

Abiodun Modupe, Ph.D

Citizenship Status: Permanent Resident

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 abiodun-modupe

 Google Scholar

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Education and Qualification

- 2018 – 2024  **Ph.D. Computer Science,**
University of the Witwatersrand,
Johannesburg, South Africa.
- 2009 – 2011  **MIT Computer Science,**
Tshwane University of Technology,
Pretoria, South Africa.
- 1991 – 1997  **BSc Hons Computer Science with Mathematics,**
Obafemi Awolowo University,
Ile-Ife, Osun State, Nigeria.

Research Interests

-  Natural Language Processing (NLP), Multilingual & Multimodal AI, Machine Learning & Deep Learning, Computational Social Science & Data Science for Social Impact

Experience

- 2019 – Current  **Lecturer & Coordinator of Big Data Science (BDS) programme,**
University of Pretoria, Pretoria, South Africa.
- 2017 – 2019  **Visiting Scholar**, *Council for Scientific and Industrial Research (CSIR)*,
Pretoria, South Africa.
- 2016 – 2017  **Tutor/Teaching Assistant**, *University of the Witwatersrand*,
Johannesburg, South Africa.
- 2012 – 2016  **Independent Contractor (eTutor)**, *University of South Africa*,
Johannesburg, South Africa.
- 2011 – 2016  **Lecturer (Contract)**, *Tshwane University of Technology*,
Pretoria, South Africa.
- 2004 – 2008  **System Analyst (Back-End)**, *First City Monument Bank*
(formerly First Atlantic Bank), Victoria Island, Lagos State, Nigeria.
- 1999 – 2004  **System Engineer**, *Alpha-beta Consulting*, Ijora, Lagos State, Nigeria.

MSc & PhD Thesis

- 1991– 1997  Project: Dermatologist diagnosis using machine learning model
Advisors:
Prof. Rotimi Adagunodo
- 2009 – 2011  Thesis: *Intelligent Identification of Advanced Fee Fraud Activities on the Internet.*
Advisors:
Prof. Olusegun Ojo
Prof. Oludayo O. Olugbara
- 2018 – 2024  Thesis: *Regularized Deep Neural Network for Post-Authorship Attribution.*
Advisors:
Prof. Turgay Celik
Prof. Vukosi Marivate

University Teaching Experience

2019 – Current

 University of Pretoria, Pretoria, South Africa. DSFSI¹

- Programme Coordination:
 1. Coordinator of the Big Data Science stream in the MIT programme.
 2. Oversight of curriculum, student mentorship, research supervision, and module delivery.
- Teaching & Curriculum Development
 1. Designed and taught several postgraduate courses, such as MIT801 – Intro to Machine & Statistical Learning, MIT808 – Big Data Science Project, COS801 – Deep Learning, COS781 – Data Mining, & COS760 – Natural Language Processing.
 2. Led the redesign and evaluation of course content, assessments, and project-based learning.
- Postgraduate Supervision & Mentorship
 1. Supervised or co-supervised over 15 MIT dissertations, as well as several MSc and PhD students across several research domains, such as NLP, fraud detection, credit scoring, vehicle damage estimation, sign language recognition, and computational science
 2. Guided students in publication writing, software prototyping, and real-world deployment.
- Research & Project Leadership
 1. Active member of the Data Science for Social Impact (DSFSI) group.
 2. Led or co-led grants on multilingual NLP, misinformation detection, financial inclusion, and SDG impact analytics.
 3. Published in top journals (IEEE Access, Applied Sciences, etc.) and conferences (SMC, AFRICON, etc.)
- Community Engagement & Conference Involvement
 1. Active member of the Data Science for Social Impact (DSFSI) group.
 2. Served on programme committees (SAICSIT, SACAIR).
 3. Participated in community-driven initiatives such as DLI, Masakhane, and AI4D.
 4. Delivered invited talks both locally and internationally (e.g., UP Colloquium, E-Voting South Africa, All You Need Is Community, G20 AI, & AI4D Partners Meeting:2025).

¹Data Science for Social Impact Research Group

University Teaching Experience (continued)

2016 – 2017

■ University of the Witwatersrand, Johannesburg, South Africa.

