

# Brinthan Kanesalingam

## *Postgraduate Student*

Address: No 238, Thirunavatkulam, Vavuniya 43000, Sri Lanka

Telephone: +94 769 923 353

Email: kbrinthan.22@uom.lk, kanesalingambrinthan187@gmail.com

Website: brinthank.github.io



## Profile

I am deeply passionate about unravelling the mysteries of the natural world through the lens of mathematics and machine learning. My research primarily focuses on Minerals, Materials, and Mining, with a multidisciplinary approach that integrates Digital Image Processing, Artificial Intelligence, and Simulation and Modelling. I am committed to advancing our understanding of these domains and making meaningful contributions to both the scientific community and society at large. I demonstrate proficiency in time management, documentation, efficient resource allocation, and continuous self-improvement, fostering a responsible and streamlined workflow.

## Education

2022 - to date	<b>MSc (Major Component of Research)</b> <b>Department of Earth Resources Engineering</b> <b>University of Moratuwa</b>
2017 - 2022	<b>BSc (Hons) in Engineering</b> <b>Department of Earth Resources Engineering</b> <b>University of Moratuwa, Sri Lanka</b> <b>GPA: 3.44 (Second upper division)</b>

## Research Experience

2022 - to date	<b>MSc (Major Component of Research)</b> <b>Department of Earth Resources Engineering</b> <b>University of Moratuwa</b> <b>Advised by</b> Dr Chulantha Jayawardena, Dr Ashane Fernando, Dr Shantha Amarasinghe, and Dr Dinesh Attygalle
----------------	---

Focusing on valorising coal fly ash waste material using advanced characterisation and separation techniques. Expertise includes mineral processing, material synthesis, machine learning, and digital image processing. Currently, specialising in computational X-ray micro-analysis and its applications for nano- and micron-scale materials. Actively involved in simulations and computational decision-making using scientific computing for characterising coal fly ash-derived materials.

2017 - 2022

**BSc Engineering - Final Year Research Project**

**Department of Earth Resources Engineering**

**University of Moratuwa**

**Advised by** Eng. Maheshwari Wickrama, Dr Ashane Fernando,  
Dr Chulantha Jayawardena, and Ms Ravindi Jayasundara

Primarily focused on preprocessing coal fly ash waste using scientifically proven washing cycle techniques and optimising parameters using surface response methodology. Proficient in characterising materials through XRD and SEM-EDS techniques. Successfully synthesised zeolites at a laboratory scale from coal fly ash using microwave-assisted hydrothermal synthesis technique.

### **Works in Review/Preparation:**

- **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 in Journal of Environmental Chemical Engineering*).
- **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". (*Submitted to Chemical Engineering Journal*).
- **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 internal review for submission to the Journal of Analytical Atomic Spectrometry*).

### **Publications:**

#### **Journal Articles**

- **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.

#### **Conferences**

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

- 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. (Accepted)
- **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.
- **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.
- 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.
- Thanujan T., **Brinthan K.**, Shivadhahini S., Subasinghe M.A.I.I.J., Vettinathan S., Dhararatne 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.

## Presentations:

### Oral Presentations:

- "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:

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

## Academic Services:

### International Conference Reviewing:

- 25<sup>th</sup> International Conference on Paste, Thickened and Filtered Tailings (Paste 2023), 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

### Workshops:

- “Machine Learning Techniques for Rock Mechanics Applications” at SLRMES Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialised Conference, Sri Lanka, December 2023. (Conducted along with Dr Chulantha Jayawardena)

### Editorial Team:

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

### Key Research Skills:

- Advanced computer vision techniques.
- Machine learning data analysis, pattern recognition, and predictive modelling.
- Physics informed machine learning.
- Digital image processing for advanced microscopy analysis.
- Material characterisation using advanced imaging and spectroscopy techniques for studying material properties and composition.
- Computational X-ray micro-analysis methods for analysing and interpreting X-ray data to extract information.
- Simulation design, performance analysis, and optimisation for developing efficient and accurate computational models and simulations.
- Statistical learning methods for analysing complex data-sets and drawing meaningful conclusions.
- Strong programming skills in Python and R for implementing algorithms, data manipulation, and statistical analysis for scientific computing.
- Proficiency in  $\text{\LaTeX}$  and markdown markup languages for creating professional and well-formatted research documents and reports.

### Open Source Software Contribution:

- **pyDeepP2SA** - Advance 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]

## Work Experience

2022 - to date

**Resource Person**

**Department of Earth Resources Engineering**

**University of Moratuwa, Sri Lanka**

**Teaching modules:** ER4290 Rock Mechanics  
ER4202 Research Project

2020 - 2021

**Trainee Irrigation Engineer**

**Department of Irrigation, Colombo, Sri Lanka**

Worked at the headquarters of the department gaining diverse experience across multiple divisions, including Engineering Materials, Geo-Informatics, Engineering Geology, and Water Resources Planning. Proficient in working with various software tools and equipment such as GeoStudio Slope/W, ArcGIS Pro, QGIS, HEC-HMS, and GNSS.

May - Sept 2021

**Internship Trainee**

**SuperMap Software Co., Ltd., Beijing, China**

Mainly focused on providing technical support for SuperMap GIS software and utilising it in real-time monitoring and modelling applications. Presented technical presentations, reports, and conducted technical short courses.

## Awards and Memberships

### 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.

## Professional Memberships:

- **Student Member (3003156)** - Australasian Institute of Mining and Metallurgy (AusIMM), Carlton, Australia.
- **Member (20231000075)** - International Association for Carbon Capture (IACC).

## Referees

### Dr Chulantha Jayawardena

Senior Lecturer,  
Department of Earth Resources Engineering,  
University of Moratuwa,  
Katubedda 10400,  
Sri Lanka.  
Tel: +94 711 365 260  
Email: chulanthaj@uom.lk

### Dr Ashane Fernando

Lecturer,  
Department of Nano Science Technology,  
Wayamba University of Sri Lanka,  
Kuliyapitiya 60200,  
Sri Lanka.  
Tel: +94 775 722 431  
Email: ashanef@wyb.ac.lk