrication of Microelectromechanical Systems,” *Journal of Mechanical Design, Trans. ASME*, Vol. 116, No. 4, March 1994, pp. 1081-1088.

J4. Ananthasuresh, G.K. and Kota, S., “Designing Compliant Mechanisms,” *Mechanical Engineering*, Vol. 117, No. 11, November, 1995, pp. 93-96.

J5. Frecker, M., Ananthasuresh, G.K., Nishiwaki, S., Kikuchi, N., and Kota, S., “Topological Synthesis of Compliant Mechanisms Using Multi-Criteria Optimization,” *Journal of Mechanical Design, Trans. ASME,* Vol. 119, No. 2, June 1997, pp. 238-245.

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J10. Ananthasuresh, G.K., "Design of Fully Rotatable, Roller-Crank-Driven, Cam Mechanisms for Arbitrary Motion Specifications," *Mechanism and Machine Theory*, **36** (2001), pp. 445-467.

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J13. Krovi, V., Ananthasuresh, G.K., and Kumar, V., 2001,"Kinematic synthesis of spatial R-R dyads for path following with applications to coupled serial chain mechanisms," *Journal of Mechanical Design, Trans. ASME*, Vol. 123, No. 3, pp. 359-366.

J14. Yin, L. and Ananthasuresh, G.K., "Topology Optimization of Compliant Mechanisms with Multiple Materials Using a Peak Function Material Interpolation Scheme," *Structural and Multidisciplinary Optimization*, Vol. 23, No. 1, 2001, pp. 49-62.

J15. Mankame, N. and Ananthasuresh, G.K., "Comprehensive Thermal Modeling and Characterization of an Electro-Thermal-Compliant Microactuator," *Journal of Micromechanics and Microengineering*, **11**, No. 5, (2001), pp. 452-462.

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J17. Wang, X., Ananthasuresh, G.K., and Ostrowski, J., "Vision-based Sensing of Forces in Elastic Objects," *Sensors and Actuators, A Physical*, **94**(3), 2001, pp. 142-156.

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J19. Lai, E. and Ananthasuresh, G.K., "On the Design of Bars and Beams for Desired Mode Shapes," *Journal of Sound and Vibration*, **254**(2), 2002, pp. 393-406.

J20. Yin, L. and Ananthasuresh, G.K., "A Novel Topology Design Scheme for the Multi-physics Problems of Electro-Thermally Actuated Compliant Micromechanisms," *Sensors and Actuators, A Physical,* **97-98**(2002), pp. 599-609.

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J25. Yin, L. and Ananthasuresh, G.K., "Design of Distributed Compliant Mechanisms," *Mechanics Based Design of Structures and Machines*, Vol. 31, No. 2, 2003, pp. 151-179.

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J33. Mankame, N. and Ananthasuresh, G.K., "Topology Optimization for Synthesis of Contact-aided Compliant Mechanisms using Regularized Contact Modeling," *Computers and Structures*, 82(15-16), 2004, pp. 1267-1290.

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J36. Ananthasuresh, G. K. and Howell, L. L., "Mechanical Design of Compliant Microsystems: A Perspective and Prospects," *Journal of Mechanical Design*, 127(4), 2005, pp. 736-738.

J37. Pedersen, C. B. W., Fleck, N. A. and Ananthasuresh, G. K., "Design of a Compliant Mechanism to Modify an Actuator Characteristic to Deliver a Constant Output Force," *Journal of Mechanical Design*, 128(5), 2006, pp. 1101-1112.

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J39. Balaji, G., Singh, A. and Ananthasuresh, G. K., "Electro-magnetically Actuated Minute Polymer Pump Fabricated using Packaging Technology," *Journal of Physics: Conference Series*, Institute of Physics Publishing, 34 (2006), pp. 258-263.

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J52. A. B. Bhaskar, Girish Krishnan, N. Shamsudhin, and G.K. Ananthasuresh, "Design, Fabrication, and Testing of a Meso-scale Accelerometer Made of Spring Steel," *Journal of the Instrumentation Society of India*, Vol. 39, No. 1, March 2009, pp. 46-52.

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J54. S. R. Deepak and Ananthasuresh, G.K., "James Watt and his Linkages", *Resonance: Science Education Journal*, Vol. 14, No. 5, June 2009, pp. 530-543.

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