Name: Pushparaj Mani Pathak

Designation: Professor

Address:
Robotics and Control Laboratory,
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Indian Institute of Technology, Roorkee, India

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Areas of Specialisation: Robotics, Dynamics, Control, Bond graph modeling, Design

Google Scholar Data
(https://scholar.google.co.in/citations?user=cTcZwhcAAAAJ&hl=en)

	All	Since 2013
Citations	764	550
h-index	15	13
i10-index	21	15

Education

Degree	Discipline/ Specialisation	Institution	Year
Ph.D.	Space Robotics	Indian Institute of Technology, Kharagpur	2005
M.Tech	Solid Mechanics & Design	Indian Institute of Technology, Kanpur	1998
B.Tech	Mechanical Engg.	National Institute of Technology, Calicut	1988

Teaching Experience

Duration	Designation	Organisation	Area(s)
22-12-2018 Continuing	Professor	IIT Roorkee	Robotics, Automatic Control, Machine Drawing, Engineering Graphics
23-10-2012- 21-12-2018	Associate Professor	IIT Roorkee	Robotics, CAD, Mechatronics, Machine Design, Machine Drawing, Engineering Graphics
23-02-2006- 22-10-2012	Assistant Professor	IIT Roorkee	Robotics, CAD, Mechatronics, Machine Design, Machine Drawing, Engineering Graphics
07-01-2004- 22-02-2006	Reader	Indira Gandhi Government Engineering College, Sagar	Machine Design, Dynamics of Machines, Vibration, Modelling & Simulation, Mechatronics
01-11-2002 – 06-01-2004	Senior Lecturer	Indira Gandhi Government Engineering College, Sagar	Machine Design, Dynamics of Machines, Vibration, Modelling & Simulation
07-01-1999 – 31-10-2002	Senior Lecturer	Government Engineering College, Raipur	Mechanics of solids, Machine Design, CAD, Engineering Graphics, Engineering Mechanics
07-01-1994 – 06-01-1999	Lecturer	Government Engineering College, Raipur	Mechanics of solids, Machine Design, CAD, Engineering Graphics, Engineering Mechanics

Industrial Experience

Duration	Organisation	Area(s)
11-06-1990 to 06-01-1994	Western Telecom region, Pithampur (Madhya Pradesh)	Maintenance of UHF & Microwave equipment
	Western Telecom region, Seoni (Madhya Pradesh)	Maintenance of coaxial Telecom transmission equipment
16-10-1989 to 30-06-1990	Regional Telecom Training Center, Hyderabad	Maintenance of Telecom transmission equipment
02-1989 to 06-1989	Gajra Gears Limited	Design of Spur and Helical gears

Prizes/Medals/Awards/Honours

- Member International Federation for the Promotion of Mechanism and Machine Science (IFToMM) Technical committee for Multi Body Dynamics.

- Member judges committee ROBOCON 2017, National Robotic Contest, 2-4 March 2017.

- Member judges committee ROBOCON 2016, National Robotic Contest, 3-5 March 2016.

- Declared one of the top ten teams in India in best B Tech project 2011 by QuEST Ingenium Design Contest 2011 held at Bangalore.(Role: project supervisor).

- Best paper award in the 4th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (IMAACA 2010), Fes, Morocco.

- B Tech best project award 2009, 2015 (Role: project supervisor).

- Session chairman, Human robot interaction session at 10th Uttarakhand State Science and Technology Congress, on 10 February, 2016.

- Chaired session at IFToMM World Congress 2015 at Taipei, October 25-30, 2015
- Chaired session at iNaCoMM 2015 at IIT Kanpur, December 16-19, 2015
- Chaired session on Dynamics and Control session of NaCoMM 2011 held at IIT Chennai.
- Chaired session on Robotics and Control session of NaCoMM 2009 held at NIT Durgapur.
- Paper Figure on cover page of proceeding of 9th International conference on Bond Graph Modelling and Simulation (ICBGM 2009), Orlando, Florida.
- Sponsored in March 2004 by AICTE, CSIR and IIT Kharagpur for paper presentation at 15th International Conference on Modelling and Simulation, organized by Association of Science and Technology for Development (IASTED), at Marina Del Ray, California.

Journals Reviewer
- Robotics and Computer Integrated Manufacturing
- Robotics and Autonomous systems
- IEEE/ASME Transactions on Mechatronics
- Robotica
- IEEE Transactions on Automation Science and Engineering
- Mechanism and Machine Theory
- International Journal of Computer and Graphics
- Journal of Simulation Modelling Practice and Theory
- International Journal of Simulation
- Simulation
- International Journal of Systems
- Journal of Sound and Vibration
- Sadhna
- The Vibration Institute of India (Journal)
- Journal of Aerospace Sciences and Technologies

Reviewed the following books
- Industrial Robotics by Groover, Weiss, Nagel, and Odrey, for McGraw Hill
- Mechanical Vibrations by S. Grahm Kelly, for McGraw Hill
- Bond Graph in Modeling, Simulation and fault Identification. A. Mukherjee, R. Karmakar and A.K. Samantaray, CRC Press, FL, 2006, for Association of Machines and Mechanisms Newsletter.
- Reviewer for Applied Mechanics course under *National Mission Project on Education through ICT,* Ministry of Human Resource Development, Government of India, Anchored by: Indian Institute of Technology, Kharagpur

Reviewer in following conferences

- RSI 2019
- MATHMOD 2015
- ICBGM 2014
- ICIAME 2014
- IMAACA 2013
- iNaCoMM 2013
- IROS, 2013
- Modelling, Identification and Control, 2013
- Advances in Robotics, 04 - 06 July 2013 Pune, India
- National Conference on Machines and mechanisms 2011
- The 5th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (part of the 8th International Mediterranean and Latin American Modelling Multiconference I3M2011); September 28-30, 2011, Rome, Italy.
- National Conference on Machines and mechanisms 2009
- IEEE Region 10 Colloquium and Third International Conference on Industrial and Information Systems, 8-10 December 2008, IIT Kharagpur, India.
- XXXII National Systems Conference NSC – 2008 December 17-19 2008, Roorkee
- Sixth (6th) International Conference of Numerical Analysis and Applied Mathematics, Greece, 2008
- National Conference on Design, Dynamics and Manufacturing (NCDDM-07), SLIET, Longowal, Punjab, 2007.
- Second international Congress on Computational Mechanics and Simulation, December 8-10, 2006, I.I.T. Guwahati.
- First International & 22nd All India manufacturing, technology, Design and Research Conference, Dec 21-23, 2006, IIT Roorkee.

