Yusuf Brima

Contact

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Summary

AI/ML researcher with 7+ years of experience in applied mathematics, data science, machine learning, and deep learning with a Ph.D. in Cognitive Science. I develop scalable algorithms for structured and unstructured data: including tabular, visual, and audio modalities with results published in top-tier venues (ICLR, NeurIPS, Springer Nature). Passionate about leveraging AI/ML to improve disease prevention, early diagnosis, and therapeutic interventions, particularly in low-resource settings.

Skills

Programming: Python, C/C++, R, JavaScript, HTML/CSS
ML & Data Science: TensorFlow, Keras, PyTorch, SciKit-Learn, CUDA, NumPy, Pandas, Matplotlib, Seaborn, Plotly, Dash
Image Processing: OpenCV, Scikit-Image
Audio Processing: Librosa, SoundFile, Wave, Pydub
High-Performance Computing: SLURM, Oracle Sun Grid Engine
Cloud & Containers: AWS, GCP, Docker, Kubernetes, Singularity
Databases: MySQL, PostgreSQL, Oracle, SQL Server
Software: Git/GitHub, LaTeX, Bash, Google Workspace, MS Office, SharePoint
OS: Linux, Unix, Windows
Languages: English (bilingual), French (A1), German (A1)
Web Servers: Nginx, Apache

Education

- **Osnabrück University, Germany** – Ph.D. Cognitive Science (Nov 2025) Supervisors: Prof. Dr. Gunther Heidemann, Prof. Dr. Simone Pika Award: RTG Computational Cognition (DFG)
- **African Institute of Mathematical Sciences (AIMS), Rwanda** – MSc. Mathematical Sciences, Jul 2021 Supervisor: Prof. Marcellin Atemkeng Award: AIMS & MasterCard Foundation Scholarship
- **University of Dhaka, Bangladesh** – MSc. Computer Science & Engineering, Aug 2020 Supervisor: Prof. Mosaddek Hossain Kamal Award: Queen Elizabeth Commonwealth Fellowship
- **University of Makeni, Sierra Leone** – BSc. Computer Science, Feb 2017 Award: Undergraduate Merit Scholarship
- **Ansarul Islamic Boys Secondary School, Sierra Leone** West African Senior School Certificate Examination (W.A.S.S.C.E.), 2007–2010
- **Jaiama Secondary School, Sierra Leone** Basic Education Certificate Examination (B.E.C.E.), 2004–2007
- **Kono District Primary School, Sierra Leone** Class 1–3, National Primary School Certificate Examination (N.P.S.E.), 2002–2004

- **United Pentecostal Primary School, Sierra Leone** Class 1–3, National Primary School Certificate Examination (N.P.S.E.), 1999–2002

Experience

Academic Research Positions

- **Fraunhofer SCAI, Germany** – Postdoctoral Fellow / Biomedical Research Scientist, May 2025 – present
  - Conduct research in biomedical AI for early diagnosis of cancer and Alzheimer's disease using uni- and multimodal deep learning.
  - Supervise bachelor and master's students; collaborate with medical industry partners.
  - Publications targeting top healthcare-focused and general ML conferences/journals including NeurIPS, ICLR, MICCAI, Springer Nature BioData Mining, Nature Digital Medicine.
- **Osnabrück University, Germany** – Research Associate, Nov 2021 – Dec 2024
  - Developed algorithms improving data processing efficiency by 20% and model accuracy by 25%.
  - Curated SynSpeech dataset for disentangled audio representations.
  - Mentored 5+ students; co-organized Deep Representation Learning Seminar (2023).
  - Published in NeurIPS, ICLR, Springer Nature. Maintained open-source code on GitHub.

