Curriculum Vitae

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1. Academic Qualifications

Degree	**Year**	**Subject**	**University/Institution**
Doctor of Philosophy (Ph.D.)	2011	Mechanical Engineering	University of Maryland, College Park, Maryland, USA
Master of Technology (M-Tech.)	2006	Manufacturing Engineering	Indian Institute of Technology Bombay, Mumbai, Maharashtra, India
Bachelor of Engineering (B.E.)	2003	Production Engineering	University of Mumbai, Mumbai, Maharashtra, India

2. Work Experience

Sr.	**Positions held**	**Institute**	**From**	**To**
1	Associate Professor	Indian Institute of Technology Patna, Bihar, India	December, 2019	Continuing
2	Assistant Professor	Indian Institute of Technology Patna, Bihar, India	September, 2012	December, 2019

3	Associate Director	School of Robotics, New Age Makers Institute of Technology, Gandhinagar, Gujarat	September, 2024	September, 2025
4	Postdoctoral Research Associate	University of Maryland, College Park, Maryland, USA	September, 2011	August, 2012
5	Design Engineer	General Electric, Bangalore Technology Center, Bangalore, Karnataka, India	August, 2006	June, 2007

3. Awards/Recognition

Sr.	**Name of the Award / Fellowship**	**Awarding Agency**	**Year**
1.	ASME Journal of Computing & Information Science in Engineering (JCISE) Associate Editor Excellence Award	American Society of Mechanical Engineers (ASME)	2024
2.	Star Chair Award	American Society of Mechanical Engineers (ASME)	2023
3.	2013 ASME Computers and Information in Engineering Division's Best Dissertation Award.	American Society of Mechanical Engineers (ASME)	2013
4.	Computer-Aided Design 2012 most cited paper award for the article "Survey of CAD model simplification techniques for physics-based simulation applications"	Elsevier	2012
5.	2012 NSF travel award to present research poster at Performance Metrics for Intelligent Systems (PerMIS'2012)	National Science Foundation (NSF), USA	2012
6.	A. James Clark Graduate School Fellowship	University of Maryland, College Park	2007-2009

7.	General Electric Night on the Town Award	General Electric, Bangalore Technology Center	2007

4. Publications

4.1 Journal Articles

1. Thakur, A., Kaipa, K., Banerjee, A. G., Cappelleri, D. J., Krovi, V. N., and Gupta, S. K. (2025). Physical AI for Powering the Next Revolution in Robotics. *ASME. J. Comput. Inf. Sci. Eng*. doi: https://doi.org/10.1115/1.4070122
2. Pandey, K. D., Kamble, Y., Thakur, A., & Thakur, A. D. (2025). An Image-Guided Untethered Approach for in-situ Force Measurement using Non-prehensile Deformation of Hydrogel. *Sensors and Actuators A: Physical*, 116995. https://doi.org/10.1016/j.sna.2025.116995
3. Ojha, P., & Thakur, A. (2025). Dynamic Obstacle Avoidance using Path Reshaping on Probabilistic Roadmaps for High-Degree-of-Freedom Robots. *IEEE Transactions on Artificial Intelligence*. https://doi.org/10.1109/TAI.2025.3584023
4. Suriyaprasaad, B., Upadhyay, A., Thakur, A., & Raj, R. (2025). Explainable boiling acoustics analysis using Grad-CAM and YAMNet for robust pool boiling regime classification. *Applied Thermal Engineering*, 278 (Part B), 127220. https://doi.org/10.1016/j.applthermaleng.2025.127220
5. Mani Sankar, K., & Thakur, A. (2025). SomerBot: A two-legged somersaulting robotic climber with compliant footpad. *Journal of Mechanisms and Robotics*, 17(8), 081009. https://doi.org/10.1115/1.4068242
6. Kamble, Y., Raj, A., & Thakur, A. (2025). Minimally invasive microrobotic system for mechanophenotyping of live zebrafish embryos. *Journal of Micro and Bio Robotics*, 21(1), 1-19. https://doi.org/10.1007/s12213-025-00186-3
7. Sharma, N. K., Tiwari, M., Thakur, A., & Ganguli, A. K. (2025). Evaluating biomechanical risks in manual material handling: an ergonomic intervention approach. *Ergonomics*, 1-13., 37. https://doi.org/10.1080/00140139.2025.2473678
8. Yadav, R., Halder, R., Thakur, A., & Banda, G. (2024). SIRD-YOLO: An enhanced deep learning model for weapon detection using spatial interactions and diverse

receptive fields. *Innovations in Systems and Software Engineering*, 1–17. https://doi.org/10.1007/s11334-024-00580-3

9. Agarwal, D., Kamble, Y., Raj, A., Thakur, A. D., & Thakur, A. (2023). Biomechanical parameter estimation using untethered nonprehensile magnetic microrobot. *Journal of Micro and Bio Robotics, 19*(1), 59–70. https://doi.org/10.1007/s12213-023-00164-7
10. Sinha, K. N. R., Kumar, V., Kumar, N., Thakur, A., & Raj, R. (2023). Dataset for boiling acoustic emissions: A tool for data-driven boiling regime prediction. *Data in Brief, 47*, 109793. https://doi.org/10.1016/j.dib.2023.109793
11. Singh, M. K., Hait, S., & Thakur, A. (2023). Hyperspectral imaging-based classification of post-consumer thermoplastics for plastics recycling using artificial neural network. *Process Safety and Environmental Protection, 179*, 593–602. https://doi.org/10.1016/j.psep.2023.09.052
12. Thakur, A. (2023). Gait parameter tuning using Bayesian optimization for an alligator-inspired amphibious robot. *Defence Science Journal, 73*(5), 519–530. https://doi.org/10.14429/dsj.73.18315
13. Ojha, P., & Thakur, A. (2023). AD*-based dynamically feasible replanning technique for anguilliform-inspired robot. *Journal of Intelligent and Robotic Systems, 108*, 53. https://doi.org/10.1007/s10846-023-01902-6
14. Thakur, A., Sahoo, S., Mukherjee, A., & Halder, R. (2023). Making robotic swarms trustful: A blockchain-based perspective. *Journal of Computing and Information Science in Engineering*. https://doi.org/10.1115/1.4062326
15. Kamble, Y., Raj, A., & Thakur, A. (2023). Artificial neural network-aided computational approach for mechanophenotyping of biological cells using atomic force microscopy. *Journal of Biomechanical Engineering, 145*(7), 071007. https://doi.org/10.1115/1.4056916
16. Feng, R., Jiang, J., Thakur, A., & Wei, X. (2022). Lightweight design of two-level supports for extrusion-based additive manufacturing based on metaheuristic algorithms. *Rapid Prototyping Journal, 29*(4), 850–866. https://doi.org/10.1108/RPJ-01-2022-0038
17. Nishad, S. R., Halder, R., Banda, G., & Thakur, A. (2022). Development of a lizard-inspired wall-climbing robot using pressure-sensitive adhesion. *IEEE Access, 10*, 72535–72544. https://doi.org/10.1109/ACCESS.2022.3189162

