MD. SHAHINOOR RAHMAN, Ph.D.

Research Associate (Geospatial Data Science)
Harvard School of Dental Medicine

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Diligent geospatial expert with more than ten years of experience in academia and industry. Demonstrated skill in cutting-edge GIS and remote sensing data, tools, and technologies. Highly competent with GIS as well as remote sensing software, computer language, and data mining. Excellent skill in both teaching and research. Mentored and supervised many graduate and undergraduate students. Continuously looks at ways to utilize modern geospatial technologies for the well-being of societies. Particular focus on remote sensing and GIS application in natural hazard analysis, urban and environmental studies, and agriculture. Highly diverse, self-motivated, and efficient in geospatial problem-solving.

EDUCATION

Ph.D. in Earth Systems and Geoinformation Sciences — **December 2019**
George Mason University, Fairfax, VA, USA
Dissertation: Remote Sensing-Based Rapid Assessment of Flood Crop Damage

MSc, Regional Development Planning and Management — **July 2011**
Technical University of Dortmund, Germany and University Austral de Chile, Valdivia, Chile
Thesis: Coastal Community Resilience to Tsunami, A Study on Planning Capacity and Social Capacity, Dichato, Chile.

BURP, Bachelor of Urban and Regional Planning — **June 2007**
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
Thesis: GIS-Based Accessibility Analysis of Public Infrastructure in City: A Case Study of Rajshahi City Corporation Area, Bangladesh

Graduate Certificate, Remote Sensing and GIS for Natural Hazard Assessment — **March 2014**
Faculty of Geo-information Science and Earth Observation (ITC),
The University of Twente, The Netherlands

TEACHING EXPERIENCES

My interdisciplinary interests and background gave me a foundation to teach a wide range of undergraduate and graduate classes including but not limited to Remote Sensing (RS), Geographic Information System (GIS), disaster risk management, GIS programming, digital cartography, land use, land cover modeling, and urban planning. I adopted a widely established progressive 5E teaching sequence –Engage, Explore, Explain, Elaborate, and Evaluate –in my teaching practice. I have been receiving high summary ratings (e.g. 4.5 to 4.9 out of 5 in Spring 2022) in my course evaluations, which can be attributed to the various interactive classroom activities (e.g., Think-Pair-Share, Kahoot quizzes, Role-playing, and group discussion) as well as hands-on activities, writing assignments, and projects. I taught the following courses at different universities.

Assistant Professor, Department of Earth and Environmental Sciences, New Jersey City University, Jersey City, NJ, USA — **September 2020 - June 2023**
- **Mapping the City**
- **Environmental Science for All**
- **Remote Sensing for a Changing World**
- **Digital Earth: Fundamentals of Geospatial Science**
- **Contemporary Applications of GIS**

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- **Environmental Issues and Policy**

Assistant Professor / Lecturer, BUET-Japan Institute of Disaster Prevention and Urban Safety, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh | **October 2011 - August 2015**
  - **Introduction to Remote Sensing and its Application in Natural Hazard**
  - **Introduction to GIS Programming and Algorithm**
  - **Remote Sensing and GIS for Natural Hazard Assessment**

Guest Lecturer, Department of Urban and Regional Planning, Rajshahi University of Engineering and Technology, Rajshahi, Bangladesh | **Fall Semester 2014**
  - **Surveying and Cartography**
  - **Surveying and Cartography Workshop**
  - **GIS and Remote Sensing**
  - **GIS and Remote Sensing Studio**

Guest Lecturer, Department of Public Health, ASA University Bangladesh, Dhaka, Bangladesh | **Spring Semester 2015**
  - **Introduction to GIS and Its Application in Public Health**

External Examiner, Department of Disaster Management, Patuakhali Science and Technology University, Patuakhali, Bangladesh | **Fall semester 2013 & 2014**
  - **Disaster Risk Management**
  - **Environmental Science**

CURRENT AND PENDING SUPPORTS

I am interested in a wide range of topics in geography. In this era, researchers must contend with data flood from sensors and networks, the internet of things, web applications, and the advancement of big data technologies. To take advantage of these opportunities, I utilize data mining, machine learning, and spatial analytics approaches, and I like to integrate both qualitative and quantitative approaches in my research work. I received several grants from NASA, USAID, and World Bank initiatives for multi-disciplinary collaborative research projects. My current and past research projects are listed below.

