Brinthan Kanesalingam

Personal Information

No 238, Thirunavatkulam, Vavuniya 43000, Sri Lanka

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Website | Google Scholar | GitHub

Research Interest

My research primarily focuses on **material characterisation**, integrating **artificial intelligence** methodologies. I study the intricate micro-structures (defects) of 3D materials to broaden their applications and enhance our understanding, employing **multimodal imaging**, **computer vision**, and **computational X-ray micro-analysis**. **Sustainability** and **decarbonisation** serve as fundamental principles guiding my research endeavours. I also explore **advanced machine learning** and **deep learning** techniques for applications in microscopy and spectroscopy.

Education

Master of Science (Major Component of Research) Sep 2022 - Apr 2024
Earth Resources Engineering
University of Moratuwa, Katubedda, Sri Lanka

Bachelor of Science in Engineering (Honours) Aug 2017 - Jul 2022
Earth Resources Engineering
University of Moratuwa, Katubedda, Sri Lanka

Research Experience

Graduate Research Assistant Feb 2024 - Present
Data Science, Engineering and Analytics Research Hub
Computer Science & Engineering, University of Moratuwa

- Engaged in research on conditional generative adversarial networks and single image super resolution (SISR) for microscopic images.

Postgraduate Researcher Sep 2022 - Dec 2023
Master of Science (Major Component of Research)
Earth Resources Engineering, University of Moratuwa

- Investigated the characterisation of coal fly ash derivatives through X-ray micro-analysis and image processing.
- Contributions: Developed a novel technique for the classification of micro and cenospheres using energy dispersive X-ray spectroscopy, and assessed the imperceptible structures of cenospheres.

Undergraduate Honours Thesis Aug 2021 - Jul 2022
Bachelor of Science in Engineering (Honours)
Earth Resources Engineering, University of Moratuwa

- Contributions: Explored the preprocessing of coal fly ash using an innovative washing method called "washing cycles". Enhanced process efficiency through the application of surface response methodology.

Publications

Unpublished Papers (Under Review)

3. **Kanesalingam B.,** Fernando W.A.M., Panda S., Jayawardena C., Attygalle D., Amarasinghe D.A.S., "Strategic routes in valorising coal fly ash waste to promote circular economy".

2. **Kanesalingam B.**, Fernando W.A.M., Jayawardena C., Attygalle D., Amarasinghe D.A.S., Panda S., Rabbani, A., "Leveraging advanced characterisation of the derivatives of pre-processed coal fly ash using deep learning and digital image processing techniques".

1. **Kanesalingam B.**, Fernando W.A.M., Jayawardena C., Attygalle D., Amarasinghe D.A.S., Panda S., Rabbani, A., "Shedding electrons on cenospheres: Advancing characterisation through X-ray micro-analysis".

Journal Articles

1. **Kanesalingam B.**, Fernando W.A.M., Panda S., Jayawardena C., Attygalle D., Amarasinghe D.A.S., (2023). "Harnessing the Capabilities of Microorganisms for the Valorisation of Coal Fly Ash Waste through Biometallurgy". *Minerals*, 13(6), 724.

Peer-Reviewed Conference Papers

7. **Brinthan K.**, Thanujan T., Thiruchittampalam S., and Jayawardena C.L., (2023). "Subclassification of water resources with Sentinel-2 satellite imagery: Spectra-based insight". *in* "International Geoscience and Remote Sensing Symposium (IGARSS)", Pasadena, California, USA. *(Invited for Journal Article)*

6. **Brinthan K.**, Shivadhahini S., Senadheera U.A.G., Fernando W.A.M., Jayawardena C.L., and Jayasundara D.R.T., Wickrama M.A.D.M.G., (2023). "A Primary Pre-Processing Strategy for Coal Fly Ash to Enhance its Performance and Usability". *in* "World Congress on Undergraduate Research", The University of Warwick, United Kingdom.

5. Jayawardena C.L., **Brinthan K.**, Gamsavi K., Samarakoon K.G.A.U.,Senarathna T.M.B., (2023). "Weathered rock surface classification with unpiloted aerial vehicle imagery and machine learning". *in* "SLRMES Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialised Conference", Sri Lanka.

4. **Brinthan K.**, Shivadhahini S., Senadheera U.A.G., Fernando W.A.M., Jayawardena C.L., and Jayasundara D.R.T., Wickrama M.A.D.M.G., (2022). "Experimental Investigation and Performance Optimisation of Washing Cycles for Pre-processing of Coal Fly Ash". *in* "Proceedings of ISERME 2022", University of Moratuwa, Sri Lanka.

3. **Brinthan K.**, Thanujan T., Thiruchittampalam S., and Jayawardena C.L., (2021). "Evaluation of Machine Learning Algorithms in Classifying Multispectral Imagery on Waterbody Extraction". *in* "Proceedings of ICSUSL 2021", Sabaragamuwa University of Sri Lanka, Sri Lanka.