Editorial Activities

- Newsletter editor, Robotics Society of India, Vol. 1, No.5, 2017.
- Focused section on Modeling and Control of Soft Manipulators, IEEE/ASME Transactions on Mechatronics, 2015.

MOOCS NPTEL Course on
- Modelling and Simulation of Dynamic Systems

Member International/National Advisory Bodies

- The 8th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (part of the 10th International Mediterranean and Latin American Modelling Multiconference I3M2015); September 21-23, 2015, Bergeggi, Italy.

- 12th International Conference on Informatics in Control, Automation and Robotics" - ICINCO 2015, COLMAR, ALSACE, France

- International Conference on Trends in Mechanical Engineering (MECE-2015) Bangalore, India, Feb 14-15, 2015.

- International conference on Cutting Edge Technological Challenges in Mechanical Engineering" (CETCME-2015) in sync with MAKE IN INDIA on 21st and 22nd March, 2015, Department of Mechanical Engineering, NIET, Gr. Noida, Up, India

- International Conference on Advancement and Recent Innovations in Mechanical, Production and Industrial Engineering" during 27-28 February, 2015, I.T.S Engineering College Greater Noida, Uttar Pradesh

- International Conference on Bond Graph Modeling 2014 (ICBGM 2014)

- The First International Conference on Recent Trends in Mechanical Engineering (RTME 2013), Dubai,UAE, (May 18 - 19) 2013.

- The 7th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (part of the 10th International Mediterranean and Latin American Modelling Multiconference I3M2013); September 25-27, 2013, Athens, Greece.

- The 6th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (part of the 9th International Mediterranean and Latin American Modelling Multiconference I3M2012); September 19-21, 2012, Vienna, Austria.

- The 5th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (part of the 8th International Mediterranean and Latin American Modelling Multiconference I3M2011); September 28-30, 2011, Rome, Italy.

- Industrial. Problems on Machines and. Mechanisms (IPRoM 2010) at NIT Jaipur.

- Member national advisory, National Conference on Design, Dynamics & manufacturing (NCDDM-07, SLIET, Longowal (Punjab), March 2007.

- Member Internal program/advisory body International Conference on Emerging Technologies and Applications in Engineering Technologies and Sciences, 13-14 January 2008.

Membership of Professional Bodies
- International Federation for the Promotion of Mechanism and Machine Science (IFToMM) Technical committee for Multi Body Dynamics
- Association of Machines and Mechanisms (AMM)
- Robotic Society of India (RSI)

Other Activities/Responsibilities:
- External Faculty, IIT Mandi for Robotics and Control course, Spring 15-16, Spring 14-15
- Organising Secretary, 1st International and 16th National Conference on Machines and Mechanisms (iNaCoMM 2013)
- Staff advisor, Model and Robotics, Hobbies Club (April 1, 2006-March 31, 2013).
- In charge Robotics & Control Laboratory (2006-continuing).
- In charge maintenance (East Block), Mechanical and Industrial Engineering Department (July 2010-June 2012)

- Staff adviser IIT Roorkee ROBOCON team (2009, 2010, 2011, 2012, 2013, 2014)
- Coordinator, project of CAD, CAM & robotics M. Tech students
- Coordinator- CE 101-Engineering Graphics (2009, 2011,2013)
- Coordinator- MI-261-Machine Drawing (2010, 2011)
- Member Department research committee(2006-2008)
- Member Department under graduate committee(2007-2008)
- Member for personal interview board, MBA admissions: IIT Roorkee 2009, 2010.
- Member AIMTDR sub-committee on inauguration and valedictory, technical sessions, proceedings (2006).
- Organised brain storming session on Mechatronics Curricula Design for Different Levels of Technical Education, event sponsored by Project No. MIT-249-MSD, "National competitiveness in the knowledge economy on 18th September 2010.

Details of Doctoral Theses Supervised

Summary

Awarded-10	Ongoing-08

S.N.	Title	Year awarded	Name of Scholar	Co-supervisor (if any)
1	Home Automation	On going	Saurabh Sachan	-
2	Development of Snake Robot	On going	Garima Bhandari	-
3	Modelling and Control of Bionic Manipulators	On going	Vipin Pachouri	-
4	Design and Development of Construction Robots	On going	Ishan Chawla	-
5	Haptic Control of In Vivo Robots	On going	Sarvesh Saini	M. Felix Orlando, Electrical Engg Deptt., IIT Roorkee
6	Modelling and Control of Soft Robots	On going	Mulu Girmay	-----------
7	Design and Development of Autonomous Climbing Robot	On going	Ravindra Singh Bisht	Dr. S. K. Panigrahi CSIR-Central Building Research Institute, Roorkee
8	Development of Control System for Mobile Robot with Manipulator	On going	Vitalram Rayankula	-----
9	Investigation of Structural Dynamics and Ride Comfort of Rail Vehicle System	2018	Vivek Kumar (SLIET, Longowal)	Prof. Vikas Rastogi (Delhi Technological University, Delhi)
10	Strategies for Control of Multiple and Hyper Redundant Space Robots	2016	Vijay Kumar Dalla	----

11	Wireless Hybrid Visual Servoing Algorithms for Mobile Robots	2016	Gossaye Mekonnen Alemu	Dr Sanjeev Kumar (Mathematics Department, IIT Roorkee)
12	Design Development and Control of Miniature Robot for In-Vivo Biopsy	2015	Mihir Kumar Sutar	Prof. N.K. Mehta (Mechanical & Industrial Engineering Department, IIT Roorkee.)
13	Remaining Life Prediction of Machine Element Using Reverse Engineering Approach	2015	Atul Kumar	Prof. P.K. Jain (Mechanical & Industrial Engineering Department, IIT Roorkee.)
14	Dynamic Modeling and Control of Quadruped Robot with Compliant Legs	2015	Gor Mehulkumar Mahendrabhai	----
15	Dynamics and Control of Dual-Arm Space Robots	2012	Haresh Kumar Punalal Patolia	Prof. S.C. Jain (Mechanical & Industrial Engineering Department, IIT Roorkee.)
16	Studies on Electro-Magnetically Stir Cast Al-Si Alloys	2012	Prabha Kiran	Prof. D. K. Dwivedi (Mechanical & Industrial Engineering Department, IIT Roorkee.)
17	Modelling and Control of Quadruped Robot with Flexible Legs	2011	V. L. Krishnan	Prof. S.C. Jain (Mechanical & Industrial Engineering Department, IIT Roorkee.)
18	Modelling and Control of Flexible Space Robots	2010	Amit Kumar	Prof. N. Sukavanam (Mathematics Department, IIT Roorkee)