18. Agarwal, D., Thakur, A. D., & Thakur, A. (2022). Magnetic microbot-based micromanipulation of surrogate biological objects in fluidic channels. *Journal of Micro-Bio Robotics.* https://doi.org/10.1007/s12213-022-00151-4
19. Agarwal, D., Thakur, A. D., & Thakur, A. (2022). A feedback-based maneuver planner for nonprehensile magnetic micromanipulation of large microscopic biological objects. *Robotics and Autonomous Systems*, *148*, 103941. https://doi.org/10.1016/j.robot.2021.103941
20. Zhang, H., Thakur, A., & Wei, X. (2022). Patch-size segmentation of small-scaled magnetic resonance images of the prostate with prior information. *Computer-Aided Design and Applications, 19*(1), 38–53. https://doi.org/10.14733/cadaps.2022.38-53
21. Sinha, K. N. R., Kumar, V., Kumar, N., Thakur, A., & Raj, R. (2021). Deep learning the sound of boiling for advanced prediction of boiling crisis. *Cell Reports Physical Science, 2*(3), 100382. https://doi.org/10.1016/j.xcrp.2021.100382
22. Gundupalli, S. P., Shukla, R., Gupta, R., Hait, S., & Thakur, A. (2021). Optimal sequence planning for robotic sorting of recyclables from source-segregated municipal solid waste. *Journal of Computing and Information Science in Engineering, 21*(1), 014502. https://doi.org/10.1115/1.4047485
23. Feng, R., Li, X., Zhu, L., Thakur, A., & Wei, X. (2021). An improved two-level support structure for extrusion-based additive manufacturing. *Robotics and Computer-Integrated Manufacturing, 67*, 101972. https://doi.org/10.1016/j.rcim.2020.101972
24. Feng, R., Jiang, J., Sun, Z., Thakur, A., & Wei, X. (2021). A hybrid of genetic algorithm and particle swarm optimization for reducing material waste in extrusion-based additive manufacturing. *Rapid Prototyping Journal*, *27*(10), 1872–1885. https://doi.org/10.1108/RPJ-11-2020-0292
25. Sharma, N. K., Tiwari, M., Thakur, A., & Ganguli, A. K. (2020). A systematic review of methodologies and techniques for integrating ergonomics in development and assessment of manually operated equipment. *International Journal of Occupational Safety and Ergonomics.* https://doi.org/10.1080/10803548.2020.1862552
26. Raj, A., & Thakur, A. (2020). Hydrodynamic parameter estimation for an anguilliform-inspired robot. *Journal of Intelligent and Robotic Systems*, *99*(3–4), 837–857. https://doi.org/10.1007/s10846-020-01154-8
27. Kumar, A., Gunjan, M. R., Jakhar, K., Thakur, A., & Raj, R. (2020). Unified framework for mapping shape and stability of pendant drops including the effect of contact angle

hysteresis. *Colloids and Surfaces A: Physicochemical and Engineering Aspects, 597*, 124619. https://doi.org/10.1016/j.colsurfa.2020.124619

28. Raj, A., & Thakur, A. (2019). Dynamically feasible trajectory planning for anguilliform-inspired robots in the presence of steady ambient flow. *Robotics and Autonomous Systems, 118*, 144–158. https://doi.org/10.1016/j.robot.2019.05.001
29. Sinha, K. N. R., Ranjan, D., Raza, M. Q., Kumar, N., Kaner, S., Thakur, A., & Raj, R. (2019). In-situ acoustic detection of critical heat flux for controlling thermal runaway in boiling systems. *International Journal of Heat and Mass Transfer*, 138, 135–149. https://doi.org/10.1016/j.ijheatmasstransfer.2019.04.029
30. Gundupalli, S. P., Hait, S., & Thakur, A. (2018). Classification of metallic and non-metallic fractions of e-waste using a thermal imaging-based technique. *Process Safety and Environmental Protection*, 118, 32–39. https://doi.org/10.1016/j.psep.2018.06.022
31. Jakhar, K., Chattopadhyay, A., Thakur, A., & Raj, R. (2017). Spline-based shape prediction and analysis of uniformly rotating sessile and pendant droplets. *Langmuir*, 33(22), 5603–5612. https://doi.org/10.1021/acs.langmuir.7b00811
32. Gundupalli, S. P., Hait, S., & Thakur, A. (2017). Multi-material classification of dry recyclables from municipal solid waste based on thermal imaging. *Waste Management*, 70, 13–21. https://doi.org/10.1016/j.wasman.2017.09.019
33. Gundupalli, S. P., Hait, S., & Thakur, A. (2017). A review on automated sorting of source-separated municipal solid waste for recycling. *Waste Management*, 60, 56–74. https://doi.org/10.1016/j.wasman.2016.09.015
34. Raj, A., & Thakur, A. (2016). Fish-inspired robots: Design, sensing, actuation, and autonomy—a review of research. *Bioinspiration & Biomimetics*, 11(3), 031001. https://doi.org/10.1088/1748-3190/11/3/031001
35. Thakur, A., Chowdhury, S., Švec, P., Wang, C., Losert, W., & Gupta, S. K. (2014). Indirect pushing-based automated micromanipulation of biological cells using optical tweezers. *International Journal of Robotics Research*, 33(8), 1098–1111. https://doi.org/10.1177/0278364914523690
36. Chowdhury, S., Thakur, A., Švec, P., Wang, C., Losert, W., & Gupta, S. K. (2014). Automated manipulation of biological cells using gripper formations controlled by optical tweezers. *IEEE Transactions on Automation Science and Engineering*, 11(2), 338–347. https://doi.org/10.1109/TASE.2013.2272512
37. Švec, P., Thakur, A., Raboin, E., Shah, B. C., & Gupta, S. K. (2014). Target following with motion prediction for unmanned surface vehicles operating in cluttered

environments. *Autonomous Robots*, 36(4), 383–405. https://doi.org/10.1007/s10514-013-9370-z

