MD ADILUR RAHIM

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EDUCATIONAL HIGHLIGHTS

1) **Ph.D. in Engineering Science**
   Louisiana State University, Baton Rouge
   Graduated in Summer 2023
2) **M.Sc. in Civil Engineering**
   Louisiana State University, Baton Rouge
   Graduated in Spring 2022
3) **B.Sc. in Civil Engineering**
   Bangladesh University of Engineering & Technology
   Graduated in July 2014

PROFESSIONAL EXPERIENCE

- **Assistant Professor Research**, LaHouse Research and Education Center, Department of Biological and Agricultural Engineering, Louisiana State University AgCenter (10/2023 – present).
- **Extension Associate**, LaHouse Research and Education Center, Louisiana State University AgCenter (08/2023 – 09/2023).
- **Graduate Research Assistant**, Louisiana State University (01/2020 – 07/2023)
  Primary research experience includes flood hazard characterization and risk assessment using data analysis, synthesis, and exploring big data through deep learning models.

Domain Expertise	Statistics, Machine Learning, Deep Learning, Computer Vision, GIS, Remote Sensing
Software Expertise	Hazus, HEC-FIA, Quantum GIS, ESRI ArcGIS; ArcGIS Maps SDK, Google Earth Engine, AutoCAD, Microsoft Office, PTV Vissim.
Programming	Python, PyTorch, R, JavaScript
Cloud platform	Google Cloud Platform
Embedded System	Jetson Nano

Research Projects:

1) U.S. Army Engineering Research and Development Center (ERDC): Developing Engineering Practices for Ecosystem Design Solutions (DEEDS). (07/2022 – 06/2025)
    - Quantifying flood hazard reduction through Natute Based Solution (NBS: mangroves, wetland platform, environmental levees) that ERDC has organized from post Hurricane Sandy analyses
    - Translating flood hazard reduction to flood risk reduction benefit of NBS in coastal areas.
    - Linking the reduction in flood risk with societal indicators (e.g., socioeconomic status, community exposure to flood vulnerability, health and well-being of human resources)
    - Develop a comprehensive benefit-cost analysis system for different NBS

2) National Institute of Food and Agriculture, United States Department of Agriculture: Decision Support, Education, and Outreach for Managing Agricultural Drought. (10/2022 – 09/2023)
    - Developed Drought Irrigation Response Tool (DIRT), an irrigation scheduling tool for farmers about managing drought. (https://dirt.lsuagcenter.com/)

3) Department of Homeland Security Coastal Resilience Center: Integrating ADCIRC Prediction System Tools to Support Hazus Damage Assessments and Planning. (07/2021 – 06/2022)
    - Developed an improved flood risk assessment method.
    - Developed a methodology to assess the flood risk mitigation effect of mangroves in coastal areas. The methodology links the wave and surge

reduction capacity of mangrove with flood risk reduction in coastal residential buildings.

- Modified the FEMA FAST code to speed up computational time by improving flexibility of the GUI software without restructuring the building data.

4) National Oceanic and Atmospheric Administration (NOAA) funded Louisiana SeaGrant Omnibus: Incentives and Barriers to Increased Freeboard to Enhance Flood Resilience: Southeast Louisiana Perspectives. (06/2021 – 06/2024)
   - Working on the development of the FloodSafeHome web-site (https://floodsafehome.lsu.edu/). FloodSafeHome provides information that is otherwise unavailable to improve risk-informed decision making for individual homeowners, community officials, and policy makers.
   - Developed flood insurance premium (Risk Rating 2.0), flood risk, building foundation cost, and social resiliency calculators.

5) National Academies of Sciences, Engineering and Medicine Gulf Research Program: The New First Line of Defense: Building Community Resilience through Residential Risk Disclosure. (06/2021 – 07/2022)
   - Developed a data-driven spatial flood hazard characterization approach
   - Characterized flood hazard for the Gulf of Mexico study area which was incorporated into HazardAware webtool (https://www.hazardaware.org)

6) Tran-SET Project: 19PITSLSU14: Investigating the Impacts of Truck Platooning on Transportation Infrastructure in the South-Central Region. (01/2020 – 12/2020)
   - Developed a CNN-based deep learning model to convert the numerical crash data into images and predict crash injury severity.
   - Conducted automated truck platooning simulation using Vissim and python.
   - Developed an economic analysis to convert the truck platooning operational, environmental, and safety metrics to dollar values. Based on the economic analysis, optimal platoon configurations were recommended.