M. Tech Dissertations Guided
Summary

Awarded: 40	Ongoing: 02

S. N.	Title	Year awarded	Name of Scholar	Co-supervisor (if any)]
1	Development of Bric laying construction robot	Ongoing	Rakesh Ravidas	-

2	Optimization of Size of Robotic Arm for Wire Actuation of Daksh Robot	2018	Gawade Shantanu Annasaheb	---
3	Modelling and Control of Humanoid Robot	Ongoing	Sukhram Kumar (PT)	---
4	Modelling and Simulation of Wire Actuated Robot With Payload	2017	Sidharth Kumar	---
5	Design and Development of a Weight In Motion Systems For Indian Railways	2016	Abhinav Bhatt	---
6	Control of Quadruped Robot for Different Environments	2016	Kushagr Goyal	Prof. B. K. Mishra, MIED, IIT Roorkee
7	Modelling and Simulation of Wire Actuated Hybrid Robot	2016	Gowtham Raj S	Prof. B. K. Mishra, MIED, IIT Roorkee
8	Experimental and Simulation Studies on Medical Robots	2016	Sarvesh Saini	
9	Set-Based Prediction of Traffic Participants	2015	Inderjeet Singh	Prof. Matthias Althoff, Technical University of Munich, Germany
10	Dynamic Analysis and Control of Cable Driven Robots	2015	Yengkhom Milannar Singh	---
11	Design and Development of Robotic Glove for Impaired Fingers	2014	Vipin Patel	---
12	Three dimensional Modelling of Bionic Manipulator for Intelligent Transportation System	2015	Himanshu	---
13	Design and Development of In-Pipe Robot	2013	Manjot Singh Arneja	---
14	Modelling and Simulation of Multiarm Bionic Trunk	2013	Sapkal Raju Mahadu	---
15	Modelling of Variable Compliant Four Legged Robot	2013	Rishit Rajesh Chauhan	---
16	Dynamic Modelling of Multi Section Bionic Manipulator: Application to ROBOTINO XT	2012	Sonam Behl	Prof. B. K. Mishra, MIED, IIT Roorkee
17	Reconfiguration of Four Legged Walking Robot	2012	Khandare Rohit Sanjeev	---
18	Development of Control Strategy for Force Control in In-Vivo Robots	2012	Osamah Fadhil Fakhri	---
19	Design and Development of Fracture-Resistant Weld Bonds of Al-Alloys	2012	Anand Kumar Mandal	Prof. D. K. Dwivedi, MIED, IIT Roorkee

20	Dynamic Modelling and Trajectory Control of Four Legged Walking Robot with Flexible Legs	2011	Ganesh Kumar K.	---
21	Dynamic Modelling and Trajectory Planning of Dual Arm Free Flying Space Robot	2011	Rishikesh Rameshchandra Rathee	---
22	Creation of Virtual Objects to be Used with Haptic Device for Motor Rehabilitation	2010	Mania Jatinkumar Babubhai	Prof. B. K. Mishra, MIED, IIT Roorkee
23	Modelling and Dynamic Analysis of Rocker Bogie Rover for Space Exploration	2010	Pushpendra Kumar	---
24	Dynamic Modelling and Experimental Studies on Four Legged Walking Robot	2010	Jagadale Balkrishna Vasantrao	---
25	Fracture Studies of Ultra Fine Grained Al Alloys	2010	Lalit Kralia	Dr. I.V. Singh MIED, IIT Roorkee
26	A Scheme for Re-configurability of Mobile Robots	2009	Mahesh Gupta	Dr. D. K. Dwivedi, MIED, IIT Roorkee
27	Modelling of Residual Stresses in Butt Weld of Stainless Steel-304 Using FEM and It's Experimental Validation	2009	Narendra Kumar	Prof. D. K. Dwivedi, MIED, IIT Roorkee
28	Fracture and Fatigue Studies of Stir Cast Al-Si-Mg Alloys	2009	Prasanta Kumar Mahanta	Prof. D. K. Dwivedi, MIED, IIT Roorkee
29	Trajectory Tracking of an Unmanned Air Vehicle	2009	Abhijit Vitthalrao Deokar	Dr. S P. Harsha MIED, IIT Roorkee
30	Control of In Vivo Robots in Workspace for Biopsy	2008	Sreenadha Reddy K.	Dr. A. K. Sharma, MIED, IIT Roorkee
31	Modelling and Trajectory Control of Multi Arm Planar Space Robot	2008	Deshpande Nachiket Prakash	Prof. S. C. Jain MIED, IIT Roorkee
32	Analysis of Buckling Performance of Laminated Cylindrical Shell with Cutout	2008	Abhishek Pyasi	Dr. Inderdeep Singh, MIED, IIT Roorkee
33	Analysis and Control of Unbalance in Raw Mill Separator due to Wear	2008	Vijay Kumar Ojha	Prof. D. K. Dwivedi, MIED, IIT Roorkee
34	Dynamic Modelling and Trajectory Control of Co-operative Flexible Space Robot System	2008	G Surya Kiran	Prof. N. Sukavanam, Dept. of Mathematics, IIT Roorkee

35	Trajectory and Attitude Control of Underwater Robot for Minimum Energy Consumption	2008	Bende Vikrant Vinay	Dr. S P. Harsha MIED, IIT Roorke
36	Tool Path Generation for Freeform Surfaces	2008	M. Satish Chandra	Prof. N. K. Mehta, MIED, IIT Roorkee
37	Design and Fabrication of Planar Space Robot	2007	Raj Kumar Jain	---
38	Dynamic Modelling and Control of Underwater Robot	2007	Dixit Kedar Shirish	---
39	Modelling and Simulation of Six Legged Walking Robot	2007	Abhay Joshi	---
40	Modelling and Dynamic Analysis of Biocompatible Robotic Arm	2007	Chandekar Bhupendra Gopal	Dr. A.K. Sharma, MIED, IIT Roorkee
41	Development of Meaningful Discretization Scheme for FEA of Stress Concentration Problem	2007	Bhangare Santosh Lalasaheb	---
42	Analysis of Drip Irrigation Submain Unit by Finite Element Method	1999	Harshal Kumar Bhange	Prof. A.P. Mukherjee, Dr. R.R. Saxena, Dr. S. Patel Indira Gandhi Agriculture University Raipur

