

ISE NEWSLETTER

DEPARTMENT OF INDUSTRIAL & SYSTEMS
ENGINEERING, IIT KHARAGPUR

Autumn 2022

The Department of Industrial and Systems Engineering (ISE) was established in 1973 as the Industrial Management Centre and later elevated to a full-fledged department in the year 1983. With strong focus in research and innovation, together with academic programs tailored to address the needs of the present day technological evolution, ISE has emerged as a unique academic institution in the country. ISE offers the following degree programs:

- **B.Tech (4-year)** - B. Tech in **Industrial Engineering**.
- **Dual Degree (5-year)** - B.Tech. in **Industrial Engineering** and M.Tech in **Industrial Engineering and Management**.
- **Dual Degree (5-year)** - B.Tech in **Manufacturing Science** and M.Tech in **Industrial Engineering and Management**.
- **M.Tech (2-year)** - M. Tech in **Industrial Engineering and Management**.
- Master of Science (**MS**).
- Doctor of Philosophy (**PhD**).



Head of the Department:
Prof. J. Maiti

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(Assistant Professor, ISE)

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Workshop and Webinars

Joint Workshop organized by IIT Kharagpur and IIS SSC

On August 12, 2022, a workshop on “*Developing Knowledge and Skill Matrix for Integrated Operations of Advanced Technology for Ferrous and Nonferrous Industries*” was organized jointly by IIT Kharagpur and Indian Iron and Steel Sector Skill Council (IIS SSC) at Bengal Club, Kolkata. The workshop was graced by Mr. T. V. Narendran, Global CEO and Managing Director of Tata Steel as the Chief Guest and Prof. V. K. Tewari, Director, IIT Kharagpur as the Guest of Honour. A team of IITKGP professors including Prof. J. Maiti, (HoD, ISE), Prof. B. Mahanty, Prof. P.K. Ray, Dr. B. G. Menon, Dr. S. Roychowdhury, Dr. A. J. Abraham, Dr. A. Sharma, Dr. C. R. Borra and Dr. A.K. Deb were also present.



Inaugural ceremony: (from Left to Right): Mr. Alope Mookherjea (Member of Board of Directors, IIS SSC), Mr. T.V. Narendran (Global CEO and MD, Tata Steel), Prof. V. K. Tewari (Director, IIT Kharagpur), Prof. J. Maiti (Head of the Department, ISE and Chairman CoE-SEA, IIT Kharagpur), Mr. Sushim Banerjee, (CEO, IIS SSC)

Workshop and Webinars

Upbodhan Alumni Talks

The IISE Student Chapter is organizing an **alumni talk series** titled "Upbodhan". The invited speakers received PhD from the Department of ISE in the received past. The speakers share their views on life after PhD, their current research projects and career prospects with the students and scholars.



Industrial and Systems Engineering Department
IIT Kharagpur

UPBODHAN

Alumni Talk Series on career prospects in research

Dr. Lohithaksha Maniraj Maiyar
ASSISTANT PROFESSOR
Entrepreneurship and Management
IIT HYDERABAD

30 JULY, 2022
11:00 - 12:00 AM

Contact
Mr. Ranil Senapati
ISE Representative
Email: ranil.iitkgp@gmail.com

Co-ordinators
Mr. Gourav Kumar
Email: gkumar@iitkgp.ac.in



Industrial and Systems Engineering Department
IIT Kharagpur

UPBODHAN

Alumni Talk Series on career prospects in research

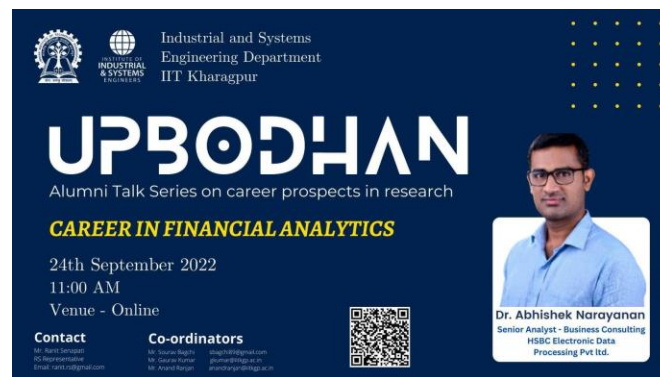
Dr. Ratri Parida

- Associate Professor, IIT Chazabod
- Visiting Research Fellow, Guildhall School of Business and Law, London metropolitan University, UK

27 AUGUST, 2022
11:00 AM

Contact
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Industrial and Systems Engineering Department
IIT Kharagpur

UPBODHAN

Alumni Talk Series on career prospects in research

CAREER IN FINANCIAL ANALYTICS

24th September 2022
11:00 AM
Venue - Online

Contact
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Dr. Abhishek Narayanan
Senior Analyst - Business Consulting
HSBC Electronic Data Processing Pvt Ltd.