- Summary of Responsibilities (2016–2017) – Teaching Assistant to Prof. Turgay Celik
 - 1. Supported delivery of postgraduate modules in machine learning and data science.
 - 2. Facilitated tutorial sessions, explained key theoretical concepts, and guided students through practical assignments.
 - 3. Assisted in grading and marking coursework, programming assignments, and final exams in accordance with university standards.
 - 4. Provided consultation support, offering academic assistance and feedback to students on their learning progress.
 - 5. Contributed to the preparation of teaching materials, including lecture slides, code notebooks, and assessment rubrics.
 - 6. Collaborated closely with Prof. Celik on academic planning, ensuring alignment between course objectives and student performance metrics.

2012 – 2016

■ University of South Africa, Johannesburg, South Africa.

- My tutoring responsibilities for COS2621 at Unisa (2012–2016) involves:
 - 1. The curriculum cover principles of different memory types, including cache, internal, and external memory.
 - 2. Include functionality of the CPU, memory, buses, and I/O devices and how they connect.
 - 3. Teach students how binary, integers, and floating-point numbers are represented and manipulated.
 - 4. Encourage critical thinking by having students evaluate the advantages and disadvantages of different technologies, such as I/O devices.
 - 5. Help students develop problem-solving skills within the context of the module's topics.

2011 – 2016

■ Tshwane University of Technology, Tshwane/Pretoria, South Africa.

- Taught core modules such as Discrete Structures (DCT115D), Principles of Programming B (PPB115D), Advanced Object-Oriented Programming (AOP216D), Information Security (ISC216D), Operating Systems (ORS216D), and Research Project (RRS108G), achieving an 85% student pass rate
- other responsibilities include:
 - 1. Prepared and delivered lectures, tutorials, and practical lab sessions.
 - 2. Set and assessed assignments, tests, and exams.
 - 3. Supervised and evaluated undergraduate research projects.
 - 4. Provided academic support and consultation to students.
 - 5. Contributed to curriculum development and module improvement.

Technical Expertise

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| Research Interest | Large language models, Information retrieval, Sentence alignment, Machine translation, Multilingual NLP, & Digital humanities and forensic linguistics. |
| Technical Skills | Python, PyTorch, TensorFlow, Transformers, DataScience, Neural Networks, Deep Learning. |
| Datasets & Tools | Multilingual corpora, Cross-lingual embeddings, & Parallel text mining |

Computing Proficiency

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| OS | Mac OS X, LINUX (UBUNTU, AND DEBIAN), Windows. |
| Scientific | Python, MatLab, Java. |
| DL Framework | TensorFlow, PyTorch, Keras. |
| Statistics Package | R, Pkanalix, Monolix. |
| Databases | MySQL, PostgreSQL, HSQL, MongoDB, SQLite, LotusNotes. |
| Typography | L <small>E</small> T <small>E</small> X, Endnote |
| Web Dev | HTML, CSS, RESTful, JavaScript, Apache Web Server, and Tomcat Web Server. |

Scholarship/Research Funding & Awards

Scholarship

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| 2009 – 2011 | ■ TUT/CSIR's, Master's Scholarship. | ZAR 30,000 |
| 2018 – 2021 | ■ CSIR-DST, PhD Bursary Support. | ZAR 360,000 |
| 2023 | ■ Google Conference Scholarships Africa | USD 3,000 |
| | ■ IEEE SMC 2023 Travel grants | USD 500 |

Research Funding & Awards

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| 2018,2019 | ■ Black in AI conference | USD 1,200 |
| 2020 | ■ Mozilla Foundation, Masakhane Web ²³ | USD 5,000 |
| 2022 | ■ Co-PI: Transaction Capital: Vehicle Damage Estimation | ZAR 2,000,000 |
| | ■ Co-PI: JP Morgan AI Research ⁴ | USD 50,000 |
| 2023 | ■ exploreCSR Program | USD 18,000 |
| | ■ Cross-lingual Embedding model by Google | USD 25,000 |
| | ■ SIT Research Colloquium | ZAR 45,000 |
| 2024 | ■ Co-PI: AI4D African Languages Lab (IDRC RDI) | CAD 1,070,500.00 |
| 2025 | ■ Co-PI: AfriGemma by Google | USD 200,000.00 |

Postgraduate mentorship

MIT⁵ in Big Data Science (BDS)

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| 2019–2021 | ■ Linae, Munsamy. MIT BDS. CS Department, University of Pretoria Supervisor & topic: Adversarial attacks on satellite imagery. |
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²³The Machine Translation Tool

³<https://zenodo.org/records/4745501>

⁴Code-mixed and code-switched language for low-resource South African languages

⁵Master in Information Technology

Postgraduate mentorship (continued)