B. Tech Dissertations Guided

S.No.	Name	Year	Title of Thesis	Co-guides (if any)
1	Saurabh Shakya Vijay Pal Bana Umang Singh Aneja	2019	Vehicle Detection Using Image Processing To Improve Safety Measures.	
2	Chaarusri Hardev Vishal Nagula Ruhi Gill	2017	Development of A Co-Operative Bionic Manipulator	
3	Pratyush Kumar Umesh Malhotra Sarabjeet Singh	2017	Development of A Haptic Robot For Motor Rehabilitation	
4	Jaligam Nihal Varma M. Karthik	2016	Design & Development of Snake Robot	
5	Jayant Jain Ratnesh Madaan	2015	Motion planning of a mobile robot on rough terrains using Digital Elevation Models	-
6	Aman Mittal Amir Raza Naman Jain	2015	Visual Servoing of a Quadruped bot **(Best B Tech thesis of Department)**	-
7	Anshul Dhurandhar Yadwinder Paul Singh	2013	Development and Control of One-Scale In-Vivo Robot	

8	Suraj Singh Shashank Shekhar Agarwal Gaurav Rakhecha	2013	Design and Development of a Pipe Inspection Robot	
9	Pankaj Goyal Rishav Kumar Shivam Kumar Gupta	2013	Design Concept and Validation of Multi Section Cable Driven Soft Robotic Arm	
10	Ankit Katiyar Tanvir Kaur (Electrical Engg. Deptt.)	2012	Model Predictive Control of a Robot	Dr. G. N. Pillai Electrical Engg. Deptt.
11	Subrot Kant Bera (Electrical Engg. Deptt.)	2012	Fuzzy Logic Control of a Robotic Arm	Dr. G. N. Pillai Electrical Engg. Deptt.
12	Saurabh Gupta Achin Garg Chandrasen Vikram	2011	Design and Development of In Vivo Robot for Biopsy	Dr. A.K. Sharma MIED, IIT Roorkee
13	Ankur Bansal Somnath Das (Electrical Engg. Deptt.)	2011	Design of Controller for a Robotic Arm	Dr. G. N. Pillai Electrical Engg. Deptt.
14	Shailabh Suman, Sunil kumar Yadav	2009	Fabrication of Low Cost EMG Controlled Prosthetic Hand	Dr. D. K. Dwivedi MIED, IIT Roorkee
15	Himanshu Lohani, Anshul Pandey, Anurag Mittal	2009	Dynamics of a Four Legged Walking Robot **(Best B Tech thesis of Department)**	-
16	Apoorv Bhargava, Ravi Prakash Sharma, Vipin Agrawal	2008	Low Cost Automation	Prof. S.C. Jain, MIED, IIT Roorkee
17	Rahul Maheshwari, Rahul Gupta, Rachit Jaiwant	2007	Design and Control of Cooperative Space Robots	-

Short Term Courses Organised

S.N.	Title of Course	Institute	Duration	Co-Coordinator
1	Modelling and Control of Robots	IIT Roorkee	July 11-15, 2016	-
2	Computer Aided Design for Mechanical Engineering curricula	IIT Roorkee	December 21-25, 2009	Prof. B. K. Mishra MIED, IIT Roorkee
3	Dynamics and Control of Robots	IIT Roorkee	April 15-19, 2008	Dr. N. Sukavanam Maths Deptt.
4	Modelling & Simulation of Mechatronic Systems	IIT Roorkee	June 18-22, 2007	Prof. B. K. Mishra MIED, IIT Roorkee

Brain Storming Session/Workshop Organised:

- Mechatronics Curricula Design for Different Levels of Technical Education on 18th September 2010.
- Experiments for Robotics Class, February 13, 2016

Organising special and invited session/track on
Bond Graph Modeling, Simulation and Applications; Chair: P.M. Pathak and Anand Vaz, India at the 5th International Conference on Integrated Modeling and Analysis in Applied Control and Automation; part of the 8th International Mediterranean and Latin American Modelling Multiconference I3M2011; September 12-14, 2011; Ergife Palace Hotel, Rome, Italy

Research Projects

S.N.	Period	Sponsoring Organisation	Title of Project	Amount of Grant (Rupees)	Co-Investigators (if any)
1	2019-21	SPARC, MHRD	Design and Development of Cable-Driven Parallel Robot for Automated Construction	46.19 Lacs	Prof. Arun Kumar Samantaray (IIT Kharagpur), Prof. Umesh Kumar Sharma (IIT Roorkee) Prof. Leila Notash Prof. Qingguo Li (Queen's University, Canada)
2	2018-21	DST(India)- and Ministry of Education, Science & Technology of the Republic of Korea	Indo-Korea joint network centre on Robotics-Hyper-redundant Robots	34.86 Lacs	Jung-Min Yang Kyungpook National University, Daegu, South Korea
3	1 July 2016- 30 June 2019	CEFIPRA, DST (India)-CNRS (France)	Modelling and control of mobile cooperating bionic arms	33.66 Lacs	(i) Prof. A.K. Samantaray Professor Department of Mechanical Engineering IIT Kharagpur (ii)Prof Rochdi MERZOUKI (iii) Prof. Belkacem Ould Bouamama, CRIStAL CNRS UMR 9189 Ecole Polytechnique Universitaire de Lille, Avenue Paul Langevin – 59655 Villeneuve d'Ascq., France
4	August 2015	Defence Research and Development Organisation (DRDO), Research and Development Establishments (Engineers), Pune	Modelling and Feasibility Studies towards development of wire actuated manipulator arm for ROV-DAKSH	9.94 Lacs	-

5	June 2015-18	Department of Science and Technology, (DST), Government of India And Ministerio De Ciencia, Teconología E Innovación Productiva, Govt of Argentina	Development of control system for mobile robot with manipulator for transporting hazardous materials.	13.95 Lacs	Sergio Jose Junco Professor Facultad de Ciencias Exactas, Ingeniería y Agrimensura, Universidad Nacional de Rosario, Argentina
6	November 2011	Department of Science and Technology, (DST), Government of India And Ministry of Education, Science & Technology of the Republic of Korea	Fault Tolerant Control and Reconfiguration of Walking Robots with Flexible Legs	19.64 Lacs	A. K. Samantaray, IIT Kharagpur Jung-Min Yang Kyungpook National University, Daegu, South Korea, Seong Woo Kwak, Keimyung University, , South Korea
7	2010-11	Crime branch, Delhi Police, Delhi	Failure investigation of cranes accidents at Jamrudpur site of DMRC	0.71 Lacs	Dr D.K. Dwivedi Dr Umesh Sharma
8	November 2009	Department of Science and Technology, (DST), Government of India	Design and Development of Miniature Robot for Biopsy and In Vivo Surgery	25.14 Lacs	Dr. A. K. Sharma Prof N. K. Mehta Dr Vinay Gupta(MD) (Vinay Nursing Home, Roorkee)
9	January 2009	Indian Space Research Organisation (ISRO)	Modelling, Simulation and Control of Space Robots	5.92 Lacs	Prof. S.C.Jain MIED
10	June 2008	Sponsored Research & Industrial Consultancy (SRIC), IIT Roorkee	Adviser for ROBOCON 2009 IIT Roorkee Team	1.6 Lacs	-
11	June 2008	Sponsored Research & Industrial Consultancy (SRIC), IIT Roorkee	Walking Robot With Flexible Legs	7.5 Lacs	
12	January 2007	Sponsored Research & Industrial Consultancy (SRIC), IIT Roorkee	Design & Fabrication of a Planer Cooperative Space Robot	1.0 Lacs	-
	Total			153.92 Lacs	