- **Research Assistant**, Structural Steel Bd. Ltd. (03/2017 – 12/2019)
  Primary research experience includes agrometeorological data processing and risk mapping of Bangladesh.

Analysis Type	Climate Parameter	Agrometeorological Data
Trend	Rainfall, Temperature, Relative humidity, Sunshine hours, Evaporation, Evapotranspiration, and Soil moisture	BMD, CRU, Aphrodite, NCEP/NCAR,
Future Scenario Development	Rainfall, and Temperature	CanESM2, GFDL-ESM2M, IPSL-CM5A-MR, MIROC-ESM., MPI-ESM-MR, and NorESM1
Vulnerability Index	Seasonal Drought (Standardized Precipitation Index)	Aphrodite
Vulnerability Map	Projected change in Rainfall, Temperature, Drought, Number of rainy days, NDVI, VCI, TCI, and P/PET.	CanESM2, GFDL-ESM2M, IPSL-CM5A-MR, MIROC-ESM., MPI-ESM-MR, NorESM1, NOAA satellite

Research Projects:

1) The World Bank Bangladesh Weather and Climate Services Regional Project Component C: Agrometeorological data analysis and future scenario development of 487 upazilas of Bangladesh. (01/2019 – 12/2019). Final Report: https://www.bamis.gov.bd/res/attachment/2021/01/05/23782.pdf
    - Agrometeorological data analysis
    - Trend analysis of historical climate parameters
    - Future scenario development considering climate change
    - Map automation

2) The World Bank Bangladesh Weather and Climate Services Regional Project Component C: Risk Mapping for Climate Vulnerability of 487 upazilas in Bangladesh (01/2019 – 12/2019). Final Report: https://www.bamis.gov.bd/res/attachment/2021/01/05/23783.pdf
    - Climate vulnerability analysis and Risk mapping considering climate change

- Map automation

- **Civil Engineer**, Asset Developments Ltd. (03/2016 – 08/2016)
- **Civil Engineer**, Jiangsu Lingzhi Environmental Protection Co. Ltd. (08/2014 – 12/2015)

BOOKS

- Arif, T.M., & Rahim, M.A. (2024). Deep Learning for Engineers (1st ed.). Chapman and Hall/CRC. https://doi.org/10.1201/9781003402923

REFEREED PUBLICATIONS

Rahim, M.A., Assi, A.A., Mostafiz, R.B., and Friedland, C.J., (2024). Effects of Damage Initiation Points of Depth-Damage Function on Flood Risk Assessment. Accepted at *npj Natural Hazards*

Rahim, M.A., Rohli, R.V., Mostafiz, R.B., Bushra, N. and Friedland, C.J., (2024). Historical Global and Regional Spatiotemporal Patterns in Daily Temperature. *Front. Environ. Sci.* 11:1294456. doi: 10.3389/fenvs.2023.1294456

Gnan, E.†, Mostafiz, R.B.*†, **Rahim, M.A.†**, Friedland, C.J., Rohli, R.V., Taghinezhad, A., and Assi, A.A. (2024). Freeboard Life-Cycle Benefit-Cost Analysis of a Rental Single-family Residence for Landlord, Tenant, and Insurer. *Front. Clim.* 5:1295592. doi: 10.3389/fclim.2023.1295592

Rahim, M.A., Friedland, C.J., Mostafiz, R.B., Rohli, R.V. & Bushra, N. (2023). Analytical advances in homeowner flood risk quantification considering insurance, building replacement value, and freeboard. *Frontiers in Environmental Science*, *11*, 1180942. https://doi.org/10.3389/fenvs.2023.1180942