- 2020–2022
- **Bayer**, Andreas. MIT BDS. CS Department, University of Pretoria
Supervisor & topic: The design and implementation of a domain-adaptive deep learning reinforcement learning for text classification.
 - **Nthimo**, Liketso P. MIT BDS. CS Department, University of Pretoria
Supervisor & topic: Simulated Annealing approach to staff scheduling in a call centre.
 - **Lusinga**, Moses. MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Predicting default for credit underserved community using machine learning.
 - **Guga**, Nkosana. MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Detection of Online Transaction Fraud Using Unsupervised Machine Learning.
 - **Noganta**, Khanyisa . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Fake News Detection in social media: Using Machine Learning with Psycho-linguistic Features.
- 2021–2023
- **Gagiano**, Marc . MIT BDS Computer Science. CS Department, University of Pretoria
Co-supervisor & topic: Quantifying the valuation of vehicles based on damage.
 - **du Preez**, Armo . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Automating Sweet Potato Grading and Defect localisation: A YoloV5-based Intelligent Food Processing Grading System.
 - **van Staden**, MH . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Explainability for natural language processing.
 - **Chinyati**, Tinashe . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Computational Linguistics to Source code plagiarism.
- 2023–2025
- **Boikanyo**, Radiokana. MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Automatic Music Recommendation System using a hybrid CNN LSTM model .
 - **Mapamela**, Salizwa Wendy . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Automatic Music Recommendation System using a hybrid CNN-LSTM.
 - **Kutshwa**, Bayanda . MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Enhancing Anomaly Detection in Transaction Networks through Cluster-Enhanced Graph Temporal Attention Networks.
 - **Moyahabo**, Muriel Rabothata. MIT BDS Computer Science. CS Department, University of Pretoria
Supervisor & topic: Legal Text Classification for South African Supreme Court of Appeal Judgments Using Supervised Machine Learning and Deep Learning Techniques.
- 2024–2026
- **van Aswegen**, Robert. MIT BDS Computer Science. CS Department, University of Pretoria
Co-supervisor & topic: Enhancing statistical process control using hybrid deep learning: A Kolmogorov-Arnold and support-vector machine approach with adaptive multivariate generalised EWMA charts.

Postgraduate mentorship (continued)

Masters (MSc)

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| 2022-2025 | ■ Sindane , Thapelo. MSc Computer Science. CS Department, University of Pretoria Co-supervisor & topic: Harnessing Cross-lingual Transfer Learning Techniques to Facilitate Interventions for Low-resourced Languages. |
| 2023-2025 | ■ De Jager , Amica. MSc Computer Science. CS Department, University of Pretoria Co-supervisor & topic: Multimodal Misinformation Detection in the South African Social Media Environment. |
| 2024-2025 | ■ Mathebula , Miehleketo. MSc Computer Science. CS Department, University of Pretoria Supervisor & topic: From Text Annotation to an Auto-Regressive Language Model for Sentiment Analysis in South African Financial Reviews. |
| 2025-2027 | ■ Shoderu , Gabriel Olanrewaju. MSc Computer Science. CS Department, University of Pretoria Supervisor & topic: Digital Forensic Readiness to Mitigate Insider Threats in The Cloud Environment |

PhD

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| 2025-current | ■ Mphogo , Dinorego. PhD Computer Science. CS Department, University of Pretoria Supervisor & PhD topic: Multimodal Decision Networks for Unmanned Aircraft Encounter Modelling and Collision. |
| | ■ Sindane , Thapelo. PhD Computer Science. CS Department, University of Pretoria Co-supervisor & PhD topic: A multimodal solution for sign language recognition for low resource language. |
| | ■ Wekwete , Takura. PhD Computer Science. CS Department, University of Pretoria Co-supervisor & PhD topic: Application of deep reinforcement learning in asset liability management. |
| | ■ Rananga , Seani. PhD Computer Science. CS Department, University of Pretoria Co-supervisor & PhD topic: Deep learning techniques for detecting malicious threats to revolutionise cybersecurity. |

