BIO-DATA OF ARPITA MUKHERJEE

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3. Qualifications

S.No.	Degree	Institution	Year	class	Area
1	Ph D	Bengal Engineering and Science University (IIEST), Shibpur	2011	…	Signal Processing, Control System
2	M Tech	Regional Engineering College (NIT), Durgapur	2003	1st	Industrial Electrical System
3	BE	Jalpaiguri Government Engineering College	2001	1st	Electrical Engineering

4. **Main Research Domain:** Control System and Signal Processing

Sub Domain: Sensor Fusion, Statistical Signal Processing, Estimation, Bayesian Filtering, Acoustics Signal Processing, Control and Guidance of Robotic System, Target Tracking, Machine Learning, Smart Agricultural System.

5. List of Publications

Journal Publications

- R K Jain, **A Mukherjee**, P Karmakar, A Banerjee, H Akbarov, S Hasanov, "Experimental performance of soil monitoring system using IoT technique for automatic drip irrigation", International Journal of Communication Systems, vol. 36, no. 18, 2023 https://doi.org/10.1002/dac.5617

- Tamal Kundu, Aloke Kumar Datta, Parikshit Roy, Pijush Topdar, Aishwarya Banerjee, Arpita Mukerjee, Pratap Karmakar, Apurba Pal, (2023), An experimental study on health monitoring of rail section using an indigenously developed AE system, International Journal of Structural Engineering, vol. 13(4), pp. 463-481

- A. Banerjee, **A. Mukherjee,** "A Mathematical Algorithm for Predicting the Crack in the Junction of a Steel Truss Bridge Using Acoustic Emission Testing." Int J Steel Struct (2023). https://doi.org/10.1007/s13296-023-00727-1

- A. Banerjee, A. Mukherjee, Banerjee, A.**, Mukherjee**, A. Methodology for localization of crack in a steel truss bridge model." Sādhanā 48, 51 (2023). https://doi.org/10.1007/s12046-023-02098-z

- Sandip Jana, Saikat Kumar Shome, **Arpita Mukherjee** (2021), "Polynomial-based Stability Analysis of Modified IMC-PID Controller for Piezoelectric Actuator System in Time Delay Environment", IETE Journal of Research, DOI: 10.1080/03772063.2021.1987996

- **A. Mukherjee,** A. Banerjee, Analysis of Acoustic Emission Signal for Crack Detection and Distance Measurement on Steel Structure. Acoust Aust 49, 133–149, 2021. https://doi.org/10.1007/s40857-020-00208-z
- Sucharita Saha, Amit Kumar Ball, **Arpita Mukherjee**, Arjita Das, Saurav Halder, Naga Hanumaiah, "Optimization of electrochemical etching process for manufacturing of micro electrodes for micro-EDM application", Volume: 235 issue: 5, page(s): 925-940, 2021

- Jain, R.K., A. Das, **A. Mukherjee,** et al. Experimental Performance of Robotic Inspection System for Underground Pipelines. J. Inst. Eng. India Ser. C 102, 683–703, 2021. https://doi.org/10.1007/s40032-021-00691-x

- **A. Mukherjee**, S. K. Shome, P. Karmakar, et al. "Hybrid controller for precision positioning application," Sādhanā 45, 81, 2020. https://doi.org/10.1007/s12046-020-1323-6

- Saikat Kumar Shome, Sandip Jana, **Arpita Mukherjee**, Partha Bhattacharjee,"Design of Adaptive Voltage Dither Control Framework Based on Spectral Analysis for Nonlinear Piezoelectric Actuator", Journal of Control, Automation and Electrical Systems-Springer, pp. 1-16, Aug 2019. https://doi.org/10.1007/s40313-019-00506-6

- Shome, S.K., Jana, S., **Mukherjee, A**., Partha, & Bhattacharjee (2019). "Sensitivity Function Based Robustness Evaluation Of Hysteretic Piezoelectric Actuator Using Internal Model Principle", UPB Scientific Bulletin, Series C: Electrical Engineering, Vol. 81, Iss. 3, pp 169-182, 2019 .

