

# Shake Ibna Abir

## Curriculum Vitae

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### Current Position

**Position Title:** Instructor of Mathematics

**Current Academic Rank:** Instructor (Full-Time)

**Rank Since:** Fall 2024

**Office:** Beck College of Sciences and Mathematics, CSM-207, Arkansas State University, AR-72467

### Education

2022–2024 **M.Sc in Computational Mathematics**, *Western Kentucky University*, Bowling Green, KY, USA,

**Thesis Title:** Parameter Estimation for Stroke Patients Using Brain CT Perfusion Imaging with Deep Temporal Convolutional Neural Network.

**Link:** <https://digitalcommons.wku.edu/theses/3755/>

2018–2021 **M.Sc in Computer Science and Technology, Concentration: Data Mining**, *Yanshan University*, Hebei, China,

**Thesis Title:** Deep Learning Application of LSTM to predict the risk factor of etiology of cardiovascular disease.

**Link:** <http://www.cnki.net/KCMS/detail/detail.aspx>

2013–2018 **B.Sc(Hons) in Mathematics**, *University of Barishal*, Barishal, Bangladesh,

**Thesis Title:** Application of He's Homotopy Perturbation Method for Solving Volterra Integral Equations.

### Publications

- Muhammad Noman Sohail, Jiadong Ren, Musa Uba Muhammad, **Shake Ibna Abir**, Tahir Rizwan. *Group covariates assessment on real-life Diabetes patients by Fractional Polynomial: A study based on Logistic Regression Modeling*, *Journal of Biotech Research*, Volume: 10, Pages: 116-125, 2019. **Link**
- Muhammad Noman Sohail, Jiadong Ren, **Shake Ibna Abir**, Musa Uba Muhammad. *Data Mining techniques for Medical Growth: A Contribution of Research's reviews*, *International Journal of Computer Science and Network Security*, Volume: 18, Page:10, October 2018. **Link**
- Muhammad Noman Sohail, Jiadong Ren, Musa Uba Muhammad, **Shake Ibna Abir**. *Why only data mining? A pilot study on inadequacy and domination of data mining technology*, *International Journal of Recent Scientific Research*, Volume: 9, Issue: 10, P: 29066-29073, 2018. **Link**
- Mohammad Ridwan, Shewly Bala, **Shake Ibna Abir**, Shaharina Shoha. *Leveraging AI for a Greener Future: Exploring the Economic and Financial Impacts on Sustainable Environment in the United States*, *Journal of Environmental Science and Economics*, Vol: 3, No: 3, P:11-30, 2024. **Link**

- Mohammad Ridwan, Shewly Bala, Sarder Abdulla Al Shiam, **Shake Ibna Abir**, Shaharina Shoha. *Leveraging AI for Promoting Sustainable Environments in G-7: The Impact of Financial Development and Digital Economy via MMQR Approach*, *Global Sustainability Research*, Vol: 3, No: 3, P: 27-53, 2024. [Link](#)
- **Shake Ibna Abir**, Shaharina Shoha, Sarder Abdulla Al Shiam. *Enhancing Load Capacity Factor: The Influence of Financial Accessibility, AI Innovation, and Institutional Quality in the United States*, *Journal of Environmental Science and Economics*, Vol: 3, No: 4, P: 12-36, 2024. [Link](#)
- Shewly Bala, S M Shamsul Arefeen, **Shake Ibna Abir**, Hemel Hossain. *Measuring How AI Innovations and Financial Accessibility Influence Environmental Sustainability in the G-7: The Role of Globalization with Panel ARDL and Quantile Regression Analysis*, *Global Sustainability Research*, Vol: 3, No: 4, P: 1-29, 2024. [Link](#)
- Md Sibbir Hossain, Mohammad Ridwan, Shaharina Shoha, **Shake Ibna Abir**, Hemel Hossain. *Exploring the LCC Hypothesis in the Nordic Region: The Role of AI Innovation, Environmental Taxes, and Financial Accessibility via Panel ARDL*, *Global Sustainability Research*, Vol: 3, No: 3, P: 54-80, 2024. [Link](#)
- Sarder Abdulla Al Shiam, Mohammad Ridwan, Md Mahdi Hasan, **Shake Ibna Abir**, Hemel Hossain. *Analyzing the Nexus between AI Innovation and Ecological Footprint in Nordic Region: Impact of Banking Development and Stock Market Capitalization using Panel ARDL method*, *Journal of Environmental Science and Economics*, Vol: 3, No: 3, P: 41-68, 2024. [Link](#)
- Afsana Akhter, Sarder Abdulla Al Shiam, Mohammad Ridwan, **Shake Ibna Abir**, Hemel Hossain. *Assessing the Impact of Private Investment in AI and Financial Globalization on Load Capacity Factor: Evidence from United States*, *Journal of Environmental Science and Economics*, Vol: 3, No: 3, P: 99-127, 2024. [Link](#)