- **Current Support**

Efficiency and Employment Nexus: Advanced Technology based Urban and Peri-urban Horticulture in Bangladesh and Nepal
USAID Feed the Future Program|Role: Advisor

Implementation Period: March 23 – August 2026; Amount awarded: $320,210

From Green to GrEEEn: Utilizing an environmental justice lens and Earth science data to enhance greenspace Equity, Exposure, and Experience
NASA Earth Science Applications: Equity and Environmental Justice
Role: Co-I/Institutional PI
Implementation Period: Aug 22-April-23; Amount awarded: $100,000

PAST EFFORTS

OGC Disaster Resilience Pilot 2019
Open Geospatial Consortium
Role: Personnel | **April - Dec 2019**

Development of Post-Graduate Research and Degree Programs in Disaster Risk Reduction at a New Institute on Disaster Prevention and Urban Safety | **July 2014 – July 2015**
Higher Education Quality Enhancement Project (HEQEP), Academic Innovation Fund, University Grants Commission of Bangladesh
Role: Co-I; Amount awarded: $230,000

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Developing Dynamic Web-GIS based Early Warning System for the Communities at Landslide Risks in Chittagong Metropolitan Area, Bangladesh
July 2014 - August 2015

ICIMOD/ SERVIR-Himalaya Small Grants Program funded by the United States Agency for International Development (USAID) in partnership with the National Aeronautics and Space Administration (NASA)
Role: Co-PI; Amount awarded: $25,000

RECENTLY SUBMITTED UNSUCCESSFUL PROPOSALS

Monitoring and Understanding Land Use Adaptations to Climate Change in Coastal Bangladesh
NASA Land Cover Land Use Program | Role: Principal Investigator (PI)
Implementation Period: three years (2023-2025); Requested Amount: $774,989

Washington-Baltimore Metropolitan Integrated Field Laboratory (WIFL)
Biological and Environmental Research (BER), DOE/SC | Role: Co-I/Institutional PI
Implementation Period: five years (2023-2027); Requested Amount: $20M (approx.)

Determinants of Time Lag in Receiving Public Health Emergency Supports During Hurricane Fiona in Puerto Rico
Natural Hazard Center Colorado Boulder |Role: Principal Investigator (PI)
Implementation Period: December 2022-August 2023; Requested Amount: $50,000

Major Agricultural Policy Interventions in Tanzania: Understanding Land Cover and Land Use Change and its Impacts on Ecosystem Services and Smallholder Livelihoods
Submitted to NASA Land Cover Land Use Program
Role: Principal Investigator (PI)
Project duration: three years (2022-2024); Amount Requested: $447,000

"DamRec Mangroves": A web-based decision-support tool for cyclone damage and recovery assessments in the Sundarbans mangrove forest
Submitted to The Coalition for Disaster Resilient Infrastructure (CDRI)
Role: Principal Investigator (Co-I)
Project duration: One year; Amount Requested: $15,000

ADDITIONAL RESEARCH EXPERIENCES

Postdoctoral Research Associate
January 2020 -August 2020

Center for Spatial Information Science and Systems
George Mason University, Fairfax, VA, USA
- Conduct research within the scope of a research project funded by NASA
- Landuse and Landcover change monitoring in the Ganges basin using earth observation data
- Change in cropping pattern

Research Assistant
September 2015 - Present

Center for Spatial Information Science and Systems, George Mason University.
- Remote-Sensing-Based Flood Crop Loss Assessment (RF-CLASS), funded by a grant from the NASA Applied Science Program (Grant # NNX14AP91G, PI: Prof. Liping Di)
- WaterSmart, funded by a grant from U.S. National Science Foundation (Grant # CNS-1739705, PI: Prof. Liping Di)
- OGC Disaster Resilience Pilot (DRP-2019)

Research Assistant
October 2007 - March 2008

Department of Urban and Regional Planning, Faculty of Spatial Planning, Technical University of Dortmund, Germany.

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SHORT COURSE AND TRAINING

Short Course on InSAR Processing and Theory with GMTSAR	**2017**
Scripps Institute of Oceanography, University of California San Diego, La Jolla, CA	
Short Course on Risk Sensitive Land Use Planning	**2013**
Jointly Organized by Earthquake and Megacity Initiative and the World Bank.	
Disaster Response Exercise and Exchange	**2013**
Jointly organized by Bangladesh Armed Forces Division and U.S. Army Pacific	
Short Course on Geographical Information System and its Applications	**2012**
Bangladesh Institute of Planners (BIP), Dhaka, Bangladesh.	
Cross-Cultural Training	**2009**
TU-Dortmund, Witten, Germany.	