Teaching / Academic Roles

- **University of Makeni, Sierra Leone** – Research Teaching Assistant, Feb 2017 – Jul 2018
  - Taught computer science courses to 40+ students; supervised 4+ dissertations; achieved 90% project completion rate.
- **Limkokwing University, Sierra Leone** – Lecturer, Jan 2018 – Jul 2018
  - Taught programming courses to 120+ students per semester.
- **African Accents International Institute of Computer Technology (AAIICT), Makeni, Sierra Leone**, Registrar, Sept 2016 – Jul 2018
  - Assisted with student enrollment, formalization and codification of college processes; established and strengthened the operations of the institute.
- **Destiny College of Management Theology and Technology, Sierra Leone** - College Instructor Jan 2015–Aug 2016
  - Taught theoretical and practical Computer Science courses, including Computer Operating Systems, Windows Server 2008 Administration, Microsoft SQL Server 2008 Administration, and other fundamental CS courses.

Leadership & Academic Service

Research Leadership

- Co-lead, ML for Neglected Tropical Diseases Consortium, Jan 2025 – present
  - Lead 25+ interdisciplinary team members across 7+ institutions; design AI/ML pipelines; preparing review for *The Lancet Digital Health*.
- Research Lead – Foundation Models for Alzheimer's Disease, Fraunhofer SCAI & DZNE, Germany
  - Lead postdocs and PhD students to develop foundation models integrating neuroimaging, genomic, and clinical data.
- Brima Y. (2022 Sep 16). Co-founded the Graduate Assistance Initiative Network (GAIN), Osnabrück University, Germany
  - Initiative aimed at increasing human capital development for underrepresented groups through a community-led mentoring program.
- **African Accents International Institute of Computer Technology, Sierra Leone** Webmaster and Instructor, 2016 – present
  - Maintain institute website, develop IT-related instructional content, and train students in computer and technical skills.
- **Destiny College of Management Theology and Technology, Sierra Leone** Acting Head of Department, Information Technology Department, 2015 – present

  - Departmental leadership, curriculum development, student mentoring, and administration.
- **University of Makeni, Sierra Leone** President, Computer Science Department, 2015–2016; Vice President, Information Computer Science, 2014–2015; Director, Radio Discussion Programme, IT Society, IT Department, 2014–2015
  - Led departmental society activities, organized STEM outreach, supervised student projects, coordinated radio programs.
- **University of Makeni, Sierra Leone** Research Coordinator, Computer Science Department, 2015
  - Developed "Manual on the Introduction to Internet" and guided students in practical and theoretical IT research projects.

Mentorship & Community

- Co-founder, Graduate Assistant Initiative Network (GAIN), Germany
  - Mentored 100+ volunteers across 20+ countries; organized events for 300+ participants.
- Co-founder, African Accents NGO, Sierra Leone
  - Trained 700+ youth in technical and vocational skills over 5 years.
- President, University of Makeni Computer Science Society (2015–2016)
  - Led STEM outreach and public debates.

Event Organization & Peer Review

- **npj Mental Health Research** – Reviewed manuscript on AI, machine learning, and computational approaches in mental health research.
- **MusIML Workshop at International Conference on Machine Learning (ICML 2025), Montreal, Canada** – Reviewed concise and impactful research in deep learning representing underserved communities.
- **Deep Learning Indaba Kambule Doctoral Award, 2025** – Served as a reviewer, evaluating doctoral research submissions in machine learning and AI.
- **Scientific Reports** (Impact Factor: 3.9, 2023–2025) – Reviewed manuscripts on biomedical AI, machine learning, and deep learning.
- **The Journal of Supercomputing** (Impact Factor: 3.3, 2025) – Reviewed papers on high-performance computing and large-scale AI systems.
- **BMC Medical Informatics and Decision Making** (Impact Factor: 3.5, 2023–2025) – Reviewed manuscripts on decision-making algorithms and clinical AI applications.
- **International Conference on Learning Representations (ICLR) Tiny Papers Track, 2023** – Reviewed short-format papers presenting concise and innovative deep learning research.
- Co-organized "Bridging Biological and Artificial Neural Networks" workshop, Osnabrück (2022)