## Accepted Publications

- **Shake Ibna Abir**, Shaharina Shoha, *Leveraging Deep Learning for Personalized Medicine: Advancements and Applications in Precision Diagnostics and Treatment*, *International Journal of Computers and Applications by Taylor & Francis*.
- Abdulla Al Shiam, Mohammad Ridwan, **Shake Ibna Abir**, Shaharina Shoha. *Measuring How AI Innovations and Financial Accessibility Influence Environmental Sustainability in the G-7: The Role of Globalization with Panel ARDL and Quantile Regression Analysis*, *Journal of Environmental Science and Economics by Global Scientific Research*.

## Conference Proceedings (Accepted & Presented)

- **Shake Ibna Abir**, Shaharina Shoha, Al Shiam. *Health Risks and Disease Transmission in Undocumented Immigrants in the U.S. Using Predictive Machine Learning*, *Sixth International Conference on Intelligent Computing in Data Sciences (ICDS 2024) by IEEE( Scopus-indexed)*.
- **Shake Ibna Abir**, Shaharina Shoha, Al Shiam. *A Comprehensive Examination of MR Image-*

*Based Brain Tumor Detection via Deep Learning Networks*, Sixth International Conference on Intelligent Computing in Data Sciences (ICDS 2024) by IEEE( Scopus-indexed).

## Submitted Journals (Under Review)

- Shake Ibna Abir, Shaharina Shoha. *Lung Cancer Predictive Analysis Using Optimized Ensemble and Hybrid Machine Learning Techniques*, *Journal of Economy and Technology, Special Issue on AI & ML by Elsevier*.
- Shake Ibna Abir, Shaharina Shoha. *Enhanced Parkinson's Disease Detection Using Advanced Vocal Features and Machine Learning*, *Journal of Economy and Technology, Special Issue on AI & ML by Elsevier*.
- Shake Ibna Abir, Shaharina Shoha. *Deep Neural Networks in Medical Imaging: Advances, Challenges, and Future Directions for Precision Healthcare*, *Journal of Economy and Technology, Special Issue on AI & ML by Elsevier*.

## Work Experience

Fall 2024 – **Instructor of Mathematics (Full-Time)**, *Department of Mathematics & Statistics*,  
Present *Arkansas State University, Jonesboro, AR, USA*

### Teaching (Fall 2024):

- Fall 2024 MATH 1054 002 – PRECALCULUS (Enrollment-31)
- Fall 2024 MATH 1054 004 - PRECALCULUS (Enrollment-31)
- Fall 2024 MATH 1023 019 - COLLEGE ALGEBRA (Enrollment 35)
- Fall 2024 MATH 0013 024 - INTERMEDIATE ALGEBRA (Enrollment 7)
- Fall 2024 MATH 1023 024 - COLLEGE ALGEBRA (Enrollment 7)

### Spring 2025 Teaching Schedule:

- Spring 2025 MATH 1054 003 – PRECALCULUS
- Spring 2025 MATH 1054 002 - PRECALCULUS
- Spring 2025 MATH 1023 001 - COLLEGE ALGEBRA
- Spring 2025 MATH 0013 008 - COLLEGE ALGEBRA

Fall 2022 – **Graduate Teaching Assistant**, *Department of Mathematics & Statistics*,  
Spring 2024 *Western Kentucky University, Bowling Green, KY, USA*

### Courses Taught in Fall Semester 2022:

- Delivered lectures and coursework for Honors **Calculus I (MATH 136)** & **Calculus II (MATH 137)**.
- Delivered **College Algebra (MATH 116)** tutoring at Math Tutoring Center to students across different academic levels.