38. Thakur, A., Švec, P., & Gupta, S. K. (2012). GPU-based generation of state transition models using simulations for unmanned surface vehicle trajectory planning. *Robotics and Autonomous Systems*, 60(12), 1457–1471. https://doi.org/10.1016/j.robot.2012.07.009
39. Thakur, A., & Gupta, S. K. (2012). Improving the performance of rigid body dynamics simulation by removing inaccessible regions from geometric models. *Computer-Aided Design*, 44(12), 1190–1204. https://doi.org/10.1016/j.cad.2012.06.007
40. Thakur, A., & Gupta, S. K. (2011). Real-time dynamics simulation of unmanned sea surface vehicles for virtual environments. *Journal of Computing and Information Science in Engineering*, 11(3), 031001. https://doi.org/10.1115/1.3617443
41. Thakur, A., Banerjee, A. G., & Gupta, S. K. (2009). A survey of CAD model simplification techniques for physics-based simulation applications. *Computer-Aided Design*, 41(2), 65–80. https://doi.org/10.1016/j.cad.2008.11.009

4.2 Peer-Reviewed Conference

1. Bhanwala, P., Ojha, P., & Thakur, A. (2025). Autonomous Mobile Robot Navigation Using Double Deep Q-Network: Efficient Goal-Seeking and Obstacle Avoidance. *Proceedings of the 7th International Conference on Advances in Robotics (AIR '25)*, IIT Jodhpur, India, July 2–5.
2. Ojha, P., Verma, N., & Thakur, A. (2025). Design, Fabrication, and Control of an Anguilliform-Inspired Underwater Fish Robot. *Proceedings of the 7th International Conference on Advances in Robotics (AIR '25)*, IIT Jodhpur, India, July 2–5.
3. Vutukuri, C., Ojha, P., & Thakur, A. (2025). LoMoCar: A BYOD-Powered, Low-cost Modular Self-Driving Research Platform. *Proceedings of the 7th International Conference on Advances in Robotics (AIR '25)*, IIT Jodhpur, India, July 2–5.
4. Kamble, Y., Sarkar, S., & Thakur, A. (2025). Deep Learning-Based Microrobot Detection and Segmentation for Localization. *Proceedings of the 7th International Conference on Advances in Robotics (AIR '25)*, IIT Jodhpur, India, July 2–5.
5. Kamble, Y., Murudkar, S., Sarkar, S., & Thakur, A. (2025). Overcoming Stick-Slip in Magnetic Microrobot via Levitation Enabled by Deep Learning-Based Localization.

Proceedings of the 7th International Conference on Advances in Robotics (AIR '25), IIT Jodhpur, India, July 2–5.

6. Saxena, S., Ojha, P., & Thakur, A. (2024). An underwater gliding robot using origami-inspired buoyancy regulator. *Proceedings of the 48th International Conference on Mechanisms and Robotics (MR) at 2024 ASME-IDETC*, Washington, DC, USA, August 25–28. https://doi.org/10.1115/DETC2024-143664
7. Kodidasu, P., Kadali, M., & Thakur, A. (2024). Improving climbing performance using passive tail in lizard-inspired robot. *Proceedings of the 48th International Conference on Mechanisms and Robotics (MR) at 2024 ASME-IDETC*, Washington, DC, USA, August 25–28. https://doi.org/10.1115/DETC2024-143646
8. Sankar, K. M., A. K., & Thakur, A. (2024). A two-legged robot for climbing vertical surfaces based on pressure-sensitive adhesion and peeling. In Youssef, E. S. E., Tokhi, M. O., Silva, M. F., & Rincon, L. M. (Eds.), *Synergetic Cooperation Between Robots and Humans. CLAWAR 2023. Lecture Notes in Networks and Systems* (Vol. 810, pp. 315–324). Springer, Cham. https://doi.org/10.1007/978-3-031-47269-5_23
9. Verma, N., Ojha, P., Sharma, A. K., & Thakur, A. (2023). ROS-based hardware-in-the-loop simulation framework for fish-inspired robot for safe control gain tuning. *2023 IEEE 7th Conference on Information and Communication Technology (CICT)*, Jabalpur, India, pp. 1–6. https://doi.org/10.1109/CICT59886.2023.10455219
10. Yadav, R., Halder, R., Banda, G., & Thakur, A. (2023). A lightweight deep learning-based weapon detection model for mobile robots. *Proceedings of the 6th International Conference on Advances in Robotics (AIR '23)*, IIT Ropar, India, July 5–8. ACM Press. https://doi.org/10.1145/3610419.3610489
11. Anugrah, A. K., & Thakur, A. (2023). Bio-inspired gait trajectory design for lizard-inspired wall climbing robot. *Proceedings of the 47th International Conference on Mechanisms and Robotics (MR) at 2023 ASME-IDETC*, Boston, MA, USA, August 20–23. https://doi.org/10.1115/DETC2023-116421
12. Sharma, N. K., Tiwari, M., Thakur, A., & Ganguli, A. K. (2022). Biomechanical simulation and a detailed analysis of the roadside cleaning activity. In Black, N. L., Neumann, W. P., & Noy, I. (Eds.), *Proceedings of the 21st Congress of the International Ergonomics Association (IEA 2021). Lecture Notes in Networks and Systems* (Vol. 223, pp. 191–202). Springer, Cham. https://doi.org/10.1007/978-3-030-74614-8_22

