Dr. Indranil Hazra

Assistant Professor, IIT Kharagpur

Education

2021 — **Doctor of Philosophy in Civil Engineering**
Department of Civil and Environmental Engineering, University of Waterloo, Waterloo, ON N2L 3G1, Canada

2016 — **Master of Engineering in Structural Engineering**
Department of Civil Engineering, Indian Institute of Science, Bangalore, KA 560012, India

2014 — **Bachelor of Engineering in Civil Engineering**
Department of Civil Engineering, Jadavpur University, Kolkata, WB 700032, India

Work Experience

Present – Jul 2023 — **Assistant Professor**
Subir Chowdhury School of Quality and Reliability, Indian Institute of Technology Kharagpur, Kharagpur, WB 721302, India

Jul 2023 – Jun 2023 — **Assistant Professor**
Department of Civil and Infrastructure Engineering, Indian Institute of Technology Jodhpur, Karwar, RJ 342030, India

May 2023 – Jun 2022 — **Postdoctoral Associate**
Center for Risk and Reliability, Department of Mechanical Engineering, University of Maryland, College Park, MD 20742, United States

May 2022 – Oct 2021 — **Postdoctoral Fellow**
Department of Civil and Environmental Engineering, University of Waterloo, Waterloo, ON N2L 3G1, Canada

Jun 2017 – Jan 2017 — **Project Associate**
Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai, TN 600036, India

Research Interests

Structural & System Reliability Analysis, Structural Health Monitoring, Stochastic Degradation Modeling, Reliability-Based Design Optimization, Probabilistic Machine Learning

Journal Publications

Under Review — **Hazra, I., Weiner, M. J., Yang, R., Chatterjee, A., Southgate, J., Groth, K. M., & Azarm, S.**
Prognostics and health management of unmanned surface vessels: past, present, and future. *Journal of Computing and Information Science in Engineering*.

Under Review — **Hazra, I., Chatterjee, A., Southgate, J., Weiner, M. J., Groth, K. M., & Azarm, S.**
A reliability-based optimization framework for planning operational profiles for unmanned systems. *Journal of Mechanical Design*.

2023 — **Hazra, I., Pandey, M. D., & Rahman, M.**
A probabilistic approach to the estimation of radioactive contaminant inventories at a nuclear waste disposal site. *Journal of Environmental Radioactivity*, 259-260, 107119.

2022 — **Hazra, I., Bhadra, R., & Pandey, M. D.**
Likelihood-free Hamiltonian Monte Carlo for modeling piping degradation and remaining useful life prediction using the mixed gamma process. *International Journal of Pressure Vessels and Piping*, 200, 104834.

2022 — **Hazra, I., & Pandey, M. D.**
A simulation-based Bayesian approach to predict the distribution of maximum pit depth in steam generator tubes. *Nuclear Engineering and Design*, 386, 111563.

Contact

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3rd Floor, Sir JC Bose Annex, Sir JC Bose Laboratory Complex, IIT Kharagpur, WB 721302, India

2021 **Hazra, I., & Pandey, M. D.**

A likelihood-free approach towards Bayesian modeling of degradation growths using mixed-effects regression. *Computers & Structures*, 244, 106427.

2020 **Hazra, I., Pandey, M. D., & Manzana, N.**

Approximate Bayesian computation (ABC) method for estimating parameters of the gamma process using noisy data. *Reliability Engineering & System Safety*, 198, 106780.

2020 **Hazra, I., Pandey, M. D., & Jyrkama, M. I.**

Estimation of flow-accelerated corrosion rate in nuclear piping system. *Journal of Nuclear Engineering and Radiation Science*, 6(1), 011106.

Conference Publications

Accepted **Hazra, I., Chatterjee, A., Southgate, J., Weiner, M. J., Groth, K. M., & Azarm, S.**

A reliability-based optimization framework for planning operational profiles for unmanned systems. *Proceedings of the ASME 2023 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE2023)*, August 20-23, 2023, Boston, Massachusetts, United States.

2022 **Hazra, I., Pandey, M. D., & Rahman, M.**

Uncertainty assessment of radiation inventories in a contaminated site. *Proceedings of the 41st Annual CNS Conference and 46th Annual CNS/CNA Student Conference of the Canadian Nuclear Society (CNS)*, June 5-8, 2022, Saint John, New Brunswick, Canada.

2018 **Hazra, I., Pandey, M. D., & Jyrkama, M. I.**

Estimation of the probability distribution of flow-accelerated corrosion rate in feeder pipes. *Proceedings of the 8th International Conference on Simulation Methods in Nuclear Science and Engineering, Canadian Nuclear Society (CNS)*, October 9-11, 2018, Ottawa, ON, Canada.