Selected publications

Journal

- | | |
|------|---|
| 2025 | ■ Sindane T, Marivate V, Modupe A : A Cross-lingual embedding methods and applications: A systematic review for low-resourced scenarios. Natural Language Processing Journal. 2025 June 9:100157. |
| | ■ Mathebula M, Modupe A , Marivate V, du Toit E. AI for ESG Governance in South Africa: A Systematic Review of Financial Intelligence Approaches. Available at SSRN 5443142. |
| 2024 | ■ Mathebula M, Modupe A , Marivate V. ChatGPT as a text annotation tool to evaluate sentiment analysis on south African financial institutions. IEEE Access. 2024 Sep 20. |
| | ■ Mathebula M, Modupe A , Marivate V. Fine-tuning retrieval-augmented generation with an auto-regressive language model for sentiment analysis in financial reviews. Applied Sciences. 2024 Nov 21;14(23):10782. |
| | ■ Rananga, Seani, Abiodun Modupe , Abiodun Isong, and Vukosi Marivate. Misinformation detection: a review for high and low resource languages. (2024). |

Selected publications (continued)

- 2022 ■ **Modupe A**, Celik T, Marivate V, Olugbara OO. Post-authorship attribution using regularized deep neural network. *Applied Sciences*. 2022 Jun 28;12(15):7518.

Book Chapter

- 2023 ■ Dlamini JS, Marshall L, **Modupe A**. Financial Inclusion in Sub-Saharan Emerging Markets: The Application of Deep Learning to Improve Determinants. In *Southern African Conference for Artificial Intelligence Research 2023* Nov 29 (pp. 219-236). Cham: Springer Nature Switzerland.
■ De Jager A, Marivate V, **Modupe A**. Multimodal Misinformation Detection in a South African Social Media Environment. In *Southern African Conference for Artificial Intelligence Research 2023* Nov 29 (pp. 285-299). Cham: Springer Nature Switzerland.
- 2014 ■ **Modupe A**, Olugbara OO, Ojo SO. Filtering of mobile short messaging service communication using latent Dirichlet allocation with social network analysis. In *Transactions on Engineering Technologies: Special Volume of the World Congress on Engineering 2013 2014* Apr 27 (pp. 671-686). Dordrecht: Springer Netherlands.
- 2012 ■ **Modupe A**, Olugbara OO, Ojo SO. Comparing Supervised Learning Classifiers to Detect Advanced Fee Fraud Activities on Internet. In *International Conference on Computer Science and Information Technology 2012* Jan 2 (pp. 87-100). Berlin, Heidelberg: Springer Berlin Heidelberg.

Conference

- 2025 ■ Marivate V, Dzingirai I, Banda F, Lastrucci R, Sindane T, Madumo K, Olaleye K, **Modupe A**, Netshifhefhe U, Combrink H, Nakeng M. Marito: Structuring and Building Open Multilingual Terminologies for South African NLP. *arXiv e-prints*. 2025 Aug:arXiv-2508.
- 2023 ■ **Modupe A**, Celik T, Marivate V, Olugbara OO. Integrating Bidirectional Long Short-Term Memory with Subword Embedding for Authorship Attribution. In *2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC) 2023* Oct 1 (pp. 1910-1917). IEEE.
■ Rozina Myoya, Lesego Matojane, **Abiodun Modupe**, Vukosi Marivate and Albert Myburgh. Evaluating Drone Imagery for Wildlife Unique Feature Identification. The Proceedings of SACAIR2023 Online Conference, the 4th Southern African Conference for Artificial Intelligence Research ISBN : 978-0-7961-0851-7 (e-book)
- 2021 ■ Nthimo L, Mokoena T, **Modupe A**, Marivate V. Call Centre Shift Schedule Optimisation using Local Search Heuristics. In *2021 IEEE AFRICON 2021* Sep 13 (pp. 1-6). IEEE.
■ Lusinga M, Mokoena T, **Modupe A**, Mariate V. Investigating statistical and machine learning techniques to improve the credit approval process in developing countries. In *2021 IEEE AFRICON 2021* Sep 13 (pp. 1-6). IEEE.
- 2020 ■ Marivate V, Sefara T, Chabalala V, Makhaya K, Mokgonyane T, Mokoena R, **Modupe A**. Investigating an Approach for Low Resource Language Dataset Creation, Curation and Classification: Setswana and Sepedi. In *Proceedings of the first workshop on Resources for African Indigenous Languages 2020* May (pp. 15-20).
- 2019 ■ Sefara TJ, **Modupe A**. Yoruba gender recognition from speech using neural networks. In *2019 6th International conference on soft computing & machine intelligence (ISCMI) 2019* Nov 19 (pp. 50-55). IEEE.
- 2017 ■ **Modupe A**, Celik T, Marivate V, Diale M. Semi-supervised probabilistic approach for normalising informal short text messages. In *2017 Conference on Information Communication Technology and Society (ICTAS) 2017* Mar 8 (pp. 1-8). IEEE.
- 2016 ■ Diale M, Van Der Walt C, Celik T, **Modupe A**. Feature selection and support vector machine hyper-parameter optimisation for spam detection. In *2016 Pattern Recognition Association of South Africa and robotics and mechatronics international conference (PRASA-RobMech) 2016* Nov 30 (pp. 1-7). IEEE.