13. Das, A., Halder, R., & Thakur, A. (2021). Deep reinforcement learning-based 3D exploration with a wall climbing robot. *Proceedings of the IEEE International Region 10 Technical Conference (IEEE TENCON '21)*, Auckland, New Zealand, December 7–10. IEEE Press. https://doi.org/10.1109/TENCON54134.2021.9707334
9. Sarwar, M. M. S., Yadav, R., Samanta, S., Ray, R., Halder, R., Banda, G., Bhattacharya, A., & Thakur, A. (2021). A robotic software framework for autonomous navigation in unknown environments. *2021 International Symposium of Asian Control Association on Intelligent Robotics and Industrial Automation (IRIA)*, pp. 345–350. https://doi.org/10.1109/IRIA53009.2021.9588693
10. Rishikesh, Bhattacharya, A., Thakur, A., Banda, G., Ray, R., & Halder, R. (2021). Secure communication system implementation for robot-based surveillance applications. *2021 International Symposium of Asian Control Association on Intelligent Robotics and Industrial Automation (IRIA)*, pp. 270–275. https://doi.org/10.1109/IRIA53009.2021.9588788
11. Ojha, P., & Thakur, A. (2021). Real-time obstacle avoidance algorithm for dynamic environments on probabilistic road map. *2021 International Symposium of Asian Control Association on Intelligent Robotics and Industrial Automation (IRIA)*, pp. 57–62. https://doi.org/10.1109/IRIA53009.2021.9588792
12. Nishad, S., Halder, R., Banda, G., Ray, R., Bhattacharya, A., & Thakur, A. (2021). A lizard-inspired quadruped robot based on pressure-sensitive adhesion mechanism for wall climbing. *Proceedings of the 5th International Conference on Advances in Robotics 2021*, Kanpur, UP, India, June 30–July 4. https://doi.org/10.1145/3478586.3480650
13. Darekar, A. Y., & Thakur, A. (2021). Trajectory planning in the presence of dynamic obstacles for anguilliform-inspired robots. *Proceedings of the 5th International Conference on Advances in Robotics 2021*, Kanpur, UP, India, June 30–July 4. https://doi.org/10.1145/3478586.3480641
14. Kumar, B., Bhatt, C., & Thakur, A. (2021). Deep learning-based real-time computation of thrust for a robotic fish. *Proceedings of the 5th International Conference on Advances in Robotics 2021*, Kanpur, UP, India, June 30–July 4. https://doi.org/10.1145/3478586.3480643
15. Pedapudi, B. R. B., Hait, S., & Thakur, A. (2021). Multi-layer perceptron-based classification of recyclable plastics from waste using hyperspectral imaging for robotic

sorting. *Proceedings of the 5th International Conference on Advances in Robotics 2021*, Kanpur, UP, India, June 30–July 4. https://doi.org/10.1145/3478586.3480644

16. Shaw, H., & Thakur, A. (2019). Shape memory alloy-based caudal fin for a robotic fish: Design, fabrication, control, and characterization. *Proceedings of the Advances in Robotics 2019 (AIR 2019)*. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/3352593.3352666
17. Thati, S., Raj, A., & Thakur, A. (2018). Optimal and dynamically feasible path planning for an anguilliform fish-inspired robot in the presence of obstacles. *ASME Mechanisms and Robotics Conference*, Quebec City, Canada, August 26–29. https://doi.org/10.1115/DETC2018-86120
18. Agrawal, K., Jain, K., Gupta, D., Shrivastav, R., Agnihotri, A., & Thakur, A. (2018). Bayesian optimization-based terrestrial gait tuning for a 12-DOF alligator-inspired robot with active body undulation. *ASME Mechanisms and Robotics Conference*, Quebec City, Canada, August 26–29. https://doi.org/10.1115/DETC2018-86033
19. Raj, A., Kumar, A., & Thakur, A. (2016). Automated locomotion parameter tuning for an anguilliform-inspired robot. *2016 IEEE International Conference on Systems, Man, and Cybernetics*, Budapest, Hungary, October 9–12. https://doi.org/10.1109/SMC.2016.7844625
20. Paulraj, S. G., Hait, S., & Thakur, A. (2016). Automated municipal solid waste sorting for recycling using a mobile manipulator. *40th International Conference on Mechanisms and Robotics (MR) at 2016 ASME-IDETC*, Charlotte, NC, USA, August 21–24. https://doi.org/10.1115/DETC2016-59842
21. Kulkarni, P., Kumar, A., Thakur, A. D., & Thakur, A. (2016). Automated non-prehensile magnetic micromanipulation in the presence of a spatially varying flow field. *10th International Conference on Micro- and Nanosystems (MNS) at 2016 ASME-IDETC*, Charlotte, NC, USA, August 21–24. https://doi.org/10.1115/DETC2016-60568
22. Shah, B. C., Švec, P., Thakur, A., & Gupta, S. K. (2016). Path planning for unmanned vehicles operating in time-varying flow fields. *ICAPS Workshop on Planning and Robotics (PlanRob 2016)*, London, UK, June 13–14.
23. Sathish, G. P., & Thakur, A. (2016). Automated municipal solid waste sorting for recycling using a mobile manipulator. *40th Mechanisms and Robotics Conference (MR) at ASME-IDETC*, Charlotte, NC, USA, August 21–24. https://doi.org/10.1115/DETC2016-59842

24. Das, A., Thakur, A. D., & Thakur, A. (2015). Image-guided automated non-prehensile magnetic micromanipulation of cells. *9th International Conference on Micro- and Nanosystems (MNS) at 2015 ASME-IDETC*, Boston, MA, USA, August 2–5. https://doi.org/10.1115/DETC2015-46569
25. Shriyam, S., Mishra, A., Nayak, D., & Thakur, A. (2014). Design, fabrication, and gait planning of an alligator-inspired robot. *International Conference on Advances in Mechanical Sciences*, Hyderabad, AP, India, January 9–11. http://dx.doi.org/10.14741/ijcet/spl.2.2014.108
26. Chowdhury, S., Thakur, A., Švec, P., Wang, C., Losert, W., & Gupta, S. K. (2013). Enhancing range of transport in optical tweezers-assisted microfluidic chambers using automated stage motion. *ASME International Conference on Micro and Nanosystems*, Portland, Oregon, August 4–7. https://doi.org/10.1115/DETC2013-13308
27. Chowdhury, S., Thakur, A., Wang, C., Švec, P., Losert, W., & Gupta, S. K. (2013). Automated indirect manipulation of irregularly shaped cells with optical tweezers for studying collective cell migration. *IEEE International Conference on Robotics and Automation (ICRA '13)*, Karlsruhe, Germany, May 6–10. https://doi.org/10.1109/ICRA.2013.6630962
28. Thakur, A., Chowdhury, S., Švec, P., Wang, C., Losert, W., & Gupta, S. K. (2012). Automated indirect optical micromanipulation of biological cells using indirect pushing for minimizing photo-damage. *ASME International Conference on Micro and Nanosystems*, Chicago, Illinois, August 12–15. https://doi.org/10.1115/DETC2012-71214
29. Švec, P., Thakur, A., Shah, B. C., & Gupta, S. K. (2012). USV trajectory planning for time-varying motion goals in an environment with obstacles. *ASME Mechanism and Robotics Conference*, Chicago, Illinois, August 12–15. https://doi.org/10.1115/DETC2012-71239
30. Chowdhury, S., Thakur, A., Wang, C., Švec, P., Losert, W., & Gupta, S. K. (2012). Automated indirect transport of biological cells using planar gripper formations. *IEEE International Conference on Automation Science and Engineering (CASE 2012)*, Seoul, Korea, August 20–24. https://doi.org/10.1109/CoASE.2012.6386430
31. Švec, P., Schwartz, M., Thakur, A., & Gupta, S. K. (2011). Trajectory planning with look-ahead for unmanned sea surface vehicles to handle environmental disturbances. *2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*,