Conference Presentations

2022 **Hazra, I., Pandey, M. D., & Rahman, M.**

Uncertainty assessment of radiation inventories in a contaminated site. *The 41st Annual CNS Conference and 46th Annual CNS/CNA Student Conference of the Canadian Nuclear Society (CNS)*, June 5-8, 2022, Saint John, New Brunswick, Canada. (Presentation)

2021 **Hazra, I., & Pandey, M. D.**

Approximate Bayesian computation method for modeling pitting corrosion in structural components. *Engineering Mechanics Institute (EMI) Conference and Probabilistic Mechanics & Reliability Conference (PMC)*, May 25-28, 2021, Virtual Event hosted by Columbia University, New York City. (Presentation)

2020 **Hazra, I., & Pandey, M. D.**

Probabilistic prediction of degradation in reactor components: A Bayesian approach. *University Network of Excellence in Nuclear Engineering (UNENE)'s R&D workshop*, December 14-15, 2020, Virtual Conference. (Poster)

2020 **Hazra, I., & Pandey, M. D.**

Probabilistic modeling of degradation in reactor components using the Bayesian mixed-effects regression method. *The First Virtual Research Colloquium 2020-2021*, November 12, 2020, jointly hosted by the University of Strathclyde, Glasgow, UK, and the University of Waterloo, Waterloo, Canada. (Presentation)

2020 **Hazra, I., & Pandey, M. D.**

Quantifying parameter uncertainty in linear mixed-effects modeling of the corrosion degradation process. *SIAM Conference on Uncertainty Quantification (UQ20)*, March 24-27, 2020, Technical University of Munich (TUM), Garching, Germany. (Abstract accepted; conference canceled due to COVID-19 outbreak)

2019 **Hazra, I., Pandey, M. D., & Jyrkama, M. I.**

Probabilistic analysis of FAC rate in CANDU® feeder pipe system. *University Network of Excellence in Nuclear Engineering (UNENE)'s R&D workshop*, January 14-17, 2019, Mississauga, Ontario, Canada. (Poster)

2018 **Hazra, I., Pandey, M. D., & Jyrkama, M. I.**

Estimation of the probability distribution of flow-accelerated corrosion rate in feeder pipes. *The 8th International Conference on Simulation Methods in Nuclear Science and Engineering, Canadian Nuclear Society (CNS)*, October 9-11, 2018, Ottawa Marriott Hotel, Ottawa, ON, Canada. (Presentation)

Teaching Engagements

2023 **Professional Training Course on Reliability Engineering**
Sponsored by TVS Motors | Autumn 2023 | Organised by SCSQR, IIT Kharagpur

2023 **RE 61003: Reliability Engineering**
Postgraduate | Autumn 2023 | IIT Kharagpur | Jointly with Prof. M. Sarma

2020 ↑ 2018 **CIVE 601: Engineering Risk and Reliability**
Postgraduate | Fall 2020, Fall 2019, Fall 2018 | University of Waterloo

2020 **CIVE 222: Differential Equations**
Undergraduate | Spring 2020 | University of Waterloo

2018 **CIVE 280: Fluid Mechanics**
Undergraduate | Spring 2018 | University of Waterloo

Student Mentoring

2023 ↑ 2022 **Arko Chatterjee**
Ph.D. Student | Mechanical Engineering | University of Maryland | Topic: Deep Learning-Based Surrogate Models for Efficient System Simulations

2023 ↑ 2022 **Colin Schell**
Ph.D. Student | Reliability Engineering | University of Maryland | Topic: Probabilistic Pipeline Failure Assessment using Bayesian Networks

2023 ↑ 2022 **LT Joseph Southgate**
M.S. Student | Mechanical Engineering | University of Maryland | Topic: Maintenance Optimization for Unmanned Surface Vessels

2023 ↑ 2022 **Matthew J. Weiner**
B.S. Student | Reliability Engineering | University of Maryland | Topic: RUL Estimation of Complex Systems using Bayesian LSTM Networks

Professional Activity

2023 ↑ 2020 **Journal/Conference Reviewer**
Reliability Engineering & System Safety (2020, 2022), Sadhana (2023), International Journal of Structural Stability and Dynamics (2023), Annual Conference of the PHM Society (2023)

Honors & Awards

2021 **Graduate Studies Conference Assistantship**
For EMI/PMC 2021 Conference | University of Waterloo | Spring 2021

2021 **Donald E. Grierson Memorial Award**
For Excellence in Structural Engineering Research | University of Waterloo | Winter 2021

2021 **University of Waterloo Senate Graduate Scholarship**
For Academic Excellence | University of Waterloo | Winter 2021

2020 **Student Presentation Competition Finalist**
First Virtual Research Colloquium | Session: Nuclear Engineering | Jointly Hosted by University of Waterloo, Canada, and University of Strathclyde, UK | Fall 2020

2020, 2019 **University of Waterloo Graduate Scholarship**
For Academic Excellence | Winter 2020, Fall 2019, Winter 2019

2017 **Graduate Research Studentship (GRS)**
University of Waterloo | 2017-2021

2017 **International Doctoral Student Award (IDSA)**
University of Waterloo | 2017-2021

2014 **Ministry of Human Resource Development (MHRD) Scholarship**
Indian Institute of Science, Bangalore | 2014-2016

2014 — **Certificate of Appreciation**

For Securing All India Rank 17 (90872 candidates) in GATE-2014

2010, 2008 — **Gold Medals from Kolkata Police Association**

For Outstanding Performances in Higher Secondary (2010) and Secondary (Madhyamik) Examinations (2008)

2007 ↑ 2004 — **Certificates of Merit**

Academic Science Culture and Promotion Society (ASCPS 2006, 2007), Rural Educational Development (RED) Scheme (2005), Bangiyo Bhugol Mancha Geography Contest (2005), Amra Ka Jan Quiz Contest (2004)