Selected Publications

Journal Articles

- Hamlomo S, Atemkeng M, **Brima Y**, Nunhokee C, Baxter J. A systematic review of low-rank and local low-rank matrix approximation in big data medical imaging. Neural Computing and Applications. 2025 Mar 4:1-56.
- Nhlapho W, Atemkeng M, **Brima Y**, Ndogmo JC. Bridging the gap: exploring interpretability in deep learning models for brain tumor detection and diagnosis from MRI images. Information. 2024 Mar 27;15(4):182.
- **Brima Y**, Atemkeng M, Tankio Djiokap S, Ebiele J, Tchakounté F. Transfer learning for the detection and diagnosis of types of pneumonia including pneumonia induced by COVID-19 from chest X-ray images. Diagnostics. 2021 Aug 16;11(8):1480.
- Singh, D., **Brima Y**, Levin, F., Becker, M., Hiller, B., Hermann, A., Villar-Munoz, I., Beichert, L., Bernhardt, A., Buerger, K. and Butryn, M., 2025. An unsupervised XAI framework for dementia detection with context enrichment. Scientific Reports, 15(1), p.39554.
- **Brima Y**, Atemkeng M. Saliency-driven explainable deep learning in medical imaging: bridging visual explainability and statistical quantitative analysis. BioData mining. 2024 Jun 22;17(1):18.
- **Brima Y**, Krumnack U, Pika S, Heidemann G. Understanding Self-Supervised Learning of Speech Representation via Invariance and Redundancy Reduction. Information. 2024 Feb 15;15(2):114.

- **Brima Y**, Kamal Tushar MH, Kabir U, Islam T. Deep Transfer Learning for Brain Magnetic Resonance Image Multi-class Classification. Dhaka Uni. J. of Applied Sci. and Eng. [Internet]. 2022 Jun. 15 [cited 2025 Oct. 26];6(2):14-29. Available from: https://doi.org/10.3329/dujase.v6i2.59215

Conference Papers / Workshops

- **Brima, Y**, Krumnack, U, Pika, S and Heidemann, G, 2023. Learning Disentangled Speech Representations. NeurIPS Workshop, New Orleans, USA, arXiv:2311.03389.
- **Brima Y**, Krumnack U, Pika S, Heidemann G. (2023). Learning Disentangled Audio Representations through Controlled Synthesis. ICLR Tiny Papers Track 2024. openreview.net
- **Brima Y**, Krumnack U, Pika S, Heidemann G. (2023 Dec 10). Poster: *Learning Disentangled Speech Representations*. New in Machine Learning Workshop, NeurIPS 2023, New Orleans, USA.
- Brima Y. (2023). Self-Supervised Learning of Speech Representation via Redundancy Reduction. In: DC@KI2023: Proceedings of Doctoral Consortium at KI 2023. Gesellschaft für Informatik e.V.; 2023. p. 11–19. Berlin, Germany. DOI: 10.18420/ki2023-dc-02.
- **Brima Y**, Southern L, Pika S, Krumnack U, Heidemann G. (2022 Jul 29–Aug 6). Poster: *Supervised Contrastive Deep Learning for Individual Recognition in Chimpanzees in the Wild*. Bridging the Technological Gap – Spreading Technological Innovations in the Study of the Human and Non-Human Mind, German Primate Center, Göttingen, Germany.

Journal Papers Under Revision

- Atemkeng M, **Brima Y**, Nguezet P. V. Multimodal explainability in medical imaging: Bridging visual saliency and large language models for explainable AI. Submitted to *BioData Mining*.
- **Brima Y**, Southern L, Krumnack U, Heidemann G, Pika S. Vocal individuality in male chimpanzees (Pan troglodytes troglodytes) in the wild: An Explainable Deep Learning-Based Analysis. Under revision at *Scientific Reports*.
- **Brima Y**, Atemkeng M. Robustness and Scalability Of Machine Learning for Imbalanced Clinical Data in Emergency and Critical Care. Under revision at *npj Digital Medicine*.
- Nhlapho W, **Brima Y**, Atemkeng M, Ndogmo J-C. A Systematic Review of Transformers for 3D Medical Image Analysis: Architectural Innovations, Benchmarking Results and Modality-Specific Performance. Under review at *Medical Image Analysis*.