Consultancy Projects

S No.	Title of Project	Funding Agency	Financial Outlay (Rupees)	Year of start & total period	Name of P.I. and other investigators	Status Started or completed or in progress
1	Inspection of injection moulding machine to determine its classification	Texplas, Haridwar	1.1236 Lakhs	2013-14	Dr D.K. Dwivedi Dr P.M. Pathak	Completed
2	Development of QAP, Production Drawing And Design of Different Components of EOT Crane	M/S B.K. TRADERS, BARAUNI,	12.92 Lacs	Mar 01,2013	Dr P.M. Pathak Dr D.K. Dwivedi	Completed
3	BOPET (Biaxially-oriented polyethylene terephthalate) Film Manufacturing Equipment Design Study, Gap Analysis and New Design for Enhance Capacity	SRF limited, Kashipur	5.75 Lacs	2009	Prof. V. K. Agrawal (PI), Chemical Deptt. Dr. C.B. Majumdar (CI), Chemical Deptt.	Completed
4	Dynamics and Control of Robots	AICTE recognized institutes	0.97 Lacs	April 2008	N. Sukavanam (co-cordinator)	Completed
5	Root cause analysis of problems caused by excessive vibration of separator fan and related imbalance	ACC,Gaggal (HP)	0.62 Lacs	2008 (one month)	Umesh Sharma (PI)(CED) P.M. Pathak (CI) D.K. Dwivedi (CI)	Completed
6	Recommendation to lower the vibrations caused by erosive wear in separator fan	ACC,Gaggal (HP)	3.93Lacs	2008	P.M. Pathak (PI) D.K. Dwivedi (CI)	Completed
Total			25.3136 Lacs			

Administrative Experience

Period	Organisation	Nature of Responsibility
2017-2018	IIT Roorkee	Chairman, GATE 2018
2016-2017	IIT Roorkee	Organising Vice Chairman, GATE 2017
2015- 2016	IIT Roorkee	Vice Chairman, GATE 2016
2014-2016	IIT Roorkee	Member, Department Purchase Committee
2014-2016	IIT Roorkee	Chairman, Department Write-off Committee
2014-2016	IIT Roorkee	Coordinator, Design Labs
2014-2016	IIT Roorkee	Member, Department Administrative Committee
2012-2014	IIT Roorkee	Examination Superintendent
2010-2012	IIT Roorkee	OC Maintenance (East Block)
One Year	IIT Roorkee	Member Department Undergraduate Committee
2014-2016	IIT Roorkee	Member Department Research Committee

2006-Conti.	IIT Roorkee	OC, Robotics & Control Lab
2006-2013	IIT Roorkee	Staff Adviser, robotics and Model Section, Hobbies Club
Six months	Indira Gandhi Engineering College, Sagar	Deputy Coordinator (Nodal Center), RGPV, Bhopal
One year	Indira Gandhi Engg. College, Sagar	College campus water supply in charge
Two year	Government Engg. College, Raipur	Assistant Superintendent University Examinations
One year	Government Engg. College, Raipur	Hostel Warden

Keynote Lecture Delivered in Conferences/Events

Title of Lecture	Date	Conference/Programme	Place
Quadruped Robots: Design and Control	7 -8 March 2014	2nd International Conference on Innovations in Automation and Mechatronics Engineering	G.H.Patel College of Engineering &Technology, Vallabh Vidyanagar, Gujrat
Advance Robotics	10 March 2013	Technica, Annual Technical Festival	BIT Mesra, Patna Campus

Expert Lecture Delivered

Title of Lecture	Date	Name of Program	Place
Robotics research in India	June 27th, 2017	IEEE Robotics & Automation Road mapping Workshop	IIT Delhi
Bond graph modelling of robots	13 January 2017	--	SLIET, Longowal
Modelling of bionic manipulators	18-19 July 2016	National Workshop on Advances in Robotics:	IIT Madras, Chennai
Bond Graph Modelling of Robots	15 March 2016	TEQIP Workshop on Advanced Robotics	IIT Kanpur
Medical robots	Jan 16-17, 2016	PunjRobotics	IIT Ropar
Quadruped Robots: Design and Control	10 March 2015	Faculty Development Programme on "Mechatronics & Robotics in Manufacturing Industries"	Jamia Millia Islamia, New Delhi
Bond graph Modelling of Robots	June 9,10, 2014	TEQIP-II sponsored Faculty Development Programme on Modeling and Simulation of Dynamical Systems and Optimization (MSMDO-2014),	Delhi Technological University (DTU) Delhi

Space Robotics	14-15 March 2014 .	Seminar on " Innovations in Robotics	Department of Mechanical Engineering, ITM Universe, Vadodara
Medical Robots	22 to 23 March, 2013	Short Term Training Program (Advanced Robotics: Design, Planning and Control)	Thapar University Patiala
Bond Graph Modeling and Control of Rigid and Flexible Legged Walking Robots	20-21 January 2012	Golden Jubilee Seminar on Bondgraph	DRDO, R&DE(E), Dighi, Pune
Modelling of Robots	4 and 5 January,2011	ISTE sponsored Faculty Development Programme on Modeling and Simulation of Manufacturing and Dynamical Systems	SLIET, Longowal
Modelling of Space Robots	January 5 – 9, 2009	Winter School on Modeling, Simulation and Control of Engineering Systems	NIT Jalandhar
Advance Robotics	February 2008	Short term course	NIT Hamirpur

Invited Lectures

Title of Lecture	Date	Name of Institute
Bionic Manipulator Modelling	02 November 2018	Kyungpook National University, Daegu, South Korea
Development of virtual objects to be used with haptic device for motor rehabilitation	25 March 2017	Uttarakhand State Council for Science & Technology, Dehradun
Modeling and control of mechatronic systems,	May 4-5, 2016	Graphic Era University Dehradun
Quadruped Robots: Design and Control	21st October 2014	Kyungpook National University, Daegu, South Korea
Bond Graph Modelling and Control of Robots	11-12 March 2013	Indian Institute of Technology, Patna
Bond Graph Modelling of Dynamic Systems	2004 (December)	Government Engineering College, Raipur

