Brinthan Kanesalingam

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Website | *Google Scholar* | *ResearchGate* | *GitHub*

Profile and Research Focus

My research interests revolves around materials and minerals sciences, computer vision, machine learning, and computational methodologies. I am particularly interested in characterising microstructures and analysing complex electromagnetic radiation data from techniques such as imaging, fluorescence, absorption spectroscopy, and scattering. My primary focus lies in X-ray and multimodal imaging. I aim to advance understanding at the convergence of these diverse fields.

Education

Master of Science (Major Component of Research) *University of Moratuwa, Sri Lanka*
Department of Earth Resources Engineering Sept 2022 - Present
Thesis: Enhancing coal fly ash waste-valorisation through advanced characterisation techniques

Bachelor of Science in Engineering (Honours) *University of Moratuwa, Sri Lanka*
Department of Earth Resources Engineering Aug 2017 - Jul 2022
Thesis: Preprocessing of coal fly ash waste for advanced material applications

Research Experience

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

- Engaged in research on conditional generative adversarial networks (CGANs) to enhance the resolution of microscopic images under the guidance of **Dr Uthayasanker Thayasivam**.
- Curating specialised synthetic datasets tailored for evaluating CGAN performance in super-resolution tasks for microscopic images
- Designing and implementing a bespoke loss function to maintain structural integrity throughout super-resolution processes

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

- Investigated the characterisation of coal fly ash derivatives through X-ray micro-analysis and image processing under the guidance of **Dr Chulantha Jayawardena**, **Dr Ashane Fernando**, **Dr Shantha Amarasinghe**, and **Dr Dinesh Attygalle**.
- 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 *Earth Resources Engineering, University of Moratuwa*
Bachelor of Science in Engineering (Honours) Aug 2021 - Jul 2022

- 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.
- Advisers: **Eng. Maheshwari Wickrama**, **Dr Ashane Fernando**, **Dr Chulantha Jayawardena**, and **Ms Ravindi Jayasundara**

Publications

** Both **Brinthan K** and **Kanesalingam B** denote the same person*

Unpublished Papers (Works in Review/ Preparation)

[U4] 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"**. *(Under Review)*

[U3] 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"**. *(Under Review)*

[U2] 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"**. *(Under Review)*

[U1] Kanesalingam B., Fernando W.A.M., Jayawardena C., Attygalle D., Amarasinghe D.A.S., Panda S., Rabbani, A.,**"Micro-structural profiling of coal fly ash through Energy Dispersive X-ray Spectroscopy"**. *(In Preparation)*

Journal Articles

[J1] 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

[C7] 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)*

[C6] 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.

[C5] 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.

[C4] 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.

[C3] 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.

[C2] 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.

[C1] 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

[M2] **"Rethinking coal fly ash waste for a circular tomorrow"**, *Materials World*, Institute of Materials, Minerals *&* Mining (IOM3), United Kingdom *(Submitted for April 2024 issue as a feature article)*

[M1] **"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	Computer Science & Engineering, University of Moratuwa	CS3111 - Introduction to Machine Learning (Summer 2024)
Resource Person	Earth Resources Engineering, University of Moratuwa	ER4290 - Rock Mechanics (Fall 2023) ER4202 - Research Project (Fall 2022 & Fall 2023)

Professional Service

Conference Organisation & Editorials

- SLRMES - Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialised Conference, Sri Lanka, December 2023. *(Organising committee & Editorial team)*
- International Symposium on Earth Resources Management and Environment 2023 (ISERME 2023), University of Moratuwa, Sri Lanka, August 2023. *(Editorial team)*

International Conference Peer Reviews

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

Open Source Software Contribution

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

Grants and Awards

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

- **Recipient of full scholarship from UK Energy Research Centre (UKERC)** to participate in the International Summer School in Global Just Transition: Equity in Net Zero at Newcastle University, Newcastle upon Tyne, United Kingdom. This conference has been organised and funded by nine different research consortia and institutions including: HI-ACT, Supergen Energy Networks Hub, the Energy Interdisciplinary Research Centre Cambridge, IDLES, the Faraday Institution, CREDS, UKCCSRC, UKERC, and the Energy Research Accelerator.
- **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).