Invited Talks and Keynotes

1. Brima Y. (2025 Aug 28). Talk: *Artificial Intelligence and Its Role in Shaping Our Future*, University of Makeni Computer Science Alumni Forum, Sierra Leone.
2. Brima Y. (2025 Feb 19). Talk: *Multimodal Federated Learning for Robust Lung Cancer Prognosis*, Fraunhofer Institute for Algorithms and Scientific Computing (SCAI), Germany.
3. Brima Y. (2024 Dec 16). Talk: *Trustworthy Healthcare AI for Mental Health Risk Prediction*, Neurobiology Research Unit, Copenhagen University Hospital, Denmark.
4. Brima Y. (2024 Dec 10). Talk: *Assessing Explainability in Deep Learning for Medical Image Analysis*, Fraunhofer Institute for Algorithms and Scientific Computing (SCAI), Germany.
5. Brima Y. (2024 Jul 10). Talk: *Assessing Fusarium oxysporum Disease Severity in Cotton Using UAV Images and Hybrid Domain Adaptation Deep Learning Time Series Model*, Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany.
6. Brima Y. (2024 Mar 13). Talk: *Causal Representation Learning*, Computer Vision Colloquium, Osnabrück University, Germany.
7. Brima Y. (2024 Feb 16). Talk: *Learning Disentangled Audio Representations through Controlled Synthesis*, ICLR Tiny Papers, 2024, International Conference on Learning Representations, 2024.
8. Brima, Y. (2019). Detecting Malaria Using a Deep Convolutional Neural Network. Department of Computer Science and Engineering, Dhaka University, Bangladesh. Co-authored with Jargis Ahmed.
9. Brima, Y (2019). Sources of Big Data in Health: A Comparative Description of National and International Data Sources and Identification of New/Emerging Sources of Data. Bangabandhu International Conference Center (BICC), Agargaon, Dhaka, Bangladesh. Co-authored with Moinul Zaber.

Summer Schools & Certifications

- Stanford University – AI for Healthcare Specialization, Coursera (Virtual), Nov–Dec 2025. Focus on understanding healthcare systems, clinical data, foundations of ML in healthcare and evaluation of AI systems in Healthcare. Certificate Link.
- North-West University, South Africa. MUST Deep Learning Bootcamp, Jan 2025. Covered supervised learning, gradient descent, overfitting/underfitting, CNNs, optimization algorithms, regularization techniques.
- IBM. IBM AI Engineering Professional Certificate. Coursera (Virtual), Aug–Sep 2023. Core skills: Neural networks, deep learning, TensorFlow, Keras, hyperparameter tuning. Certificate Link.
- IBM. IBM Data Science Professional Certificate. Coursera (Virtual), Feb–Aug 2023. Core skills: Python programming, data visualization, machine learning, SQL, cloud computing. Certificate Link.
- University of Michigan. Python Programming and Data Structures. Coursera (Virtual), Mar–Apr 2023. Core skills: Python data structures, algorithms, recursion, object-oriented programming. Certificate Link.
- Università Milano Bicocca, Italy. Mediterranean Machine Learning School, Sep 2022. 5-day intensive program covering keynotes, lectures, and hands-on sessions in advanced deep learning.
- Neuromatch Academy. Deep Learning Program, Online, Jul 2022. Three-week intensive program covering theoretical and practical deep learning approaches from data to models.
- MathWorks Training Service. MATLAB & Deep Learning for Image Recognition. Online MOOC, Aug–Sep 2020. Core skills: MATLAB, transfer learning, pre-trained networks. Certificate Link.
- Machine Learning Summer School, Bandung, Indonesia, Aug 2020. Covered fundamentals and advanced topics: TensorFlow, CNNs, VAEs, NLP, and transfer learning.
- Oxford Machine Learning Summer School, Oxford, United Kingdom, Jul 2020. Courses in Bayesian ML, computer vision, NLP, reinforcement learning, causal inference, and transfer learning.
- Imperial College London. Linear Algebra, Multivariate Calculus & Optimization Techniques. Coursera (Virtual), Aug 2019 – Jun 2020. Core skills: Linear algebra, PCA, optimization techniques. Certificate Link.