Lectures Delivered at IIT Roorkee

Title of Lecture	Date	Place
Solid Modelling	January 2008	IIT Roorkee
Failure Predictions, When to take corrective actions?	2007	IIT Roorkee
Examples of Mechatronic System Modelling	June 2007	IIT Roorkee
Multi body system & Approaching Control system	June 2007	IIT Roorkee

Modelling of Mechanical & Electrical Systems	June 2007	IIT Roorkee
Introduction to Mechatronic Systems	June 2007	IIT Roorkee

Publications
Book

R. Merzouki, A. K. Samantaray, P. M. Pathak, B. Ould Bouamama, Intelligent Mechatronic Systems: Modeling, Control and Diagnosis, **ISBN 978-1-4471-4627-8, 2013, Springer, London**

Book Chapter

- Shailabh Suman, Sunil Kumar, Pushparaj Mani Pathak, Development of Low Cost Electromyography (EMG) Controlled Prosthetic Hand, Mechatronic & Innovative Applications, Editor(s): Rochdi Merzouki, Bentham Science Publishers, 2012, pp. 37-54, DOI: 10.2174/9781608054411112201010037

- M.M. Gor, P.M. Pathak, A.K. Samantaray, J.M. Yang, and S.W. Kwak, Bond graph Modeling and Control of Compliant Legged Quadruped Robot, Springer (Editor: Wolfgang Borutzky), 2017

- Mihir Kumar Sutar and Pushpraj Mani Pathak, Bond Graph Modelling and Control of Hyper-Redundant Miniature Robot for In-Vivo Biopsy, Springer (Editor: Wolfgang Borutzky), 2017

(Journal **55**; Conferences **65**)

2019

1. Vitalram Rayankula, **P M Pathak**, Sergio Jose Junco, Inverse kinematics of mobile manipulator using bidirectional particle swarm optimization by manipulator decoupling, Mechanism and Machine Theory, Volume 131, January 2019, pp 385-405.

2. R.V.Ram, **P.M.Pathak**, and S. J. Junco, Trajectory Control of Mobile Manipulator in the Presence of Base Disturbance, Simulation: Transactions of the Society for Modeling and Simulation International, 2019, Vol. 95(6) 529–543.

3. Vivek Kumar, Vikas Rastogi and **P M Pathak**, Modelling and evaluation of the hunting behaviour of a high-speed railway vehicle on curved track, Proc IMechE Part F: J Rail and Rapid Transit, 2019, Vol. 233(2), 220–236.

4. Vijay Kumar Dalla and **Pushparaj Mani Pathak**, Impedance Control in Multiple Cooperative Space Robots Pulling a Flexible Wire, The Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 2019, Vol. 233(6) 2190–2205.

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6. Ishan Chawla, P.M Pathak, Performance Enhancement of Interval-Analysis-Based-Methods for Wrench-Feasible Workspace Computation of Cable-Driven Parallel, RSI conference on Advances In Robotics - 2019, IIT Madras Chennai, 2-6 July 2019.

2018

1. Vijay Kumar Dalla and **Pushparaj Mani Pathak**, Power Optimized Motion Planning of Reconfigured Redundant Space Robot, Proceedings of the Institution of Mechanical Engineers. Part I: Journal of Systems and Control Engineering, accepted, 2018, https://doi.org/10.1177/0959651818814133

2. Ravindra Singh Bisht, Pushparaj Mani Pathak, Soraj Kumar Panigrahi, Development of a Climbing Robot Based on Multi-Suction Cups Mounted on Timing Belt Mechanism, Asian MMS 2018, December 17-20, Bengaluru, India

3. Ravindra Singh Bisht, Pushparaj Mani Pathak, and Saroj Kumar Panigrahi, Development of Magnetic Adhesion Based Wheel-Driven Climbing Machine for Ferrous Surface

Applications, Proceedings of the ASME 2018 Dynamic Systems and Control Conference DSCC2018, September 30-October 3, 2018, Atlanta, Georgia, USA

4. RS Bisht, P M Pathak, SK Panigrahi, Experimental investigations on permanent magnet based wheel mechanism for safe navigation of climbing robot, Procedia Computer Science 133, 377-384, 2018.

5. Martín Crespo, Matías Nacusse, Sergio Junco, Vitalram Rayankula, Pushparaj Mani Pathak, Control of a mobile robotic manipulator: a combined design approach, IMAACA: The International Conference on Integrated Modeling and Analysis in Applied Control and Automation, 11th Edition, Part of I3M2018, September 17-19, 2018, Danubius Health SPA Resort Margitsziget, Budapest, Hungary.

6. Mulu Girmay, Pushparaj Mani Pathak, A.K. Samantaray, Rochdi Merzouki, Belkacem Ould Bouamama, Model Based Control of Cooperative Planar Bionic Manipulator, International Conference on Bond Graph Modeling (ICBGM). ICBGM 2018. Bordeaux, France July 9-12, 2018, pp.754-762.

7. R.V.Ram, P.M.Pathak, and S. J. Junco, Reconfiguration of the Mobile Manipulator under the Failure of Joint Actuator, International Conference on Bond Graph Modeling (ICBGM). ICBGM 2018. Bordeaux, France July 9-12, 2018, pp. 577-587.

8. Martín Crespo, Matías Nacusse, Sergio Junco, Vitalram Rayankula, Pushparaj Mani Pathak, Control of A Mobile Robotic Manipulator: A Combined Design Approach, IMAACA 2018, Accepted

9. M. M. Gor, P. M. Pathak, A. K. Samantaray, K. Alam, P. Kumar, D. Anand, P. Vijay, R. Sarkar, J.-M. Yang, S. W. Kwak, Development of a Compliant Legged Quadruped Robot, Sadhna, 43 (7), 102, 2018.

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12. M. M. Gor, **P. M. Pathak**, A. K.Samantaray, J. M. Yang, S. W. Kwak, Fault Accommodation in Compliant Quadruped Robot through a Moving Appendage Mechanism, Mechanism and Machine Theory, pp. 228–244, Vol. 121, March 2018.

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2. Inderjeet Singh, othman lakhal, Yacine Amara, Vincent Coelen, **Pushparaj Mani Pathak** and Rochdi Merzouki, Performances Evaluation of Inverse Kinematic Models of a Compact Bionic Handling Assistant, The 2017 IEEE International Conference on Robotics and Biomimetics, ROBIO 2017, Macau SAR, China, December 5-8, 2017.