### Courses Taught in Spring Semester 2023:

- Conducted two sections of Honors **Calculus II**, totaling 220 minutes weekly with each class session lasting 55 minutes.
- Provided 4 hours of tutoring support per week at the university's Math Tutoring Center.

### Courses Taught in Fall Semester 2023:

- Conducted two sections of **Calculus II (MATH 137)**, totaling 220 minutes weekly with each class session lasting 55 minutes.
- Collaborated with peers to enhance the work environment and support instructional planning.
- Proctor tests, and responsible for grading assignments and exams for **Calculus I (MATH 136)** course.

### Courses Taught in Spring Semester 2024:

- Conducted one section of **Calculus I** and one section of Honors **Calculus I**, totaling 220 minutes per week with each class session lasting 55 minutes.
- Provided 4 hours of tutoring support per week at the university's Math Tutoring Center.
- Provided online academic assistance and support to students.

Summer 2023 & 2024 **Graduate Research Assistant**, *Applied Center for Data Science*,  
Western Kentucky University, Bowling Green, KY, USA

- Assisted Dr. Richard Schugart's Research Group.
- Collected, analyzed, and preprocessed medical datasets using Python and MATLAB.
- Conducted literature reviews and supported ongoing research projects, contributing to the writing of articles in LaTeX.
- Performed experiments and simulations (with mathematical explanations), developing algorithms in machine learning and deep learning.
- Preprocessed 90GB of raw DICOM images from medical computed tomography (CT) of brain stroke patients in Python to calculate four perfusion parameters: cerebral blood flow (CBF), cerebral blood volume (CBV), mean transit time (MTT), and time to peak (TTP) for 265 consecutive patients.

Fall 2018 – **Graduate Research Assistant**, *Data Mining Key Laboratory*,

Spring 2020 *Department of Computer Science & Technology*, Yanshan University, Hebei, China

- Collected a comprehensive cardiovascular disease dataset from Hebei Medical University, including patient demographics, clinical data, diagnostic information, lifestyle factors, and biomarkers for research purposes.
- Applied various deep learning algorithms, including Long Short-Term Memory (LSTM), Generative Adversarial Networks (GAN), and Convolutional Neural Networks (CNN), to analyze data behavior and identify key findings, ultimately predicting risk factors for cardiovascular disease etiology.
- Conducted model evaluation using metrics such as accuracy, precision, recall, and F1 score, along with statistical tests like the t-test, p-value assessments and ANOVA, to assess the performance of the predictive algorithms.

### Communication Skills (Contributed, Flash Talk and Poster)

- **Contributed talk** "Society for Mathematical Biology Annual Meeting" 16<sup>th</sup>-21<sup>th</sup> July, 2023, **Ohio State University in Columbus, Ohio, USA**  
Title: Deep Learning Application of Long-Short Term Memory (LSTM) to predict the risk factor of etiology of cardiovascular disease.  
Abstract Link: <https://2023.smb.org/CARD/CT02-CARD-1.html>
- **Contributed talk** "3rd Annual WKU Mathematics Symposium," 17<sup>th</sup>-18<sup>th</sup> November, 2023, **Western Kentucky University, Bowling Green, KY, USA**  
Title: Parameter Estimation for Stroke Patients Using Brain CT Perfusion Imaging with Deep Temporal Convolution Neural Network Application.  
Abstract Link: <https://www.wku.edu/math/symposium2023scheduleabstracts.php/>
- **Contributed talk** "2nd Annual Data Science Day," 4<sup>th</sup> April, 2023, **Western Kentucky University, Bowling Green, KY, USA**

Title: Practical Application of LSTM to predict the risk factors of etiology cardiovascular disease.