Selected publications (continued)

- 2015 └─ Adedamola AA, **Modupe A**, Dehinbo OJ. Development and evaluation of a system for normalizing Internet slangs in social media texts. In Proceedings of the World Congress on Engineering and Computer Science 2015 Oct 21 (Vol. 1, pp. 21-23).
- 2013 └─ **Modupe A**, Olugbara OO, Ojo SO. Investigating topic models for mobile short messaging service communication filtering. In Proceedings of the world congress on engineering 2013 (Vol. 2, pp. 1-8).

Workshop

- 2023 └─ Myoya RL, Banda F, Marivate V, Modupe A. FINE-TUNING MULTILINGUAL PRETRAINED AFRICAN LANGUAGE MODELS. In 4th Workshop on African Natural Language Processing 2023.
- 2011 └─ **Modupe A**, Olugbara OO, Ojo SO. Exploring support vector machines and random forests to detect advanced fee fraud activities on internet. In 2011 IEEE 11th International Conference on Data Mining Workshops 2011 Dec 11 (pp. 331-335). IEEE.

Manuscript in Review

- 2025 └─ Seani Rananga, Bassey Isong, **Abiodun Modupe** & Vukosi Marivate. Neural Machine Translation for Misinformation Detection in South African Languages, Submission to TRANSACTIONS ON ASIAN AND LOW-RESOURCE LANGUAGE INFORMATION PROCESSING (Undereview: TALLIP-25-0618.)
- └─ Seani Rananga, Bassey Isong, **Abiodun Modupe** & Vukosi Marivate. Neural Machine Translation for Misinformation Detection in South African Languages, Submission to TRANSACTIONS ON ASIAN AND LOW-RESOURCE LANGUAGE INFORMATION PROCESSING (Undereview: TALLIP-25-0618.)
- └─ Miehleketo Mathebula, **Abiodun Modupe**, Vukosi Marivate & Elda du Toit. AI for ESG Governance in South Africa: A Systematic Review of Financial Intelligence Approaches Intelligent Systems with Applications, Submission to INTELLIGENT SYSTEMS WITH APPLICATIONS. (Undereview: ISWA-D-25-01371.)
- └─ Sindane T, **Modupe A** & Marivate V. A Modern Lens into Sign Language Processing: A Review on Encoding Multi-modal Spatio-Temporal Input Using Transformers, Submission to ACM COMPUTING SURVEYS. (Undereview: ACM CSUR-2025-1316.)

Editorial & Review Activities

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|---------------------------------|---|
| Journal Reviewer | └─ IEEE/ACM TASLP, Machine Translation, LRE, SN Computer Science & Applied Sciences by MDPI, Humanities & Social Sciences Communications by Springer Nature |
| Conference & Workshop Organizer | └─ ICML, SACAIR (Program Committee: 2022-till date), AfricaNLP; ICCAIT 2023, 2025, SAICSIT 2024 (Program Committee) |
| Shared Task Organizer | └─ SemEval 2023, 2024, 2025, 2026; WMT2023, 2024, 2025; IWSLT 2025 |

Invited Talks/Colloquium

- June 2021 └─ UP Research Workshop
Topic: Exploring Word-Character Attention Model with Convolution for Authorship Authentication.
Lynndwood Road, Hatfield. Pretoria.

Invited Talks/Colloquium (continued)

- March 2025
- IEC (Conference and Exhibition) South Africa
Topic: Foundations, Theory and Practice of E-Voting.
Cape Town International Convention Centre,
Cape Town SA.
 - AI in Science & Engineering Symposium
Topic: All You Need Is Community.
Ann Arbor, Michigan. USA
- June 2025
- Panelist, UN/CAIR Data Commons Workshop

Professional Membership/Affiliations

Affiliations

- Black in AI
- Deep Learning Indaba
- Senior Member of DSFSI

Membership

- IEEE (95685929)
- Stimson Responsible Fellow
- Data Science Africa
- Masakhane

Languages

- | | |
|---------|--------------|
| English | ■ Proficient |
| Yoruba | ■ Proficient |
| French | ■ Basic |

Research/Online Profiles

- Google Scholar
- ORCID
- Scopus

References

Available on Request