Friedland, C.J., Lee, Y., Mostafiz, R.B., Lee, J., Mithila, S., Rohli, R.V., **Rahim, M.A.,** Gnan, E., and Farris, M.T. (2023). FloodSafeHome: Evaluating Financial Benefits and Savings of Freeboard for Improved Decision-Making in Flood Risk Mitigation. **Front. Commun.** 8:1060901. doi: 10.3389/fcomm.2023.1060901

Assi, A.A., Mostafiz, R.B., Friedland, C.J., Rohli, R.V., Taghinezhad, A., & **Rahim, M.A.** and (2023). Cost-effectiveness of Federal CDBG-DR Road Home Program Mitigation Assistance in Jefferson Parish, Louisiana. *Natural Hazards 117*, 1291-1319

Assi, A.A., Mostafiz, R.B., Friedland, C.J., Rohli, R.V. and **Rahim, M.A.** (2023). Homeowner Flood Risk and Risk Reduction from Home Elevation between the

100-and 500-year Floodplains. *Front. Earth Sci.* 11:1051546. doi: 10.3389/feart.2023.1051546

Kodavatiganti, Y., Friedland, C.J., **Rahim, M.A.,** Mostafiz, R.B., Taghinezhad, A., and Shandy, H. (2023). Material Quantities and Estimated Construction Costs for New Elevated IRC 2015-Compliant Single-Family Home Foundations. *Front. Built Environ.* 9:1111563. doi: 10.3389/fbuil.2023.1111563

Mostafiz, R.B.*†, **Rahim, M.A.†**, Friedland, C.J., Rohli, R.V., Bushra, N., and Orooji, F. (2022). A Data-driven Spatial Approach to Characterize Flood Hazard. *Front. Big Data* 5:1022900. doi: 10.3389/fdata.2022.1022900

Gnan, E., Friedland, C.J., **Rahim, M.A.***, Mostafiz R.B., Rohli, R.V., Orooji, F., Taghinazhad, A., and McElwee, J. (2022). Improved Building-specific Flood Risk Assessment and Implications of Depth-damage Function Selection. *Front. Water – Water and Hydrocomplexity*. doi: 10.3389/frwa.2022.919726

Gnan, E., Friedland, C.J., Mostafiz R.B., **Rahim, M.A.**, Gentimis, T., Rohli, R.V., and Taghinazhad, A. (2022). Economically optimizing elevation of new, single-family residences for flood mitigation via life-cycle benefit-cost analysis. *Front. Environ. Sci. – Water and Wastewater Management*. doi: 10.3389/fenvs.2022.889239

Imam, M., Rahman, M., Roy, S., Hoque, F., Ahsan, U., Abdullah, S., ... & **Rahim, M. A.** (2022). Analysis of Diurnal Air Temperature Range Variation over Bangladesh. *Earth Systems and Environment*, 1-13. doi: 10.1007/s41748-021-00282-x

Assi, A.A., Mostafiz, R.B., Friedland, C.J., **Rahim, M.A.** and Rohli, R.V. (2022). Assessing community-level flood risk at the micro-scale by owner/occupant type and first-floor height. Accepted at *Frontiers in Big Data*.

Rahim, M. A., & Hassan, H. M. (2021). A deep learning based traffic crash severity prediction framework. *Accident Analysis & Prevention*, *154*, 106090. doi: 10.1016/j.aap.2021.106090

Arif, T. M., Ji, Z., **Rahim, M. A.**, & Nunna, B. B. (2021). Modeling Focused-Ultrasound Response for Non-Invasive Treatment Using Machine Learning. *Bioengineering*, *8*(6), 74. doi: 10.3390/bioengineering8060074

Mostafiz, R.B., Bushra, N., Rohli, R.V., Friedland, C.J., and **Rahim, M.A.** (2021). Present vs. future property losses from a 100-year coastal flood: A case study of Grand Isle, Louisiana. *Frontiers in Water*, *3*, Art. No. 763358. doi: 10.3389/frwa.2021.763358

Bushra, N., Mostafiz, R.B., Rohli, R.V., Friedland, C.J., and **Rahim, M.A.** (2021). Technical and social approaches to study shoreline change of Kualkata, Bangladesh. *Frontiers in Marine Science*, *8*, Art. No. 730984. doi: 10.3389/fmars.2021.730984.