2. Thanujan T., **Brinthan K.**, Thiruchittampalam S., and Jayawardena C.L., (2021). "Evaluation of Ventilation Network through Hybrid Analytical-Numerical Approach in Underground Working Block". *in* "Proceedings of ISERME 2021", University of Moratuwa, Sri Lanka.

1. Thanujan T., **Brinthan K.**, Shivadhahini S., Subasinghe M.A.I.I.J., Vettinathan S., Dharmaratne P.G.R., Hemalal P.V.A., Chaminda S.P., and Jayawardena C.L., (2021). "A Study of Underground and Surface Mining Methods in Sri Lanka and its Suitability Assessment". *in* "Proceedings of ISERME 2021", University of Moratuwa, Sri Lanka.

Magazine Articles

2. "Coal, Calm, and Collected", *Materials World*, Institute of Materials, Minerals & Mining (IOM3), United Kingdom.

1. "Are we going to let coal fly ash to just fly? Transforming pollution into innovation", *Bolgoda Plains*, University of Moratuwa *(Submitted)*

Research presentations

Oral Presentations

1. "Pre-processing: A new avenue for coal fly ash circular economy", *World Congress on Undergraduate Research*, The University of Warwick, United Kingdom, April 2023.

Poster Presentations

3. "Decode subclasses of water resources with the indicator matrix", *International Geoscience and Remote Sensing Symposium (IGARSS)* (h5-median - 68), Pasadena, California, USA, July 2023.

2. "Demystifying the heterogeneity of coal fly ash through washing cycles", *International Summer School in Global Just Transition: Equity in Net Zero*, Newcastle University, United Kingdom, June 2023.

1. "Experimental investigation and performance optimisation of washing cycles for pre-processing of coal fly ash", *Research Week 2023*, University of Moratuwa, Sri Lanka, December 2022.

Teaching Experience

Teaching Assistant

- CS3111 - Introduction to Machine Learning — Summer 2024
  Computer Science & Engineering, University of Moratuwa

Resource Person

- ER4290 - Rock Mechanics — Fall 2023
  Earth Resources Engineering, University of Moratuwa
- ER4202 - Research Project — Fall 2022, 2023 & 2024
  Earth Resources Engineering, University of Moratuwa

Synergistic Activities

Conference Organisation & Editorials

2. SLRMES - Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialised Conference, Sri Lanka, December 2023. *(Organising committee & Editorial team)*

1. International Symposium on Earth Resources Management and Environment 2023 (ISERME 2023), University of Moratuwa, Sri Lanka, August 2023. *(Editorial team)*

International Conference Peer Reviews

5. National Conference on Undergraduate Research 2024 (NCUR 2024), California, United States of America

4. 25^{th} & 26^{th} International Conference on Paste, Thickened and Filtered Tailings (Paste 2023 - 2024), The University of Western Australia, Australia.
3. Rocscience International Conference 2023 (RIC 2023), Toronto, Canada.
2. World Congress on Undergraduate Research - British Conference of Undergraduate Research 2023 (WorldCUR-BCUR 2023), The University of Warwick, United Kingdom.
1. International Symposium on Earth Resources Management and Environment 2023 (ISERME 2023), University of Moratuwa, Sri Lanka

Open Source Software Contribution

GitHub | **Python Package Index**

- **pyDeepP2SA** - Advanced particle characterisation package developed using deep learning, digital image processing, and numerical computing.
- **pyChemEng** - Rapid assessment of raw data for adsorption isotherms and kinetic models. Co-authored by *Dr Ashane Fernando*.

Grants and Awards

Recipient of full scholarship from UK Energy Research Centre (UKERC) (2023) to participate in the International Summer School in Global Just Transition: Equity in Net Zero at Newcastle University, Newcastle upon Tyne, United Kingdom.

Recipient of full scholarship from The University of Warwick (2023) to participate in the World Congress on Undergraduate Research 2023 at The University of Warwick, Coventry, United Kingdom.

Dean's List (2017 - 2022) honouree during Bachelor's Degree at the University of Moratuwa, Sri Lanka, on three occasions.

Work Experience

Internship Trainee May 2021 - Sept 2021
SuperMap Software Co., Ltd., Beijing, China

Trainee Irrigation Engineer Oct 2020 - Jun 2021
Department of Irrigation, Colombo, Sri Lanka

Scientific and Professional Societies

Member (RMS14078) - Royal Microscopical Society (RMS), Oxford, England.

Student Member (3003156) - Australasian Institute of Mining & Metallurgy (AusIMM), Carlton, Australia.

Member (20231000075) - International Association for Carbon Capture (IACC).

Member - Sri Lankan Rock Mechanics and Engineering Society/ International Society for Rock Mechanics and Rock Engineering (SLRMES/ ISRM).