Abstract Link: [https://www.wku.edu/artp/data\\_scienceday2023.php](https://www.wku.edu/artp/data_scienceday2023.php)

- **Contributed talk** “3rd Annual Data Science Day,” 11<sup>th</sup> April, 2024, **Western Kentucky University, Bowling Green, KY, USA**

Title: A Practical Application of Deep Temporal Convolution Neural Networks for Parameter Estimation in Computed Tomography Perfusion Imaging of Patients with Strokes.

Abstract Link: [https://www.wku.edu/artp/data\\_scienceday2024.php](https://www.wku.edu/artp/data_scienceday2024.php)

- **Presented Poster** “7<sup>th</sup> Commonwealth Computational Summit 2023: Artificial Intelligence” 16<sup>th</sup>-17<sup>th</sup> October, 2023, **University of Kentucky’s Center for Computational Science and ITS/Research Computing Infrastructure, Lexington, KY, USA**

Title of Paper (Flash talk and Poster): Parameter Estimation for Stroke Patients Using Brain CT Perfusion Imaging with Deep Temporal Convolution Neural Network Application.

Abstract Link: [https://summit.ccs.uky.edu/ccs\\_summit2023/](https://summit.ccs.uky.edu/ccs_summit2023/)

- **Presented Poster** “Student Research Accomplishments Poster Session Representative” 18<sup>th</sup> April, 2024, **The Applied Research and Technology Program, Western Kentucky University, Bowling Green, KY, USA**

Title of Paper (Flash talk and Poster): A Practical Application of DTCNNs for Parameter Estimation in Computed Tomography Perfusion Imaging of Patients with Strokes.

## Research Related Experience (summer schools, & workshops)

- **CIMPA-Banladesh** (Centre International de Mathematiques Pures et Appliquees) research school in “*Dynamical Systems and Applications to Biology*” from 10<sup>th</sup> June - 21<sup>th</sup> June, 2019, **Dhaka, Bangladesh.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*Dealing with Uncertainties in Data Processing: from Probabilistic and Interval Uncertainty to Combination of Different Approaches, with Application to Geoinformatics, Bioinformatics, and Engineering*” on 30<sup>th</sup> July, 2020, **presented by Prof. Dr. Viadik, University of Texas at El Paso, USA.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*Man or Machine: AI for Pulmonary Abnormality Screening (TB and COVID-19)*” on 13<sup>th</sup> August, 2020, **presented by Prof. Dr. Santosh K.C, University of South Dakota, USA.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*State-of-the-Art Methods for Brain Tissue Segmentation*” on 27<sup>th</sup> July, 2020, **presented by Prof. Dr. Rutuparna, VSS University of Technology, India.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*Intelligent Data Mining*” on 21<sup>th</sup> July, 2020, **presented by Dr. Tzung-Pei Hong, National University of Kaohsiung, Taiwan.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*An Overview of Machine Learning Based Intelligent Computing and Applications*” on 27<sup>th</sup> July, 2020, **presented by Prof. Dr. Ganapati Panda, Former Dy Director, IIT Bhubaneswar, India.**
- **MIR Labs** (Machine Intelligence Research Labs, USA) workshop on “*Linear Algebra for Machine Learning*” on 23<sup>th</sup> July, 2020, **presented by Prof. Dr. RNDr. Vaclav Snasel, CSc, VSB Technical University of Ostrava, Czech Republic.**