San Francisco, California, September 25–30. https://doi.org/10.1109/IROS.2011.6095021

32. Thakur, A., Švec, P., & Gupta, S. K. (2011). Generation of state transition model using simulation for unmanned sea surface vehicle trajectory planning. *ASME Mechanisms and Robotics Conference*, Washington, DC, August 28–31. https://doi.org/10.1115/DETC2011-48624
33. Thakur, A., & Gupta, S. K. (2010). A computational framework for real-time unmanned sea surface vehicle motion simulation. *ASME Computers in Engineering Conference*, Montreal, Canada, August 15–18. https://doi.org/10.1115/DETC2011-48624
34. Gupta, S. K., Anand, D. K., Thakur, A., Švec, P., & Schwartz, M. (2010). A simulation-based framework for discovering planning logic for unmanned surface vehicles. *ASME Engineering Systems Design and Analysis Conference*, Istanbul, Turkey, July 12–14. https://doi.org/10.1115/ESDA2010-24894
35. Schwartz, M., Švec, P., Thakur, A., & Gupta, S. K. (2009). Evaluation of automatically generated reactive planning logic for unmanned surface vehicles. *Performance Metrics for Intelligent Systems Workshop*, Gaithersburg, Maryland, September 21–23. https://doi.org/10.1145/1865909.1865965
36. Thakur, A., & Gupta, S. K. (2009). Context-dependent contact-preserving offline model simplification for interactive rigid body dynamics simulations. *ASME Computers and Information in Engineering Conference*, San Diego, California, August 30–September 2. https://doi.org/10.1115/DETC2009-87119
37. Thakur, A., Gupta, S. K., Anand, D. K., Brough, J. E., Kavetsky, R. A., & Schwartz, M. (2008). A survey of virtual environments-based assembly training applications. *Virtual Manufacturing Workshop*, Turin, Italy, October 7–8.
38. Pavanaskar, S. S., Thakur, A., Sunil, V. B., & Pande, S. S. (2009). WebNC: An internet-based system for global product development. *7th Global Conference on Sustainable Manufacturing*, Chennai, India, December 1–4.
39. Thakur, A., & Pande, S. S. (2006). A web-based system for sheet metal modeling and process planning. *1st International and 22nd All India Conference on All India Manufacturing Technology Design and Research*, Roorkee, India, December 21–26.
40. Thakur, A., & Pande, S. S. (2006). SIBAM: A web-based feature modeler for sheet metal components. *22nd International Conference on CAD/CAM, Robotics and Factories of the Future*, Vellore, India, July 19–23.

41. Pavanaskar, S. S., Thakur, A., Sunil, V. B., & Pande, S. S. (2006). FBMod: A web-based feature modeler for prismatic components. *National Conference on Design for Product Life Cycle (DPLC-2006)*, Pilani, India, February 17–18.

4.3 Book Chapters

1. Chowdhury, S., Thakur, A., & Gupta, S. K. (2021). Manipulation of biological cells using optical tweezers: Challenges and solutions. In *Autonomous Robot-Aided Optical Manipulation for Biological Cells*. Elsevier Science.
2. Schwartz, M., Švec, P., Thakur, A., & Gupta, S. K. (2011). Simulation-based synthesis of planning logic for autonomous unmanned sea surface vehicles. In *Simulation-Driven Innovation and Discovery: Energetics Applications*. CALCE EPSC Press, College Park.

4.4 Patent

1. **Raj, R., Thakur, A., Banerjee, S., & Pandey, U.** *A System and Method for Controlling Buoyancy of an Underwater Submersible*. Indian Patent Office, Patent No. 453932. **Status: Granted** on 22/09/2023.
2. **Anugrah, A. K., Thakur, A., & Halder, R.** *Design of adhesion-based omni-orientation surface traverse mechanism in crawling quadruped trot-gaited robot.* Indian Patent Office, Patent Application No. 202331026910. **Status: Published**.

5. R&D Projects

i.) Project Title: Robust Motion Planning for Amphibious-Inspired Robots
Sponsor: Department of Science and Technology, Government of India
Project Cost: ₹ 17.81 lakh
PI/CoPI: PI
Duration: 03-Sep-2013 to 02-Sep-2016
Present Status: Completed

ii.) Project Title: Development of Low Cost, Efficient, Mechanism for Collection of Garbage and Dirt for Municipal Corporations, Panchayats
Sponsor: Swacchta Action Plan, MHRD
Project Cost: ₹ 16.71 lakh

PI/CoPI: Co-PI

Duration: 22-Jan-2018 to 21-Jul-2021

Present Status: Completed

iii.) Project Title: Development of Lizard-like Robotic Spy Surveillance System

Sponsor: SERB

Project Cost: ₹101.49 lakh

PI/CoPI: Co-PI

Duration: 21-May-2019 to 21-Nov-2022

Present Status: Completed

iv.) Project title: Intelligent Partition of Complicated Multiscale 3D Models for Rapid Additive and Subtractive Manufacturing

Project Cost: 300,000RMB

PI/CoPI: CoPI

Duration: 25-Jul-2018 to 24-Jul-2020

Present Status: Completed

v.) Project Title Assessment of the Use of Modern Robotic and Machine Learning Tools for Addressing Operational Challenges at 3×660 MW Capacity Coal Fired Supercritical Power Plant

Sponsor: Prayagraj Power Corporation Limited

Project Cost: ₹ 8.76 lakh

PI/CoPI: PI

Duration: 24-Aug-2022 to 23-Aug-2023

Present Status: Completed

vi.) Project Title: Development of Affordable Ergonomic Exoskeleton for Ameliorating Manual Work for Improving Safety and Dignity

Sponsor: Swacchta Action Plan, MHRD

Project Cost: ₹ 26.64 lakh

PI/CoPI: PI

Duration: 21-Jun-2023 to 19-Jun-2026

Present Status: Ongoing

vii.) Project Title: Mechanical and Thermal Analysis of Compressor Housed Generator

Sponsor: Gas Turbine Research Establishment, DRDO

Project Cost: ₹37.32 lakh

PI/CoPI: CoPI

Duration: 05-Mar-2025 to 11-Sep-2026

Present Status: Ongoing

6. Consultancy/Commissioned Work

i.) Project Title: Preparation of Detailed Project Report for Robotics Center and Central Instrumentation Facility