Industrial and Systems Engineering Department
IIT Kharagpur

UPBODHAN

Alumni Talk Series on career prospects in research

DATA SCIENCE IN MANAGEMENT STUDIES

19th November 2022
11:00 AM
Venue - Online

Contact
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Co-ordinators
Mr. Sourav Bagchi
Email: sbagchi@iitkgp.ac.in
Mr. Anand Ranjan
Email: anandranjan@iitkgp.ac.in

Dr. Abhishek Verma
Assistant Professor
Management Information Systems
IIM Rohtak



Industrial and Systems Engineering Department
IIT Kharagpur

UPBODHAN

Alumni Talk Series on career prospects in research

BENDERS DECOMPOSITION- THEORY AND APPLICATION

19th December 2022
6:30 PM
Venue - Online

Contact
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Email: anandranjan@iitkgp.ac.in

Dr. Ajinkya N. Tanksale
Assistant Professor
Operations/Engineering Management
Clarkson University, Potsdam, NY, USA

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Department News

Visit of Prof. Denny Yu, (PhD, CPE)

In connection with the project titled ‘**Design and Development of Automated Systems for Ergonomic Evaluation of Human-Product Interface in Healthcare Systems**’ under **SPARC (Scheme for Promotion of Academic and Research Collaboration, GoI)** supervised by, Indian PI: **Prof. P. K. Ray (ISE, IITKGP)** and Co-PI **Prof. V. K. Tewari (Director, IITKGP)**, with **Purdue University, USA**, a training course on ‘**Human Factors Engineering in Healthcare Systems**’ was organized during **May 16 - 20, 2022** at the Department of ISE. **Dr. Denny Yu, (PhD, CPE) Associate Professor of Industrial Engineering, Purdue University USA**, who is also the project PI from USA visited ISE, to deliver lectures on the contemporary practices and research problems relevant to the topic. The lecture sessions centered around topics such as Information-centred Human Factors, Human Body-centred Ergonomics, Organisation-centred Human Factors, and Applications in Healthcare Systems.



Visit of Prof. Christoph Glock (TUDarmstadt, Germany)

The Department of ISE invited **Prof. Christoph Glock** to share his insights on advanced research topics in Industrial Engineering. He delivered an insightful and informative lecture on “**future prospects and research opportunities in areas like energy management, human factors and supply chain management**” on **11th October 2022** at the ISE department. Prof. Glock currently a professor at the Institute of Production and Supply Chain Management and Dean of the Department of Law and Economics at TU Darmstadt, Germany. In addition, he is handling editorship roles in top-rated journals like Applied Mathematical Modelling, Computers & Industrial Engineering and the International Journal of Integrated Supply Management. The department of ISE looks forward to collaborate with Prof. Glock and the Technical University of Darmstadt, Germany.



Department News

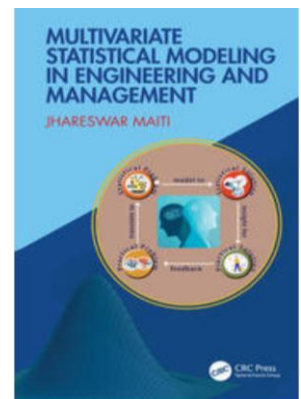
Visit of Dr. Ryichi Shibasaki, (The University of Tokyo)

Dr. Ryichi Shibasaki, Associate Professor, Resilience Engineering Research Center, Department of Technology Management for Innovation (TMI), The University of Tokyo, visited the department of ISE with his student **Mr. Koki Kawachi** on **24th November 2022**. They delivered an insightful lecture on “**Global Logistics Intermodal Network Simulation modelling and its application to South Asia**”. Dr. Shibasaki was the Head of International Coordination Division, NILIM, MLIT, Japan.



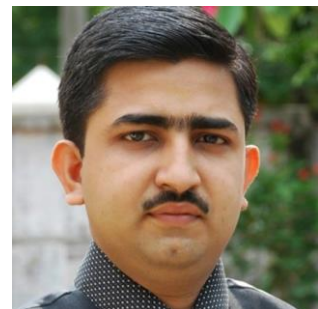
Book Published

Prof. J. Maiti's new book titled “**Multivariate Statistical Modeling in Engineering and Management**” was published by CRC Press in 2022. The book covers important concepts on multivariate modeling, along with real world examples from the industry. The book is a culmination of Prof. Maiti's long experience in teaching and research. The ebook version is **available online** at <https://www.taylorfrancis.com/>.