- S K Shome, **A Mukherjee**, P Karmakar, U Datta, "Adaptive Feedforward Controller of Piezoelectric Actuator for MicroNano Positioning" in Sadhana, Indian Academy of Science, Springer, 2018. Issue – Academy proceedings in Engineering Science, Volume 43, Issue 10, Aug 2018

- S K Shome, S Jana, **A Mukherjee**, P Bhattacharjee, U Datta, "Bio Inspired Modified Internal Model Control Approach for Improved Disturbance Rejection of Piezo Micro Manipulator" Studies in Informatics and Control, Vol 27(3) 295-306, September 2018

- Saikat Kumar Shome, Mangal Prakash, Sourav Pradhan, and **Arpita Mukherjee**, "On Synergistic Integration of Adaptive Dithering Based Internal Model Control for Hysteresis

Compensation in PiezoactuatedNanopositioner," Mathematical Problems in Engineering, vol. 2015, Article ID 365141, 19 pages, 2015. doi:10.1155/2015/365141

- U Datta, **A. Mukherjee**, PK Sahu, S Kundu, "Resource utilization of multi-hop CDMA wireless sensor networks with efficient forwarding protocols", Procedia Engineering, Volume 64, pages 46-55, 2013.

- Shome, S. K., S. R. K. Vadali, U. Datta, S. Sen, and **A. Mukherjee**. "Performance Evaluation of Different Averaging based Filter Designs Using Digital Signal Processor and its Synthesis on FPGA", International Journal of Signal Processing, Image Processing and Pattern Recognition, Vol.5, No.3, September 2012.
- **Arpita Mukherjee**, Aparajita Sengupta, State Estimation of Linear Stochastic System Using Recursive Maximum a Posteriori Estimator", Asian *Journal of Control*, Volume 13, Issue 3, pages 465–469, May 2011

- **Arpita Mukherjee**, Aparajita Sengupta, Likelihood Function Modeling of Particle Filter in Presence of Non-Stationary Non-Gaussian Measurement Noise", *Signal Processing-Elsevier*, Volume 90, Issue 6, June 2010, Pages 1873-1885.

- **Arpita Mukherjee**, Aparajita Sengupta, "Estimating the Probability Density Function of a Non-Stationary Non-Gaussian Noise", *IEEE Transaction of Industrial Electronics*, vol. 57, no. 4, pp. 1429-1435, April 2010

- **Arpita Mukherjee**, Subhankar Bhowmik, Aparajita Sengupta, "State Estimation of a Ballistic Missile in presence of Bad Seeker Measurement and Model Uncertainty", Journal of Systems Science and Engineering, vol. 17, no.1, pp. 23-29, June 2008

Conference Presentations

- Aishwarya Banerjee, Arpita Mukerjee, (2024), Discrimination of Acoustic Emission Signals Generated from Different Sources using Support Vector Machine, Proceedings of SICE 2022, Department of Mechanical and Aerospace Engineering, IIT Hyderabad

- Jain, R. K., Mukherjee, A., Karmakar, P., Banerjee, A., Akbarov, H., Hasanov, S. (2023). Soil Monitoring Using Sensor Network and IoT Technique for Automatic Irrigation System. Academic research in educational sciences. SamTSAU Conference 1. Vol. 4, 139-156.

- A. Banerjee, **A. Mukherjee,** "Discrimination of Acoustic Emission Signals Generated from Different Sources using Support Vector Machine," 4th Structural Integrity Conference and Exhibition, SICE-2022, 14th-16th December 2022, IIT Hyderabad.

- **A. Mukherjee**, A. Maurya, P. Karmakar and P. Bhattacharjee, "Analysis of Signal for Determination of Crack Distance from Acoustic Emission Sensor of a Steel Bridge," 2019 International Conference on Computing, Power and Communication Technologies (GUCON), 2019, pp. 969-974.