Sponsor: Department of Science and Technology, Government of Bihar

Project Cost: ₹3.25 lakh

PI/CoPI: PI

Duration: 2016 – 2018

Present Status: Completed

ii.) Project Title: Design, Fabrication and Installation of Motorized Sliding Security Gate at Reserve Bank of India, Patna

Sponsor: Reserve Bank of India, Patna

Project Cost: ₹3.52 lakh

PI/CoPI: PI

Duration: 2018 – 2019

Present Status: Completed

iii.) Vetting of design documents for Integrated Command and Control Center (ICCC) and Smart Components of Muzaffarpur Smart City

Sponsor: Shapoorji Pallonji And Company Private Limited

Project Cost: ₹11.8 lakh

PI/CoPI: PI (along with Dr. Raju Halder, Dr. Samrat Mondal, and Dr. Subrata Hait)

Duration: 2022

Present Status: Completed

iv.) Preparation of Course Material for Mobile Robotics

Sponsor: Mathworks

Project Cost: ₹6.07 lakh

PI/CoPI: PI

Duration: 2025-26

Present Status: Ongoing

7. Teaching, Mentoring, and Advising

7.1 Courses Taught at IIT Patna

- Mobile Robotics (ME512)
- Robot Motion Planning (ME510)
- Modeling and Simulation of Mechatronic Systems (MH504)
- System Dynamics and Control (ME312)
- Bio-inspired Robotics (ME335)
- Fundamentals of Mechatronics (MH501)
- Control Systems (ME309)
- Kinematics of Machinery (ME304)
- Engineering Mechanics (ME101)
- Engineering Drawing (ME111)
- Mechatronics Lab I and II (MH519 and MH520)
- Control of Mechatronic Systems (EE501)
- Seminar for Masters' Students (SE507)

7.2 New Courses Developed at IIT Patna

- Mobile Robotics (ME512): This course provides an overview of the aspects of design, fabrication, motion planning, and control of intelligent mobile robotic systems and is offered to senior undergraduate and graduate students. The focus of the course is distributed equally on the computational aspects and practical implementation issues and thereby leads to a well-rounded training. As part of this course, the students design and fabricate a mobile robotic platform and program it to apply learned theoretical concepts in practice as a semester long class project. The topics covered in this course

include: Robot locomotion, maneuverability, controllability, mobile robot kinematics, dynamics, and motion simulation, robot perception, localization, introduction to planning and navigation focusing especially on graph search techniques.

- Bio-Inspired Robotics (ME335): This course covers the fundamentals and applications of bio-inspired robots. The aspects covered in this course include the following: bio inspiration vs biomimetics, types of locomotion, hopping robots, biped, quadruped and hexaped robots, crawling robots, wheeled robots, fish-inspired aquatic robots, stability, maneuverability, and controllability. The course provides the students an opportunity to design and fabricate a mobile robotic platform and program it to apply learned theoretical concepts in practice as a semester long class project.

- Robot Motion Planning (ME510): This course covers the prominent motion planning algorithms used in the area of mobile robotics. The course will cover various motion planning algorithms and analyses. The contents covered in this course include: Configuration space and topology, potential functions, roadmaps, cell decomposition, sampling-based algorithms. The students are allotted several mini-projects wherein they are challenged to implement motion planning algorithms that implement the theoretical concepts taught in the class. For the simulations, CoppeliaSim™ software and Matlab™ are used.

7.3 Laboratory Developed at IIT Patna

The Bio Robotics and Artificial Intelligence (BRAIN) Laboratory at IIT Patna was established with a vision to advance the frontiers of bio-inspired robotics and artificial intelligence research. As the founder of the lab, I spearheaded efforts to create a dynamic and innovative research environment focused on biorobotics and artificial intelligence. In biorobotics, we focus on designing robotic systems inspired by natural creatures and microrobotics for the manipulation of biological objects. In artificial intelligence, our emphasis is on developing motion planning algorithms for the robots we create. The lab's hallmark achievements include the development of various bio-inspired robotic platforms, such as alligator-inspired, snake-inspired, eel-inspired, and other fish-inspired robots, along with innovative motion planning algorithms to handle dynamic environments.

The BRAIN Lab has made significant contributions to robotics by designing locomotion control and path-planning algorithms that enable robots to emulate the

movements of natural creatures. These algorithms, grounded in biological principles, allow the robots to navigate complex environments with efficiency and agility. Our research aligns closely with emerging trends in bio-inspired robotics, contributing to advancements in underwater exploration, disaster response, and environmental monitoring.

The laboratory is equipped with state-of-the-art fabrication facilities, including:

- Laser Cutting Machine: For precise cutting and engraving of materials.
- 3D Printer: For rapid prototyping of robotic components.
- Tabletop Milling Machine: For intricate machining tasks.
- PCB Prototyping Machine: For custom circuit board design and testing.

In addition to these fabrication tools, the lab houses a variety of electrical and electronic equipment such as sensors, actuators, and data acquisition (DAQ) systems. This comprehensive setup enables seamless integration of mechanical, electrical, and software components in robotic systems.

7.4 Short-term Training and Continuing Education Program

- Organized a Short-term Training Program for the Engineers of Building Construction Department, Govt. of at IIT Patna in collaboration with Dr. Subrata Hait, Department of Civil and Environmental Engineering, IIT Patna during May 20 to June 12, 2013. Number of participants was 25.
- Organized a CEP course “Introduction to robotics: Mechanics, Control, and Programming” during October 26 – 28, 2018. Number of participants was 31.
- Conducted an FDP on Mobile Robotics funded by AICTE under its ATAL program during June 16-20, 2021. Number of participants was 200.
- Conducted an FDP on Advanced Mobile Robotics funded by AICTE under its ATAL program during September 20-24, 2021. Number of participants was 88.