Special Invited Lecture on Scientific Conduct

Dr. Balagopal Menon, Assistant Professor, Department of ISE was a resource person for ‘**Special Invited Lecture on Scientific Conduct**’ organized by **Prof N R Madhava Menon** Interdisciplinary Centre for Research in Ethics and Protocols (ICREP), Cochin University of Science and Technology, Cochin on **24th November, 2022**.



Placement News

The academic year 2022-23 has been an excellent year in terms of placement. The major employers include **Amazon, American Express, Society General, AB InBev, Morgan Stanley, Accenture, Bain & Company** among others.

Department News

DAAD Internship

Varshitha P (19IM3FP26), has been awarded the prestigious **DAAD Working Internships in Science and Engineering (WISE)** scholarship to do a research internship at **Technische Universität Darmstadt, Germany** during the summer of 2023. Her project titled '**real-time management of Hybrid Order Picking Systems (HOPS) in warehouses**' will be guided by **Dr. Christoph Glock**, Professor at the Institute of Production and Supply Chain Management, TU Darmstadt. She was also selected for the **Mitacs Globalink** Research Internship this year.



Teacher's Day Celebration 2022



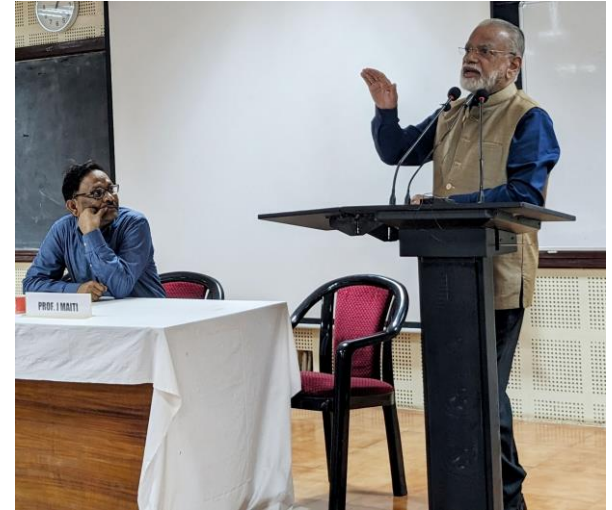
ISE students and research scholars, celebrated **Teacher's Day** by hosting a cultural program on the **5th of September, 2022**. Among the program events, the main attraction was a **duo song performance** and a **Quiz** hosted by research scholars. A **friendly football match** involving all the students and Professors was also organized on **4th September 2022**.



Alumni Focus

The Department Industrial and Systems Engineering (ISE) of IIT Kharagpur organized an interactive session with **Dr. K. Radhakrishnan, Former Chairman, ISRO (2009 – 2014), Padma Bhushan**, and the distinguished alumnus of ISE, IIT Kharagpur on **20th January 2023**.

Dr. Radhakrishnan was awarded **PhD from the Department of ISE (then IEM) in the year 2000**. Dr. K. Radhakrishnan served as the Chairman, ISRO from 2009–2014. Prior to this, he was the **Director of Vikram Sarabhai Space Centre (2007-2009)** and Director of National Remote Sensing Agency (2005-2008) of the Department of Space. Presently, he is the Chairperson of the Board of Governors of Indian Institute of Technology (IIT), Kanpur & Indian Institute of Technology (IIT), Ropar, and Chairman of the Standing Committee of the IIT Council; Chairperson of the Oversight Committee of Science & Engineering Research Board (SERB-DST), and Chairman, High-powered Committee of Indian Knowledge Systems, Ministry of Education-Government of India besides being a Member of Space Commission and Honorary Distinguished Advisor in the Department of Space/ISRO. He is a Fellow of the Indian National Academy of Engineering; Fellow of the National Academy of Sciences, India; and several other professional societies of repute. Apart from his grand accomplishments in the scientific domain, he is an accomplished **vocalist (Carnatic music) and Kathakali artist**. In 2014, he received the **"Padma Bhushan"** award for contribution to Science and Engineering, especially in the field of Space Science and Technology. He was also named one of Nature's ten **"people who mattered"** of 2014.



In his brief discourse, Dr. Radhakrishnan fondly reminisced his days as a scholar of ISE. He shared valuable insights on the **role of Systems Engineering in the development of important missions at ISRO**.