- Sucharita Saha, **Arpita Mukherjee**, Nagahanumaiah, "A Review on Short Pulse Generator Used for Micro Electric Discharge Machining," Manufacturing Technology Today, Vol 18, No 12, Pages: 3-11, 2019

- R. K. Jain, Abhijit Das, **A. Mukherjee**, Santosha Goudar, Ankita Mistri, Design Analysis of Novel Scissor Mechanism for Pipeline Inspection Robot (PIR), 4th International Conference on Advances in Robotics, May 2019

- Saikat Kumar Shome, Sandip Jana, **Arpita Mukherjee**, Partha Bhattacharjee,"Design of Adaptive Voltage Dither Control Framework Based on Spectral Analysis for Nonlinear Piezoelectric Actuator", Journal of Control, Automation and Electrical Systems-Springer, pp. 1-16, Aug 2019

- **Arpita Mukherjee** , Abhishek Maurya, Pratap Karmakar, Partha Bhattacharjee, "Internet of Things Based Data Acquisition System of Acoustic Emission Sensor for Structural Health Monitoring Applications", 2nd International Conference on Intelligent Data Communication Technologies and Internet of Things (ICICI 2019), Sep 2019.

- S K Shome, **A Mukherjee**, P Bhattacharjee, U Datta, “Piezoelectric Actuation and Motors - An Overview of Nonlinearities, Control and Emerging Industrial Applications” in the proceedings of IEEE International Conference on Innovative Applications of Computational Intelligence on Power, Energy and Controls with their impact on Humanity, IEEE UP Section, pp. 160-164, Nov 2018.

- S K Shome, S Jana, **A Mukherjee**, P Bhattacharjee, U Datta, “Improved Internal Model Control based Closed Loop Controller Design for Second Order Piezoelectric System with Dead-Time” in the proceedings of IEEE India International Conference on Power Electronics, IEEE PES-IAS Delhi Chapter, Dec 2018.

- **Arpita Mukherjee** and Abhishek Maurya, Identification of Different Acoustic Emission Signal", IEEE International Conference on Applied Electromagnetics, Signal Processing and Communication, 22 – 24th October 2018.

- **Arpita Mukherjee**, PratapKarmakar, Saikat kumar Shome, Siddheswar Sen, Uma Datta, "Precision Positioning System for Long Travel Range and Submicron Resolution", IEEE 2nd International Conference on Control Instrumentation Energy and Communication CIEC 16, 28 - 30 Jan 2016, Kolkata, West Bengal, India.

- S. K. Shome, M Prakash, S. Pradhan, **A. Mukherjee**, "Adaptive linearization of hysteresis for enhanced positional accuracy of robotic arm," IEEE Annual International Conference on Emerging Research Areas: Magnetics, Machines and Drives (AICERA/iCMMD), 2014, 24-26 July 2014.

- S. K. Shome, M Prakash, S. Pradhan, **A. Mukherjee**, "Online tuning of dither for micro-nano positioning platform: A PID based approach," IEEE Annual International Conference on Emerging Research Areas: Magnetics, Machines and Drives (AICERA/iCMMD), 2014, 24-26 July 2014.

- B. S. Somesh, **A. Mukherjee**, S. Sen, P. Karmakar, "Constant current control of stepper motor in microstepping mode using PIC16F877A", IEEE 2nd International Conference on Devices, Circuits and Systems (ICDCS) 2014, 6-8 March 2014.

- Anirban Bhakta, Saikat Kr Shome, **Arpita Mukherjee**, Uma Datta,"Hysteresis Compensation using Modified Internal Model Control for Precise Nano Positioning",International Conference on Industrial Engineering Science and Applications, 2014, April 2014.

- A. Bhakta, S. K. Shome, **A. Mukherjee**, S. Sen, "Dahl model based feedforward control for precise positioning of nano actuators using TMS320C6713," IEEE International Conference on Control, Instrumentation, Energy and Communication (CIEC), 2014, pp.7-11, Jan. 31, 2014-Feb. 2, 2014.

- S. K. Shome, **A. Mukherjee**, U. Datta, "Input Shapers against System Parametric Uncertainty," in Machine Intelligence and Research Advancement (ICMIRA), 2013 International Conference on , vol., no., pp.299-304, 21-23 Dec. 2013.

- Saikat Kumar Shome, Sourav Pradhan, **Arpita Mukherjee**, Uma Datta, "Dither Based Precise Position Control of Piezo Actuated Micro-Nano Manipulator" 39th Annual Conference of IEEE Industrial Electronics Society, Austria, 10 – 13 Nov, 2013.