†These authors contributed equally and share first co-authorship.

THESIS

Rahim, Md Adilur, "Analytical Advances in Homeowner Flood Risk Quantification Considering Insurance and Hazard Mitigation" (2023). LSU Doctoral Dissertations. 6219. https://repository.lsu.edu/gradschool_dissertations/6219

Rahim, Md Adilur, "Examining Optimal Truck Platoon Configurations to Maximize Its Operational, Safety, And Environmental Performance" (2022). LSU Master's Theses. 5489. https://repository.lsu.edu/gradschool_theses/5489

PROJECT REPORTS

Hassan, H., Dessouky, S., Talebpour, A., & Rahim, M. A. (2020). Investigating the Impacts of Truck Platooning on Transportation Infrastructure in the South-Central Region (No. 19PITSLSU14). Transportation Consortium of South-Central States. doi: 10.5281/zenodo.4885110

CONFERENCES

Rahim, M. A., Friedland, C. J., Gandikota, S., & Mostafiz, R. B. (2024). Dynamic Geographical Risk Assessment Tool for FEMA Risk Rating 2.0 Premium Calculation. AGU Fall Meeting 2023

Rohli, R.V., **Rahim, M.A.,** Mostafiz, R.B., Bushra, N., and Friedland, C.J. (2024). Spatiotemporal Patterns in the Number of Hours Exceeding the Mean Temperature for That Day, across the Terrestrial Earth. AGU Fall Meeting 2023

Mostafiz, R.B., Lee, J., Mithila, S., **Rahim, M.A.**, Garcia, A., Friedland, C.J., Rohli, R.V. and Lee. Y.C. (2023). Enhancing Flood Damage Mitigation and Resilience in Louisiana's Coastal Parishes through Geospatial Decision Support. AGU Fall Meeting 2023

Rohli, R.V., Mostafiz, R.B., **Rahim, M.A.**, Mithila, S., Conger, S.D., and Friedland, C.J. (2023). Drought Webtool: Development of the Drought Irrigation Response Tool Using the Representational State Transfer Application Programming Interface. AGU Fall Meeting 2023

Mostafiz, R.B., Assi, A.A., Friedland, C.J., **Rahim, M.A.**, Rohli, R.V., Emrich, C.T., and Gall, M. (2023). Empowering Resilient Communities: The Flood Risk and Mitigation Calculator Tool for Informed Decision-Making. AGU Fall Meeting 2023

Rahim, M. A. (2023). Quantifiable Flood Risk Reduction for Homeowners through Natural and Nature-based Features. Presented at State of the Coast Conference, June 1.

Rahim, M.A.*, Mostafiz, R.B., and Friedland, C.J. (2023). Disseminating Flood Risk Information in the USA through Risk Rating 2.0. Poster presented virtually at EGU General Assembly 2023. https://doi.org/10.5194/egusphere-egu23-16893

Rahim, M.A.*, Mostafiz, R.B., Friedland, C.J., and Rohli, R.V. (2022). New insights into damage initiation point of depth-damage function revealed from flood risk patterns in the United States. Poster presented virtually at American Geophysical Union Fall Meeting, Chicago, Illinois, December 12−16.

Rahim, M.A.*, Friedland, C.J., Twilley, R. R., Rohli, R.V. and Mostafiz, R.B. (2022). Reduction in Flood Risk to Residential Housing Expected from Wave and Surge Reduction by Mangroves. Poster presented virtually at American Geophysical Union Fall Meeting, Chicago, Illinois, December 12−16.

Mostafiz, R.B. *, **Rahim, M.A.**, Friedland, C.J., and Rohli, R.V. (2022). A Data-driven Spatial Approach to Characterize Flood Hazard. Poster presented virtually at American Geophysical Union Fall Meeting, Chicago, Illinois, December 12−16.