He touched upon the evolving technological landscape and the future directions for IE. In the end, he interacted with students and faculty members of ISE.

Publication Watch

ISE Publications

Below is the list of publications appeared in journals and conference proceedings from the department of ISE in 2021-2022 (as of December 2022).

1. Paltrinieri, N., Maiti, J., Stefana, E., & Patriarca, R. (2022). Harmonising Occupational and Process Safety: a myth or a good safety management practice?. *Journal of Loss Prevention in the Process Industries*, 104950.
2. Sarkar, S., Pramanik, A., & Maiti, J. (2023). An integrated approach using rough set theory, ANFIS, and Z-number in occupational risk prediction. *Engineering Applications of Artificial Intelligence*, 117, 105515.
3. Pramanik, A., Pal, S. K., Maiti, J., & Mitra, P. (2022). Traffic Anomaly Detection and Video Summarization Using Spatio-Temporal Rough Fuzzy Granulation with Z-Numbers. *IEEE Transactions on Intelligent Transportation Systems*, 23(12), 24116-24125.
4. Mitra, R., Goswami, A., & Tiwari, M. K. (2022). Financial supply chain analysis with borrower identification in smart lending platform. *Expert Systems with Applications*, 208, 118026.
5. Sahoo, D. P., Sahoo, B., Tiwari, M. K., & Behera, G. K. (2022). Integrated remote sensing and machine learning tools for estimating ecological flow regimes in tropical river reaches. *Journal of Environmental Management*, 322, 116121.
6. Zaman, D., Gupta, A. K., Uddameri, V., Tiwari, M. K., & Sen, D. (2022). Robust sensor placement for sustainable leakage management in water distribution networks of developing economies: A hybrid decision support framework. *Journal of Environmental Management*, 320, 115816.
7. Singh, S., Mohanty, A., Rai, R., Mahanty, B., & Tiwari, M. K. (2022). An optimization framework for operational-level resource composition in an inclusive manufacturing system. *Journal of Computing and Information Science in Engineering*, 22(5), 051003.
8. Sahoo, D. P., Sahoo, B., & Tiwari, M. K. (2022). MODIS-Landsat fusion-based single-band algorithms for TSS and turbidity estimation in an urban-waste-dominated river reach. *Water Research*, 224, 119082.
9. Sarkar, S., Vinay, S., Djeddi, C., & Maiti, J. (2022). Classification and pattern extraction of incidents: a deep learning-based approach. *Neural Computing and Applications*, 34(17), 14253-14274.
10. Maiti, J. (2022). *Multivariate Statistical Modeling in Engineering and Management*. CRC Press.

Publication Watch

11. Roy, C., Chowdhury, C. R., Misra, S., & Maiti, J. (2021). DQ-Map: Dynamic Decision Query Mapping for Provisioning Safety-as-a-Service in IoT. *IEEE Internet of Things Journal*, 9(4), 3150-3157.
12. Chakraborty, A., Misra, S., & Maiti, J. (2021). Mobility-Aware Controller Orchestration in Multi-Tier Service-Oriented Architecture for IoT. *IEEE Transactions on Vehicular Technology*, 71(2), 1820-1831.
13. Garg, A., Maiti, J., & Kumar, A. (2022). Granulized Z-OWA aggregation operator and its application in fuzzy risk assessment. *International Journal of Intelligent Systems*, 37(2), 1479-1508.
14. Pramanik, A., Pal, S. K., Maiti, J., & Mitra, P. (2021). Granulated RCNN and multi-class deep sort for multi-object detection and tracking. *IEEE Transactions on Emerging Topics in Computational Intelligence*, 6(1), 171-181.
15. Garg, A., Das, S., Maiti, J., & Pal, S. K. (2020). Granulized Z-VIKOR model for failure mode and effect analysis. *IEEE Transactions on Fuzzy Systems*, 30(2), 297-309.
16. Saha, P., Gudheniya, N., Mitra, R., Das, D., Narayana, S., & Tiwari, M. K. (2022). Demand Forecasting of a Multinational Retail Company using Deep Learning Frameworks. *IFAC-PapersOnLine*, 55(10), 395-399.
17. Badulescu, Y., Tiwari, M. K., & Cheikhrouhou, N. (2022). MCDM approach to select IoT devices for the reverse logistics process in the Clinical Trials supply chain. *IFAC-PapersOnLine*, 55(10), 43-48.
18. Balamwar, A., Mitra, R., Tiwari, M. K., & Verma, P. (2022). Prediction and Analysis of Seasonal Dynamic Metal Consumption using Aggregated LightGBM-A Case Study. *IFAC-PapersOnLine*, 55(10), 725-730.
19. Kumar, R., Ganapathy, L., Gokhale, R., & Tiwari, M. K. (2022). Scaling up the Digitalization of the Public Distribution System: A COVID-19 Pandemic Impetus. *Ifac-papersonline*, 55(10), 55-60.
20. Das, J. N., Mandal, J., Date, H., & Tiwari, M. K. (2022). Joint optimization of bunker fuel and vessel speed considering delay and carbon emission. *IFAC-PapersOnLine*, 55(10), 31-36.
21. Juned, M., Sangle, P., Gudheniya, N., Haldankar, P. V., & Tiwari, M. K. (2022). Designing the drone based end-to-end local supply chain distribution network. *IFAC-PapersOnLine*, 55(10), 743-748.
22. Wani, D., Singh, R., Khanapuri, V. B., & Tiwari, M. K. (2022). Delay Prediction to Mitigate E-commerce Supplier Disruptions using Voting Mechanism. *IFAC-PapersOnLine*, 55(10), 731-736.
23. Yadav, P., Bhosale, R., Sahoo, R., Khanzode, V., & Tiwari, M. K. (2022). Advances in Air Cargo Financing Using a Consortium Blockchain. *IFAC-PapersOnLine*, 55(10), 737-742.