- Saikat Kumar Shome, Mangal Prakash, **Arpita Mukherjee**, Uma Datta, "Dither Control For Dahl Model Based Hysteresis Compensation" proceedings of IEEE International Conference on Signal Processing, Computing and Control, 26 - 28 Sep 2013, India.

- **Arpita Mukherjee**, DebaprasadMukherjee, "Distributed probability density function estimation of environmental function from sensor network data," IEEE International Conference on Signal Processing Image Processing & Pattern Recognition (ICSIPR), pp. 346-350, 7- 8 Feb. 2013.

- **Arpita Mukherjee**,Debaprasad Mukherjee, AparajitaSengupta, "Filter design for tracking of ballistic target missile using seeker measurements with time lag," IEEE International Conference on Signal Processing Image Processing & Pattern Recognition (ICSIPR), pp. 351-355, 7- 8 Feb. 2013.

- Pradyumna Kumar Sahu, **Arpita Mukherjee**, Siddheswar Sen and Uma Datta "Performance Analysis of Piezoelectric Energy Harvesting Device", First International Workshop on Sustainable Monitoring through Cyber-Physical Systems (SuMo-CPS), TIFR, India, pp. 13-16, 3-6 January 2013.

- **Arpita Mukherjee** and Uma Datta, "Comparative study of piezoelectric materials properties for green energy harvesting from vibration ", Annual IEEE India Conference (INDICON 2010), Dec 75-19, 2010.

- **Arpita Mukherjee** and Uma Datta, "Real Time Probability Density Function Estimation in Sensor Networks", IEEE Sixth International Conference on Wireless Communication and Sensor Networks (WCSN), pp. 50- 53, Dec 15-19, 2010.

- **Arpita Mukherjee**, AparajitaSengupta, “Kinematic State Estimation of a Ballistic Target Missile from Bad Seeker Measurements”, IEEE International conference on Avionics Systems ICAS-2008, Feb 2008, pp 246-246.

- **Arpita Mukherjee**, AparajitaSengupta, “Parameter Estimation of a Signal along with Non-Stationary Non-Gaussian Noise”, 33rd Annual Conference of the IEEE Industrial Electronics Society IEEE IECON 2007, pp 2429-2433, Nov 5-8, 2007.

- **Arpita Mukherjee**, AparajitaSengupta, “State Estimation of Ballistic Target Missile from Seeker Measurements using Nonlinear Filters”, National System conference (NSC-2007), Dec 14-15, 2007.

- **Arpita Mukherjee**, Arnab Ghosh, AparajitaSengupta, P K Nandi “A comparison of unscented Kalman filter and extended Kalman filter for estimating the kinemating state of ballistic target”, National Conference on Range Technology-2006, Nov 28 – 30, 2006.

Book Chapter

- Ankan Dutta, Surbhi Pal, Aishwarya Banerjee, Pratap Karmakar, **Arpita Mukherjee**, Debaprasad Mukherjee & Prabal Kumar Sahu, "Survey on Irrigation Scheduling with Machine Learning", Smart Trends in Computing and Communications. SmartCom 2023. Lecture Notes in Networks and Systems, vol 650. Springer, Singapore. https://doi.org/10.1007/978-981-99-0838-7_68

- A. Laha, B. Saha, A. Banerjee, P. Karmakar, D. Mukherjee, **A. Mukherjee** (2023) “IoT-Based Automatic Irrigation Scheduling Using MQTT Protocol.” In: Fong, S., Dey, N., Joshi, A. (eds) ICT Analysis and Applications. Lecture Notes in Networks and Systems, vol 517. Springer, Singapore. https://doi.org/10.1007/978-981-19-5224-1_58

- D. Dutta, C. Mazumder, A. Banerjee, P. Karmakar, D. Mukherjee, **A. Mukherjee** (2023) “IoT-Based Smart Monitoring of Soil Parameters for Agricultural Field.” In: Fong, S., Dey, N., Joshi, A. (eds) ICT Analysis and Applications. Lecture Notes in Networks and Systems, vol 517. Springer, Singapore. https://doi.org/10.1007/978-981-19-5224-1_60