7.5 Students Mentored

Ph.D. Thesis Completed

1. Dharmveer Agarwal, 2024
    - Thesis title: Robotic Nonprehensile Magnetic Micromanipulation of Large Microscopic Biological Objects
2. Aditi Raj, 2019
    - Thesis title: Trajectory planning for underwater anguilliform-Inspired robots operating in presence of ambient flow
3. Sathish P. Gundupalli, 2019
    - Thesis title: Automated segregation of recyclables from solid waste stream using thermal imaging technique
4. Neelesh Sharma (thesis submitted)
    - Thesis title: Biomechanical Risk Assessment and Ergonomic Intervention Design for Manual Material Handling

Ph.D. Thesis Ongoing

1. Mukesh Kumar Singh
2. Pritam Ojha
3. Yuvaraj Kamble (jointly guided with Dr. Abhishek Raj, ME, IITP)
4. Kadali Manisankar (jointly guided with Dr. Sunil Kumar Singh, ME, IITP)
5. Shantmanu (jointly guided with Dr. Anirban Mahato, ME, IITP)
6. Suriyaprasaad B. (jointly guided with Dr. Rishi Raj, ME, IITP)
7. Prashant Parmar

M-Tech. Thesis Completed

1. Chakradhar Vutukuri
    - An Outdoor Ready Bring Your Own Device Powered Low-cost Modular Self-Driving Research Platform
2. Pratik Kumar Bhanwala
    - Autonomous Navigation in Dynamic Environments through Deep Reinforcement Learning
3. Hardik Singh Chauhan
    - Design and Sensor Integration of Groundwater Depth Datalogger

4. Sujoy Garain
    - Assessment and Performance Evaluation of Passive Overhead Exoskeleton during Diverse manual tasks
5. Kundan Saha, 2024
    - Thesis title: Design & Development of a Portable Augmented Reality Enabled Smart Digital Stethoscope
6. Purusottam Pradhan, 2024
    - Thesis title: Simultaneous Localization and Mapping of the Unknown Environment using Kobuki Robot and LiDAR Sensor
7. Kodidasu Purna Rama Sai Usha Pranav, 2024
    - Thesis title: Improving the Performance of Climbing Robots with Tail
8. Anugrah A. K., 2023
    - Thesis title: Miniaturization and Rapid Prototyping of Lizard Inspired Robot for Swarm Application
9. Ajayan, 2022
    - Thesis title: Development of experimental setup for robotic sorting of plastic waste
10. Ninad Kuware, 2022
    - Thesis title: Prognosis and control of boiling crisis by leveraging acoustic emissions and deep learning.
11. Pedapudi Bharath Raja Bhoopal, 2021
    - Thesis title: Classification of recyclable plastic from waste using hyperspectral imaging technique
12. Akshay Y. Darekar, 2021
    - Thesis title: Trajectory planning for fish-inspired robots in the presence of dynamic obstacles
13. Aditya Sudeep Ratnaparkhi, 2020
    - Thesis title: Model-based backtepping leader-follower formation control of unmanned surface vehicles
14. Abhishek Sharma, 2020
    - Thesis title: Design and control of haptic interface for laparoscopic simulator
15. Shubham Pathak, 2019
    - Thesis title: Control of boiling-based variable buoyancy robot
16. Sushrut Lingayat, 2019
    - Thesis title: Laparoscopic simulator with haptic feedback
17. Amit Kumar, 2019
    - Thesis title: Design of a dragonfly-inspired micro air vehicle
18. Aaditya Asati, 2018
    - Thesis title: Haptic feedback from virtual environment for laparoscopic surgical simulation using cutaneous and kinesthetics haptic Interface
19. Rajan Sippy, 2018
    - Thesis title: Development of android powered eye tracking-based wheelchair control with autonomous navigation
20. Adnan Jawed, 2018
    - Thesis title: Design and fabrication of carangiform robotic fish
21. Sumit Banerjee, 2017 - Joint guidance with Dr. Rishi Raj, Department of Mechanical Engineering

    - Thesis title: Boiling-based buoyancy controlled underwater robot
22. Biswaranjan Das, 2017
    - Thesis title: Anguilliform-inspired robot
23. Himansu Shaw, 2017
    - Thesis title: A shape-memory alloy actuated robotic fish
24. Kishan Gopal Karwa, 2017
    - Thesis title: Magnetic microrobot for non-prehensile manipulation of cells
25. Krishna Agrawal, 2017
    - Thesis title: Automatic gait adaptation for alligator-inspired robot
26. Akash Das, 2015 – Joint guidance with Dr. Ajay D. Thakur, Department of Physics
    - Thesis title: Automated motion planning of magnetic microrobot
27. Guddi Kumari, 2015 – Joint guidance with Dr. Rishi Raj, Department of Mechanical Engineering
    - Thesis title: Temperature feedback control for enhancing critical heat flux during pool boiling.
28. Anand Kumar Mishra, 2014
    - Thesis title: Design, fabrication and planning of bio-inspired quadruped robots
29. Sherbahadur Yadav, 2014
    - Thesis title: Design and planning of unmanned ground vehicles for human following

M-Tech Thesis Ongoing

1. Aditya Singh Chauhan
2. Abhijit Singh Chauhan

Bachelors

B-Tech Thesis Completed

1. Shreya Murudkar
    - Design and Fabrication of a Magnetic Actuation System for Independent Multi-Microrobot Manipulation
2. Anubhav Roy and Priyanshu Kumar
    - Development and Implementation of an Underground Water Monitoring Data Logger
3. Aditya Baberwal and Krishna Raj, 2024
    - Development of a Prototype of Self-Driving Car
4. Anushkha Singh and Gogineni Charishma, 2023
    - 3D ObjectT Reconstruction from Multiview Monocular Images
5. Kritadhi Maity and Ayush Gupta, 2023
    - Advance Prediction of Boiling Crisis through Acoustic Signal Analysis
6. Pranay and Hareesh, 2022
    - Thesis title: Sanitization robot
7. Maria and Anisha, 2022
    - Thesis title: Animal health monitoring tool
8. Aman Kumar and Akshat Jain 2022

    - Thesis title: Modelling and simulation of adhesive force and climbing in a lizard-inspired robot
9. Bansal Kumar and Chandan Bhatt, 2021
    - Thesis title: A deep learning-based real time computation of thrust for fish-inspired robot
10. Rishabh Shukla and Rohit, 2019
    - Thesis title: Sorting of municipal solid saste using robotic hand
11. Rajendra Verma and Rahul Dilare, 2019
    - Thesis title: Quadruped robot based on mammalian gait
12. Santhosh Thati, 2018
    - Thesis title: Optimal trajectory planning for an anguilliform-inspired robot
13. Kushagra Jain, 2018
    - Thesis title: Gait parameter estimation using Bayesian-optimization for an alligator-inspired robot
14. Amit Kumar and Maneesh Meena, 2018
    - Thesis title: Stair-climbing gait control of a 12-DOF quadruped robot
15. Ashwin Goyal and Chirag Jain, 2017
    - Thesis title: Estimation of crowd density using a quadcopter
16. Abhijeet Agnihotri and Raunak Srivastava, 2017
    - Thesis title: Control of quadruped gait in an alligator-inspired robot
17. Pranav Kulkarni, 2016 – Jointly guidance with Dr. Ajay Thakur, Department of Physics
    - Thesis title: Control of magnetic microrobot in the presence of environmental flow
18. Samiran Mondal, 2015
    - Thesis title: Design, control and fabrication of an alligator-inspired underwater swimming robot
19. C. Nitish, 2015
    - Thesis title: Design and fabrication of glove for augmented reality applications
20. Ashesh Chattopadhyay, 2015 – Joint guidance with Dr. Rishi Raj, Department of Mechanical Engineering
    - Modeling of droplet geometry on surfaces exhibiting different contact angles
21. Shivam Chourey and Vora Nishant, 2014 – Joint guidance with Dr. Ajay D. Thakur, Department of Physics
    - Thesis title: Development of magnetic microrobot
22. Delip Thomas and Srinivas Gunti, 2014
    - Thesis title: Design and fabrication of snake-inspired robots