Publication Watch

24. Sharma, A., Keshari, A., Swadhin, S., Gokhale, R. S., & Tiwari, M. K. (2022). AI-Powered Cyberinfrastructure Platform for Modular Electric Vehicle Product Design: Conceptual framework and architecture. *IFAC-PapersOnLine*, 55(10), 400-405.
25. Shukla, M., & Tiwari, M. K. (2022). Digital operations scheduling, workflow management, and performance measures of factors responsible for disruption in Industry 4.0 supply chain. *IFAC-PapersOnLine*, 55(10), 37-42.
26. Balamwar, A., De, T. S., Das, D., & Tiwari, M. K. (2022). Prediction of Turn Around Time using Neural Networks-A Case Study of Shipping Ports. *IFAC-PapersOnLine*, 55(10), 389-394.
27. Roy, C., Misra, S., Maiti, J., & Chakravarty, U. (2020). Safe-Serv: Energy-efficient decision delivery for provisioning safety-as-a-service. *IEEE Transactions on Services Computing*, 15(4), 1954-1966.
28. Misra, S., Roy, C., Sauter, T., Mukherjee, A., & Maiti, J. (2022). Industrial Internet of Things for safety management applications: A survey. *IEEE Access*, 10, 83415-83439.
29. Pramanik, A., Sarkar, S., Djeddi, C., & Maiti, J. (2022, April). Real-Time Detection of Traffic Anomalies Near Roundabouts. In *Pattern Recognition and Artificial Intelligence: 5th Mediterranean Conference, MedPRAI 2021, Istanbul, Turkey, December 17–18, 2021, Proceedings* (pp. 253-264). Cham: Springer International Publishing.
30. Maity, S., Rastogi, A., Djeddi, C., Sarkar, S., & Maiti, J. (2022, April). A Novel Optimized Method for Feature Selection Using Non-linear Kernel-Free Twin Quadratic Surface Support Vector Machine. In *Pattern Recognition and Artificial Intelligence: 5th Mediterranean Conference, MedPRAI 2021, Istanbul, Turkey, December 17–18, 2021, Proceedings* (pp. 339-353). Cham: Springer International Publishing.
31. Sahoo, R., Pasayat, A. K., Bhowmick, B., Fernandes, K., & Tiwari, M. K. (2022). A hybrid ensemble learning-based prediction model to minimise delay in air cargo transport using bagging and stacking. *International Journal of Production Research*, 60(2), 644-660.
32. Rastogi, A., & Tiwari, M. K. (2022). Microbial degradation of pharmaceuticals. *New Trends in Emerging Environmental Contaminants*, 183-210.
33. Mishra, A., Verma, P., & Tiwari, M. K. (2022). A circularity-based quality assessment tool to classify the core for recovery businesses. *International Journal of Production Research*, 60(19), 5835-5853.
34. Das, S., Garg, A., Khorania, Y., & Maiti, J. (2022). Dual hesitant Z-number (DHZN), correlated distance, and risk quantification. *International Journal of Intelligent Systems*, 37(1), 625-660.

IISE Student Chapter, IIT Kharagpur

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