3. Matías Nacusse, Martín Crespo, Sergio Junco, Vitalram Rayankula, **Pushparaj Mani Pathak**, Bond Graph Model Conditioning For Analysis, Simulation And Control System Design: Application To A Planar Mobile Robotic Manipulator, IMAACA 2017.

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7. Vivek Kumar, Vikas Rastogi and **P.M. Pathak**, Simulation for Whole-Body Vibration to Assess Ride Comfort of a Low–Medium Speed Railway Vehicle, Simulation: Transactions of the Society for Modeling and Simulation International, pp. 225–236, Vol.93, Issue 3, 2017.

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2001

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2000

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1999

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Visits Abroad

- 2019 Association for Practical and Professional Ethics (APPE) Annual International Conference February 28 through March 3, 2019 in Baltimore, Maryland.
- Joint India-France project, École Polytechnique Universitaire de Lille (Polytech'Lille), **France, December 9 – 29, 2018**
- Workshop of Indo-Korea joint Network Center on Robotics, 27-31 October 2018, Chungnam National University, Daejon, Korea
- ASME 2018 Dynamic Systems and Control Conference DSCC2018, September 30- October 3, 2018, Atlanta, Georgia, USA
- Joint India-France project, École Polytechnique Universitaire de Lille (Polytech'Lille), **France, June 1 - June 21, 2017**
- The 14th IFToMM World Congress, Taipei International Convention Center, **Taiwan**, October 25-30, 2015
- International Conference on Production and Mechanical Engineering (ICPME-2014), Bangkok, **Thailand**, Dec. 30-31, 2014
- Joint Korea-India project in Robotics, Kyungpook National University, Daegu, **South Korea**, 20-26 October 2014.
- Joint Korea-India workshop in Robotics, Jeju, **South Korea**, 30-31 November 2013.
- École Polytechnique Universitaire de Lille (Polytech'Lille), **France**, June-July 2013
- Catholic university and Keimyung University Daegu, **South Korea**, June 17-25, 2012.
- MATHMOD 2012 - 7th Vienna International Conference on Mathematical Modelling, Vienna University of Technology, February 15 - 17, 2012, **Austria**.
- École Polytechnique Universitaire de Lille (Polytech'Lille), **France**, May-July 2011.
- The 4th International Conference on Integrated Modeling and Analysis In Applied Control And Automation (IMAACA 2010), Fes, **Morocco**, 2010.
- École Polytechnique Universitaire de Lille (Polytech'Lille), **France**, May-July 2009.
- École Polytechnique Universitaire de Lille (Polytech'Lille), **France**, May-July 2008.
- International Association of Science and Technology for Development (IASTED) fifteenths International Conference on Modelling and Simulation at Marina Del Rey, California, **U.S.A.**, 2004

International Coopérations :

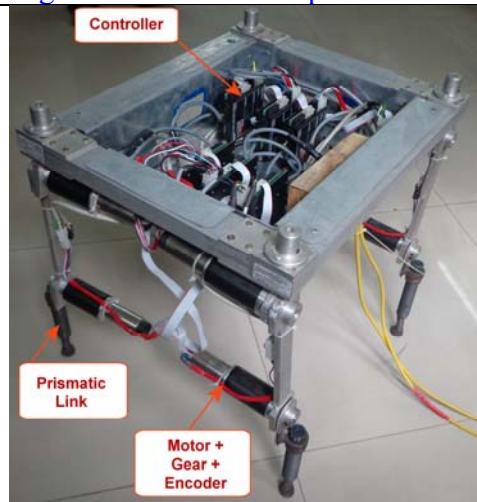Visiting researcher at École Polytechnique Universitaire de Lille (Polytech'Lille), France

- June-July 2013
- May-July 2011
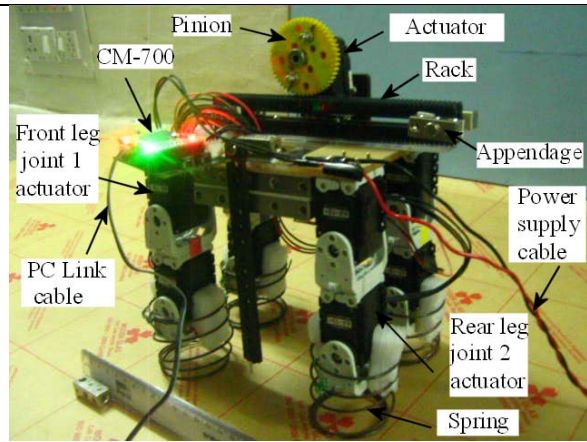- May-July 2009
- May-July 2008

Joint India Korea project

- June 17-25, 2012.
- November 30-31, 2013

- October 20-26 2014
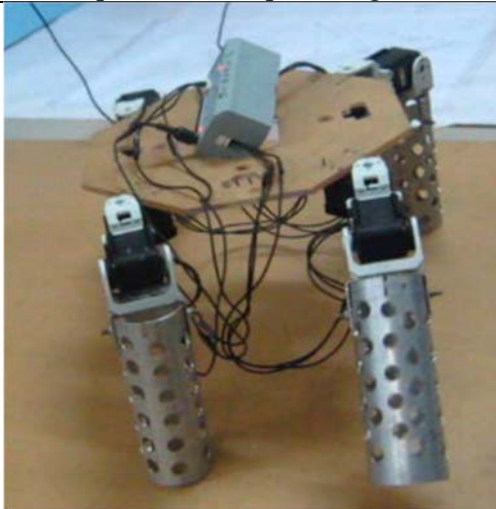
Joint India-France project