B-Tech Thesis Ongoing

1. Shuchi Saxena
2. Arti Dewangan
3. Ansh Singh

Research Engineers and Programmers

1. Batchu Madhu Sri Kiran (September 2023 – December 2024)
2. Ravi Shekhar Tiwari (December 2022 – May 2023)
3. Harshang Shah (January 2023-April 2023)

4. Rajeshwar Yadav (September 2019-April 2022)
5. Satyendra R. Nishad (September 2019-April 2022)
6. Amarjeet Kumar (September 2016-September 2019)

8. Invited Talks

- Real-Time Path Reshaping Over PRMs for Dynamic Obstacle Avoidance in Manufacturing Environment, Embodied AI for Robot-Powered Manufacturing Systems Workshop at IEEE CASE 2025, August 17, 2025, Los Angeles (online)
- Robotics Across Scales: Lizard-Inspired Climbing Robots and Microrobots that Measure Biomechanics of Zebrafish Embryos, January 2025, IIT Gandhinagar
- Robotics Across Scales: Lizard-Inspired Climbing Robots and Microrobots that Measure Biomechanics of Zebrafish Embryos, December 2024, University of Massachussets, Lowell
- Lizard-Inspired Climbing Robots and Microrobots for Biomechanical Analysis of Zebrafish Embryos, November 2024, IIT Gandhinagar
- Actuation and Control of Micro- and Nano- Robots for Biomedical Applications, March 2024, NIT Jamshedpur
- Fundamentals of Robotics: Mechanisms and Kinematics of Manipulators, March 2024, NIT Sikkim
- Autonomous Underwater Robotics at Various Size Scales: Challenges and Opportunities, November 2023, Paris-Saclay University & UEVE University (online)
- Bioinspired Mobile Robotics: Sensing, Actuation and Autonomy, Darbhanga College of Engineering, October 2023, Darbhanga, Bihar, India
- Teaching Methodology in Engineering Education, Bihar Institute of Public Administration and Rural Development, July 2023, Gaya, Bihar, India.
- Applications of AI and ML in Robotics: Basic Concepts, NIMS Jaipur, November 2022, Jaipur, Rajasthan, India.
- Mechatronics and Robotics Research at IIT Patna, Prayagraj Power Generation Co. Ltd., April 2022, Prayagraj, UP, India.
- Structural Health Monitoring: Collaboration proposal between IIT Patna and NTPC, National Thermal Power Generation Ltd., Vaibhav Singhal, Udit Satija, and January 2022, India. (online)

- Actuation and Control of Micro- and Nano- Robots for Biomedical Applications, IIT BHU, August 2021, Varanasi, UP, India. (online)
- Actuation and Control of Micro- and Nano- Robots for Biomedical Applications, NIT Silchar, June 2021, Silchar, Assam, India. (online)
- Actuation and Control of Micro- and Nano- Robots for Biomedical Applications, Indian Institute of Technology Indore, MP, December 2020, Indore, India. (online)
- Underwater Robotics at different size-scales, GIET Gaya, December 2020, Gaya, India. (online)
- Underwater Robotics at different size-scales, Shanghai Jiaotong University, December 2019, Shanghai, China.
- Underwater Robotics at different size-scales, NIT Silchar, May 2019, Silchar, Assam, India.
- Underwater Robotics at different size-scales, IIT Bombay, February 2019, Mumbai, Maharashtra, India.
- Research on Fish-Inspired Underwater Robot at IIT Patna, IIT Gandhinagar, October 2017, Gandhinagar, Gujarat, India.
- Introduction to Mobile Robotics, Bhagalpur College of Engineering, November 2016, Bhagalpur, Bihar, India.
- Introduction to mobile robots and research on fish-inspired underwater robots, G H Patel College of Engineering & Technology, December 2016, Surat, Gujarat, India.
- Dynamics-aware online motion planning for mobile robotic systems operating in stochastic environment, System and Controls Group, IIT Bombay, October 2014, Mumbai, Maharashtra, India.
- Magnetic Microrobot Assisted Selective Non-Prehensile Cell Micromanipulation, Indian Institute of Science Education and Research Bhopal, December 2015, Bhopal, MP, India
- Physics-Aware Planning of Robot Motion: Unmanned Surface Vehicles to Bio-Inspired Robots, 11th National Conference on Industrial Problems on Machines and Mechanisms (IPRoMM-2014), February 2014, Delhi, India.
- Robotics based indirect optical manipulation of biological cells for studying collective migration, Mahavir Cancer Sansthan, September 2013, Patna, Bihar, India.
- Robotics Research at IIT Patna, Center for Mechanical Engineering Research Institute, March 2013, Durgapur, WB, India.

- Robotics Research at IIT Patna, Center for Artificial Intelligence and Robotics, Bangalore, Karnataka, India.
- Advances in Modeling and Simulation for Physics-Aware Planning in Robotics, Indian Institute of Technology Delhi, April 2012, Delhi, India. February 2013,
- Real-Time High-Fidelity Rigid Body Simulations for Virtual Environments, Tata Institute of Fundamental Research, August 2011, Mumbai, Maharashtra, India

9. Academic Service

- Serving as Associate Editor of IEEE Robotics and Automation Letters (RA-L)
- Serving as Associate Editor of Journal of ASME *Journal of Computing and Information Science in Engineering* (JCISE)

10. Institutional Service at IIT Patna

- Associate Dean Academic Affairs, July 2021-July 2022
- Secretary, Department Academic Program Committee of Mechanical Engineering Department, 2016-2020.
- Member, Department Purchase Committee of Mechanical Engineering Department, 2016-2019.
- Member, Committee for Developing Executive M-Tech Program in Mechatronics, 2021
- Member, Committee for Developing Dual Degree B-Tech (Mechanical)+MBA Program in collaboration with National Institute of Industrial Engineering (NITIE) 2022
- Member, Institute Wellness Center, 2018-2022