Professional Compliance & Data Access Training

- **UK Biobank / Medical Research Council (MRC) Research Credentials** – Trained in GDPR, confidentiality, and ethical handling of human research data.
- **CITI Program (Collaborative Institutional Training Initiative)** – Completed modules on "Data or Specimens Only Research" and "Conflicts of Interest" for access to EHRSHOT and other human subject research.
- **PhysioNet CITI Training** – Completed "Data or Specimens Only Research" module for secure access to clinical datasets.
- **Access to LONI IDA (Laboratory of Neuro Imaging / USC)** – Authorized access to neuroimaging and clinical research data via https://ida.loni.usc.edu.

Seminars & Workshops

- **Seminar on ICT in Higher Education Innovation for African Countries**, UNESCO-ICHEI, China, Jun – Jul 2018 Attained knowledge on the role of informatization in higher education to improve learning outcomes.
- **Deep Representation Learning Seminar**, Osnabrück University, Germany, Winter 2023/24 Co-organized and coordinated a seminar on theoretical and practical aspects of deep representation learning, including paper reproduction and student presentations.
- **Bridging the Gap between Biological and Artificial Neural Networks Workshop**, RTG Computational Cognition, Osnabrück University, Germany, Aug 6–7, 2022 Co-organized interdisciplinary workshop exploring connections between neuroscience and deep learning.

Teaching and Supervision

BSc Graduated at Osnabrück University

- Oscar Hirsch – BSc in Cognitive Science, thesis: *Comparative Analysis of CNN Audio Denoising: Assessing efficacy between waveform-based and spectrogram-based input methodologies.* Institute of Cognitive Science, Universität Osnabrück, 2024.
  Supervisor: Yusuf Brima, **Co-supervisor:** Ulf Krumnack

Study Projects / Course Supervision

- **Automatic Music Transcription**, Summer Semester 2024, Cognitive Science, Master of Science, Universität Osnabrück.
  - Instructors: Dr. Ulf Krumnack, Prof. Dr. phil. Kai-Uwe Kühnberger, **Yusuf Brima**
  - Student contributors: Lena Brügemann, Seun Choi, Deniz Gün, Anish Haluvani Sundresh, Paul Koesling, Nina Ma, Aaron Ritz, Fernando Riveros, William Shelor, Julian Straatman, Arman Taghizadeh, Mira Wolters

Student Assistants / Research Projects

- Ronja Natascha Lindemann – Student Assistant on *Neural Speech Synthesis*, Computer Vision Group, Institute of Cognitive Science, Universität Osnabrück, Apr–Sep 2024.
  Project page: https://synspeech.github.io/

Media Coverage & Press

- Brima Y (2025 Jan 20). The Association of Commonwealth Universities Case Study: "Advancing artificial intelligence for healthcare and developing human capital in low-resource settings." ACU Research. Available at: Advancing artificial intelligence for healthcare and developing human capital in low-resource settings

Networks & Memberships

- **Gesellschaft für Informatik e.V. (GI)**, Germany, 2024 – present Member of the German Computer Science Association.
- **MICCAI Society**, 2023 – present Member of the Medical Image Computing and Computer Assisted Intervention community.
- **Black in AI**, 2022 – present Community supporting Black researchers in AI through mentorship and networking.
- **Deep Learning Indaba**, 2022 – present African community focused on advancing machine learning and AI research; participation in workshops, networking, and mentoring.
- **African Institute of Mathematical Sciences (AIMS) Community**, 2021 – present Alumni network for collaborative research and workshops.
- **Association of Commonwealth Universities (ACU) Alumni**, 2020 – present International network for knowledge-sharing and research initiatives.
- **Institute of Electrical and Electronics Engineers (IEEE), Student Member**, 2019 – present Participation in technical workshops and conferences in AI and computer science.