Mostafiz, R.B.*, Gnan, E., Friedland, C.J., Rohli, R.V., and **Rahim, M.A.** (2022). Life cycle benefit cost analysis of optimizing freeboard of new, single-family residences for flood hazard mitigation. Presented virtually at Japan Geoscience Union Meeting, Chiba, Japan, May 22−27.

Assi, A.A.*, Mostafiz, R.B., Friedland, C.J., Rohli, R.V., and **Rahim, M.A.** (2022). Evaluating the Cost-Effectiveness of Federal Awards for Flood Mitigation at the Individual Building Level in Jefferson Parish, Louisiana. Presented virtually at AGU Frontiers in Hydrology Meeting, San Juan, Puerto Rico, June 19−24.

Mostafiz, R.B.*, Assi, A.A., Friedland, C.J., Rohli, R.V., and **Rahim, M.A.** (2022). A Numerically-integrated Approach for Residential Flood Loss Estimation at the Community Level. Presented virtually at European Geophysical Union General Assembly, Vienna, Austria, May 23−27.

Rahim, M.A.*, Gnan, E., Friedland, C.J., Mostafiz, R.B., and Rohli, R.V. (2022). An Improved Micro Scale Average Annual Flood Loss Implementation Approach. Presented virtually at European Geophysical Union General Assembly, Vienna, Austria, May 23−27.

Mostafiz, R.B.*, Friedland, C.J., **Rahim, M.A.**, Rohli, R.V., and Bushra, N. (2021). A data-driven, probabilistic, multiple return period method of flood depth estimation. Poster presented virtually at American Geophysical Union Fall Meeting, New Orleans, Louisiana, December 13−17.

Rahim, M.A.*, Friedland, C.J., Rohli, R.V., Bushra, N., and Mostafiz, R.B. (2021). A data-intensive approach to allocating owner vs. NFIP portion of average annual

flood losses. Poster presented virtually at American Geophysical Union Fall Meeting, New Orleans, Louisiana, December 13−17.

Tao, H.*, Farris, M., Jenkins, P., Friedland C.J., Rohli R.V., Lee, Y.C., Taghinezhad, A., Mithila, S., Lee, J., Mostafiz, R.B.*, Gnan, E., and **Rahim, M.A.** (2021). Incentives and Barriers to Increased Freeboard to Enhance Flood Resilience with FloodSafeHome. 2021 EPA Region 6 Stormwater Conference, New Orleans, LA, August 8–12.

CERTIFICATES

1) Build Basic Generative Adversarial Networks (GANs), Coursera, Issued Oct. 2020
2) Deep Learning (5 courses) Specialization, Coursera, Issued May 2018
3) Mathematics for Machine Learning (3 courses) Specialization, Coursera, Issued Aug. 2018
4) Probabilistic Graphical Models (3 courses) Specialization, Coursera, Issued Aug. 2018
5) How Google does Machine Learning, Coursera, Issued Aug. 2018
6) Supply Chain Technology and Systems, edX, Issued Apr. 2017
7) Supply Chain Analytics, edX, Issued Feb. 2017
8) Supply Chain Dynamics, edX, Issued Nov. 2016
9) Supply Chain Design, edX, Issued Aug. 2016
10) Supply Chain Fundamentals, edX, Issued May 2016

PROFESSIONAL ORGANIZATIONS

1) American Geophysical Union (AGU) (2021-present)
2) European Geophysical Union (EGU), (2022-present)

PEER-REVIEW

1) Accident Analysis and Prevention, Elsevier.

KAGGLE COMPETITIONS

1) New York City taxi fare prediction by Google. (5/1488) (2018)
2) TGS Salt Identification Challenge. (Top 24%) (2018)
3) Human Protein Atlas Image Classification Challenge. (Top 27%) (2019)

REFERENCES

1) Dr. Carol J Friedland, Associate Professor, LSU AgCenter, CFriedland@agcenter.lsu.edu
2) Dr. Robert Twilley, Professor, LSU, rtwilley@lsu.edu
3) Dr. Robert V Rohli, Professor, LSU, rohli@lsu.edu
4) Dr. Tariq Arif, Assistant Professor, Weber State University, tariqarif@weber.edu