- June 1- June 21, 2017

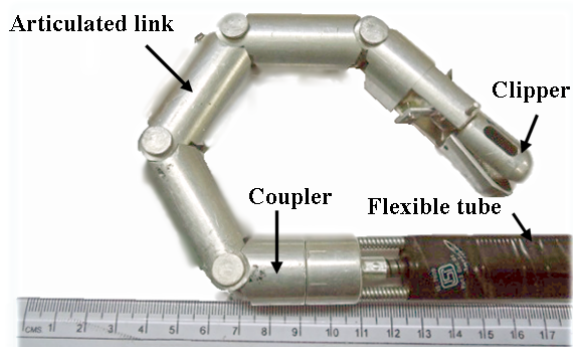Quadruped with compliant legs

Quadruped with compliant legs

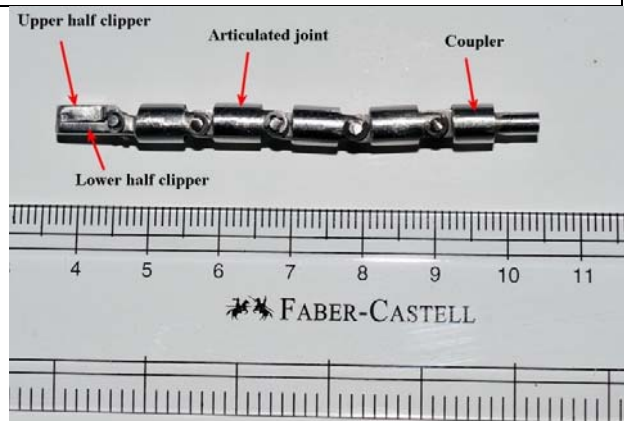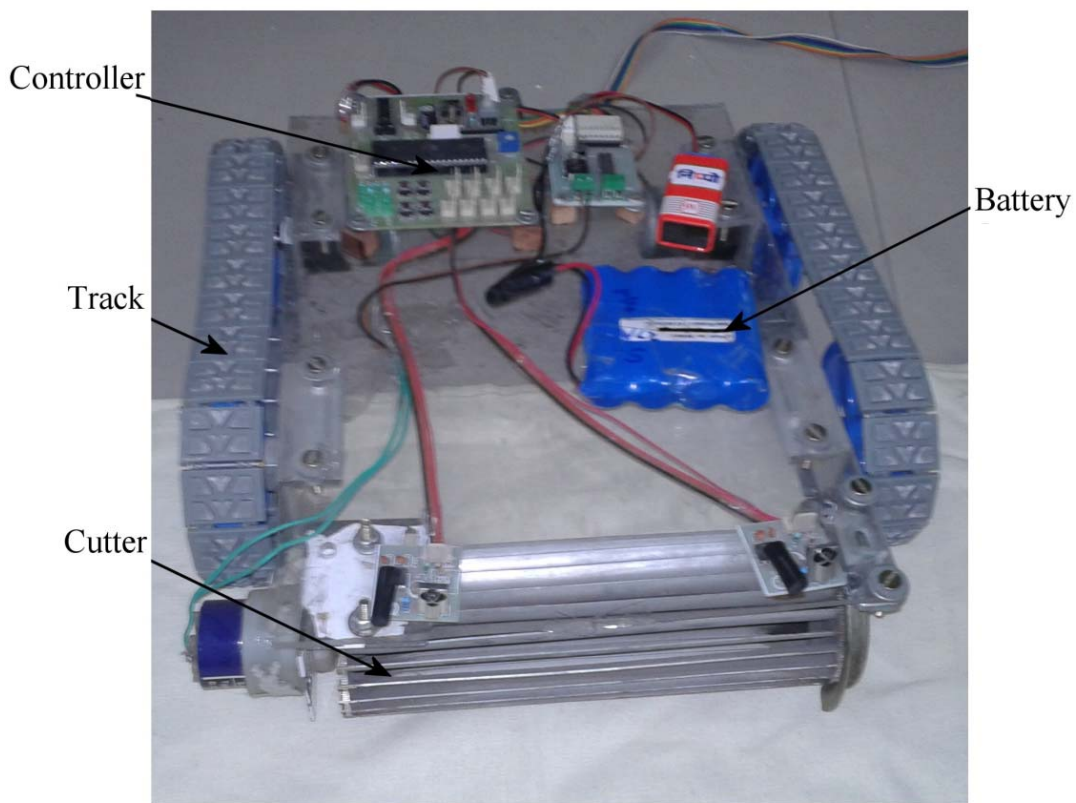

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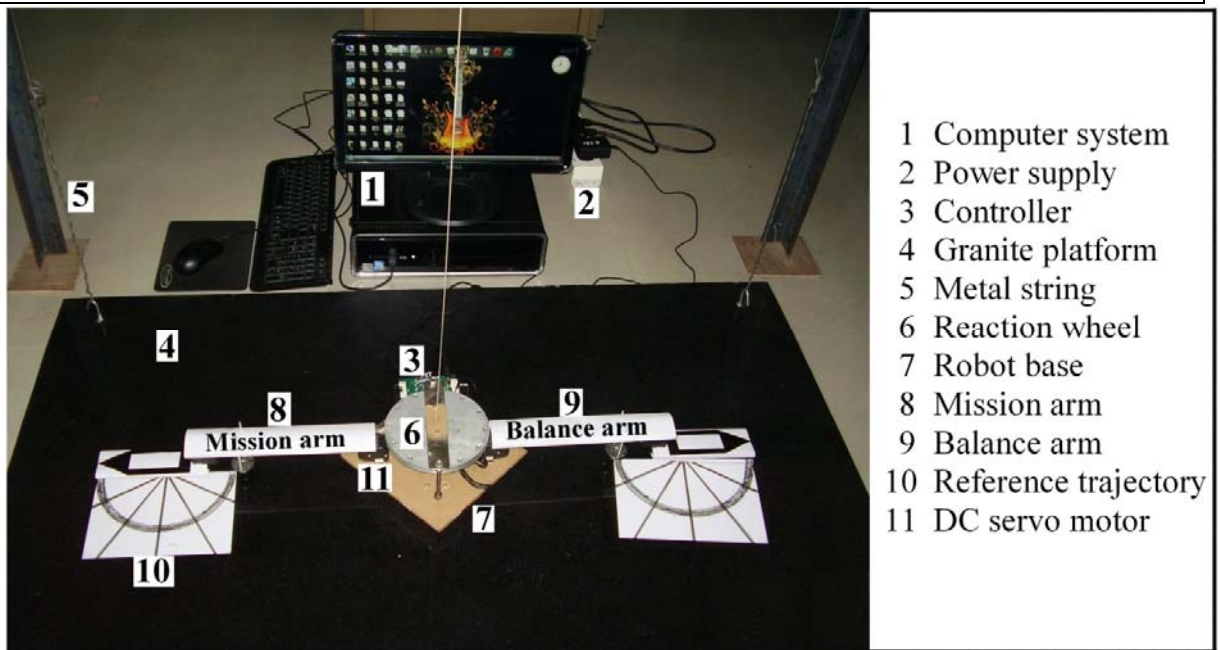

Four-scaled model of the *in-vivo* robot

Actual scale model of *in-vivo* robot

Snow removal robot

1 Computer system
2 Power supply
3 Controller
4 Granite platform
5 Metal string
6 Reaction wheel
7 Robot base
8 Mission arm
9 Balance arm
10 Reference trajectory
11 DC servo motor

Space robot setup