## Certifications on Data Science, Machine Learning, & Deep Learning

- 19 May 2020 **Certification Link**, *Applied Plotting, Charting, & Data representation in Python*.
- 23 May 2020 **Certification Link**, *Data Analysis with Python by IBM*.
- 17 June 2020 **Certification Link**, *Data Visualization with Python by IBM*.
- 28 April 2020 **Certification Link**, *Data Science Methodology by IBM*.
- 23 August 2020 **Certification Link**, *Database and SQL for Data Science with Python*.
- 09 July 2019 **Certification Link**, *Machine Learning Foundation: A Case Study Approach*.
- 28 June 2020 **Certification Link**, *Machine Learning with Python by IBM*.
- 25 July 2020 **Certification Link**, *Deep Learning with TensorFlow by IBM*.
- 8 August 2020 **Certification Link**, *Neural Network & Deep Learning*.
- 19 August 2020 **Certification Link**, *Bayesian Statistics: From Concept to Data Analysis*.
- 22 August 2020 **Certification Link**, *Bayesian Methods for Machine Learning*.
- 03 March 2020 **Certification Link**, *Introduction to Big Data*.
- 16 August 2019 **Certification Link**, *Google Cloud Platform Big Data & Machine Learning*.
- 27 September 2019 **Certification Link**, *How Google does Machine Learning*.

## Professional Skills

- Programming languages MATLAB (advance), R (advance), Python (advance), SAS (advance), and SPSS (advance)
- Big data Map/Reduce, Apache Hadoop.
- Database MySQL.
- Pattern recognition OpenCV, Caret, Scikit-Learn, DASK, Tensorflow, Keras, and PyTorch.
- Medical imaging Experience with SimpleITK, ITK, and Pydicom for reading and processing DICOM images.
- Deep learning Proficient in MONAI (Medical Open Network for AI) for building deep learning models.
- Segmentation Experience with U-Net, Res-Net and V-Net architectures for image segmentation and classification tasks.
- Statistical theory Causal inference, multivariate statistical analysis, predictive and optimization modeling, survival analysis, factor analysis, cluster analysis, A/B testing.

## Academic Awards and Grants

- July 2023 **Dr. R. Glenn and Virginia Powers Memorial Scholarship (\$1400)**, *Western Kentucky University, USA, 2023*
- December 2023 **Graduate Student Research Grant (\$2000)**, *Western Kentucky University, USA, 2023*

- April 2019 **CIMPA — International Travel Award (370 EURO)**, (*Centre International de Mathématiques Pures et Appliquées*) travel Grants for participation in the Research School “Dynamical Systems and Applications to Biology”, Dhaka, Bangladesh
- December 2020 **Chinese Government Scholarship for Outstanding International Students, 2020 (15000 RMB)**, Annual award by the Ministry of Education for top-performing full-time international students at Chinese Government Scholarship institutions, Beijing, China  
<http://www.ysu.edu.cn/info/5415/17569.htm>
- November 2020 **Award for Outstanding International Students**, School of International Education, Yanshan University, Hebei, China
- December 2018 **Dean’s Award**, Dean’s Award for academic extraordinary performance during Bachelor of Science, University of Barishal, Bangladesh

## Professional Memberships

- 2022-Present **AMS**, American Mathematical Society, USA
- 2022-Present **SIAM**, Society’s for Industrial & Applied Mathematics, USA
- 2020-Present **MIR**, Machine Intelligence Research Labs, USA
- 2022-Present **ASA**, American Statistical Association, USA
- 2016-Present **BMS**, Bangladesh Mathematical Society, Bangladesh
- 2022-Present **IEEE**, IEEE Computational Intelligence Society, USA
- 2024-Present **NSLS**, National Society of Leadership and Success, USA

## Professional Development

### ○ Faculty Mentoring and Professional Development Institute

*Department of Mathematics and Statistics, Arkansas State University, Fall 2024*

- (a) Engaged in comprehensive training focused on faculty mentoring techniques, preparing effective syllabus and strategies for professional growth.
- (b) Participated in workshops and discussions aimed at enhancing mentorship skills and supporting faculty development.

### ○ Center for Innovative Teaching & Learning (CITL)

*Graduate Assistant Teaching Certification, Western Kentucky University, November 2022*

- (a) Participated in a professional learning community focused on effective teaching strategies and student-centered learning.
- (b) Developed a comprehensive teaching portfolio, including a course syllabus, lesson plans, assessments, and rubrics.
- (c) Certified to serve as a Graduate Assistant Instructor (GAI) after demonstrating proficiency in college teaching and student engagement techniques under Academic Policy 1.112 at Western Kentucky University.