- A.K. Pandey, **A. Mukherjee**, (2022). “A Review on Advances in IoT-Based Technologies for Smart Agricultural System”. In: Pattnaik, P.K., Kumar, R., Pal, S. (eds) Internet of Things and Analytics for Agriculture, Volume 3. Studies in Big Data, vol 99. Springer, Singapore. https://doi.org/10.1007/978-981-16-6210-2_2

- **A. Mukherjee**, S.K. Shome, P. Bhattacharjee (2022) Survey on Internet of Things Based Intelligent Wireless Sensor Network for Fire Detection System in Building. In: Gu J., Dey R., Adhikary N. (eds) Communication and Control for Robotic Systems. Smart Innovation, Systems and Technologies, vol 229. Springer, Singapore. https://doi.org/10.1007/978-981-16-1777-5_12

- S. Jana, S.K. Shome, **A. Mukherjee**, P. Bhattacharjee (2022) Performance Evaluation of Adaptive Dither Control Frameworks for Nonlinear Piezoactuator. In: Gu J., Dey R., Adhikary

N. (eds) Communication and Control for Robotic Systems. Smart Innovation, Systems and Technologies, vol 229. Springer, Singapore. https://doi.org/10.1007/978-981-16-1777-5_1

- S. Jana, S.K. Shome, **A. Mukherjee**, P. Bhattacharjee (2022) Comparative Performance Study of Different Controllers for Nonlinear Piezoelectric Stack Actuator. In: Gu J., Dey R., Adhikary N. (eds) Communication and Control for Robotic Systems. Smart Innovation, Systems and Technologies, vol 229. Springer, Singapore. https://doi.org/10.1007/978-981-16-1777-5_2

- **A. Mukherjee**, A. Maurya, P. Karmakar., P. Bhattacharjee, "Internet of Things Based Data Acquisition System of Acoustic Emission Sensor for Structural Health Monitoring Applications," book chapter on Data Engineering and Communications Technologies, vol 38. Springer, Cham., 2020

6. Patents/Copyright filed/granted with details

Patents filed:

- **Arpita Mukherjee**, Pratap Karmakar, Aishwarya Banerjee, "Preamplifier with Multi Selectable Gain and Bandwidth for acoustic emission signal" CMERI Ref.: CSIR-CMERI/IPMG/Patent/2021-22/193, File No. : 193, IPU-CSIR Ref.: 0071NF2022, Date: 30.03.2022

Copyright Granted:

- Pratap Karmakar, **Arpita Mukherjee,** Sandip Jana, Anirudh Kumar, Partha Bhattacharjee, "Interlocking Based Automatic Outdoor COVID Protection System (COPS)", dated 03/02/2022, Registration Number: L-111633/2022

- **Arpita Mukherjee,** Pratap Karmakar, Partha Bhattacharjee, "Software for Acquisition, Identification and Determination of Distance of Crack Signal on Steel Structure from Acoustic Emission Sensor", Registration Number: L-97246/2020, dated 08/12/2020.

- Saikat Kumar Shome, Siddheswar Sen, **Arpita Mukherjee,** Partha Bhattacharjee, Harish Hiran, "Vibration reduction of piezoelectric inchworm motor using input shaper algorithm.", No. L-87231/2019, Dated 22.11.2019

- **Arpita Mukherjee**, Uma Datta, Pratap Karmakar, Sidhheswar Sen, Bipul Kumar, Saikat Kumar Shome, Sushil Murmu, Pradyumna Kumar Sahu, Somnath Chatterjee, Shantanu Kumar Naskar and Rabisankar Mandal, "Hybrid controller for long travel range with sub-micron resolution", Registration Number: L-79379/2018, dated 10/12/2018.

- **Arpita Mukherjee**, Uma Datta, Pratap Karmakar , Sidhheswar Sen, Bipul Kumar, Saikat Kumar Shome, SushilMurmu, Pradyumna Kumar Sahu, Somnath Chatterjee, Shantanu Kumar Naskar and Rabisankar Mandal, "Feed forward and feedback controller for piezo actuator",

Registration Number: L-79366/2018, dated 07/12/2018.

- Itiaz Alam, Sarbari Datta, **Arpita Mukherje, "**Wireless communication architecture for amphibian robot for post disaster rescue operation in inland shallow water**"**, Registration Number: L-77705/2018**,** dated 08/09/2018.

Copyright Filed:

- **Arpita Mukherjee**, Pratap Karmakar, Ravi Kant Jain, Aishwarya Banerjee, "Sensor Network for Automatic Irrigation System and Real Time Agricultural Field Monitoring," CMERI Ref.: CSIR-CMERI/IPMG/Copyright/2022-23/238, IPU-CSIR Ref.: 041CR2022, Date: 10.06.2022

- Pratap Karmakar, **Arpita Mukherjee,** Sandip Jana, Tapas Naskar, Kalyan Kumar Mistry, "Circuit for maintaining the TTL level voltage in long distance wired communication," CMERI Ref.: CSIR-CMERI/IPMG/Copyright/2021-22/210, IPU-CSIR Ref.: 044CR2021, Date: 31.08.2021.

- **Arpita Mukherjee**, Uma Datta, Pratap Karmakar, Sidhheswar Sen, Bipul Kumar, Saikat Kumar Shome, SushilMurmu, Pradyumna Kumar Sahu, Somnath Chatterjee, Shantanu Kumar Naskar and Rabisankar Mandal, "Precision Positioning System with Constant Current Micro-Stepping Control" Filed on 22/12/16.

- Uma Datta, Sidhheswar Sen, **Arpita Mukherjee,** Saikat Kumar Shome, Bipul Kumar, Sushil Murmu, Pradyumna Kumar Sahu, Pratap Karmakar, "Wireless sensing module for vibration monitoring of structures", Filed on 21/09/16.

7. Sponsored Research Projects

S. No	**Title**	**Sponsoring Agency**	**Period**	**Amount** (Rupees in lakhs)
1	Sensor Fusion Algorithms for Underwater Robotic System	MoES-NIOT, Chenaai under Deep Ocean Mission (DOM)	06/02/2023 - 05/02/2026	189
2	Advances in Internet-of-thing (IOT) based crop health and soil monitoring with automatic irrigation system	DST	15/03/2021-14/03/2024	18
3	IoT based Intelligent Integrated Cyber Physical Sensor Framework for Building Fire Disaster Management (IC-FDM)	DST	29/05/2020-28/05/2023	44
4	Development of COVID Protection System at CMERI colony	CSIR	18/09/2020 - 31/03/2021	5

5.	Design and development of crack detection system in steel bridges using acoustic emission technique	DST	1st Nov 2017 - 31st Apr 2021	Rs. 29.19 Lakhs
6.	Pipeline Inspection Robot (PIR) under Robotic Intervention for Industrial and Strategic Applications	CSIR	23 Aug 2018- 31 Mar 2020	Rs 98.0 Lakhs
7	Piezoelectric Actuator System for Automotive Translation Systems(PASATS	DST	22/02/2017 to 21/02/2020	Rs 91.44 Lakhs
8	Development of flying skills and theoretical analysis of certain rotorcraft Configurations.	CSIR	12/06/2017 to 11/12/2017	5 lakhs
9	Amphibian Robot for post disaster rescue operation in inland shallow water	CSIR	01/09/2016 to 31/08/2018	100 Lakhs
10	Solar Assisted Robot for Surveillance Application	CSIR	11/06/2017 to 12/12/2017	6 lakhs
11	Robotics and Micro Machines-> Multi-axis motion drives and control systems for micro machines, Network Project	CSIR	01/04/2013 to 31/03/2017	Rs 98 Lakhs
12	Modeling and Experimental Validation for Energy Harvesting System using Piezoelectric Device	CSIR-CMERI	01/05/2011 to 30/04/2013	Rs 9.4 Lakhs.
13	Capability Building for Design and Development of Ultra Wide Band (UWB) Microwave Sensor for Hidden Object Detection	CSIR-CMERI	01/04/2011 to 31/03/2014	Rs 19.86 Lakhs
14	Solar Power generation through rooftop PV panel and solar tree combination model (OLP213012)	CSIR-CMERI	Sept 2016- Aug 2017	Rs. 100 Lakhs