RELEVANT COMPUTER SKILLS

Python, R, JavaScript, MATLAB, ArcGIS, ERDAS IMAGINE, Google Earth Engine, ILWIS, Photoshop, Illustrator, AutoCAD, HTML, CSS, Microsoft Office Suite, and SPSS.

SERVICES

Mentor	**Since Fall**
NJCU STEM ON-PACE mentoring program	**2020**
Member of the Curriculum Committee	**October**
New Jersey City University, Jersey City, NJ, USA	**2020-**
Special Issue Editor and Topic Editor	**September**
Geospatial Techniques in Advancing Land-Change Science and Management, Land	**2020-**
Director, The Board of Directors (BAAI)	**2019-2020**
Bangladesh Association of America Inc.	
Executive Editor, Journal of Bangladesh Institute of Planners (JBIP) Volume 7	**2014 - 2015**
Bangladesh Institute of Planners (BIP), Dhaka, Bangladesh	
Member of Technical Working Group	**2014**
Enhanced Land-use Planning in Bangladesh, A joint project of Urban Development Directorate (UDD) and Asian Disaster Preparedness Center (ADPC), Dhaka Bangladesh	
Focus Group Member	**2014**
Bangladesh Urban Earthquake Resilience Project, The World Bank	
Board Member (Research and Publications)	**2014-2015**
11th Executive Board, Bangladesh Institute of Planners (BIP)	
Board Member (National and International Liaison)	**2012-2013**
10th Executive Board, Bangladesh Institute of Planners (BIP)	

HONORS AND AWARDS

Outstanding Ph.D. Student Award	**2020**
Department of Geography and Geoinformation Science, George Mason University, Fairfax VA, USA	
Best Poster Award	**2018**
GIS Day Poster Competition 2018, Department of Geography and Geoinformation Science, George Mason University, Fairfax VA, USA	
Best Young Scientist Paper Award	**2017**
The Sixth International Conference on Agro-Geoinformatics, Fairfax VA, USA	

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UNAVCO Fellowship for InSAR Processing and Theory with GMTSAR Short Course at Scripps Institute of Oceanography, University of California San Diego, La Jolla, CA	**2017**
ICT for Mountain Development Award The International Centre for Integrated Mountain Development (ICIMOD); for Developing Dynamic Web-GIS based Early Warning System for the Communities at Landslide Risks in Chittagong Metropolitan Area, Bangladesh.	**2015**
Netherland Fellowship Netherland Fellowship Program (NFP) by the Dutch Ministry for Foreign Affairs	**2014**
Best End of Course Project Award 2013 Blended Training Course on Risk Sensitive Land Use Planning, Jointly Organized by Earthquake and Megacity Initiative and the World Bank	**2013**
DAAD Scholarship German Academic Exchange Service, Germany	**2009-2011**
Technical Scholarship Bangladesh University of Engineering and Technology, Dhaka, Bangladesh	**2002-07**

REVIEWER

Remote Sensing /Geosciences /Natural Hazards / Scientific Reports/ Progress in Physical Geography/ IEEE Access/ International Journal of Disaster Resilience in the Built Environment /Journal of Arid Environments / Spatial Information Research / Sustainability / Water / IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing / ISPRS International Journal of Geo-Information /Landslides/ PeerJ Computer Science/ International Journal of Digital Earth

SELECTED ACADEMIC PRESENTATIONS

Invited Speaker

- Remote Sensing Based Rapid Assessment of Flood Crop Damage, IEEE Geoscience & Remote Sensing Society (GRSS) Washington, DC & Northern VA Chapter virtual seminar, December 17, 2021
- The role of geospatial technologies for building flood resilient communities, *Webinar on Flood Resilience: Opportunities and Challenges organized by Resilient Bangladesh* on 4-5 July 2019
- Tropical Cyclone Hazard to Remote Home for the Rohingya at Bhasan Char in Bangladesh, *International Conference on the Rohingya Crisis in Comparative Perspective* held at University College London (UCL), the UK on 4-5 July 2019

Oral Presentation

- Prediction of Field Level Crop Types Using Markov Chain Modeling on Crop Rotation Pattern, *AGU Fall Meeting 2019* held on 09 – 13 December in San Francisco, USA
- In-Season Major Crop-Type Identification for US Cropland from Landsat Images, *AAG Conference 2019* held on 03 –07 in Washington DC, USA
- Agriculture flood mapping with Soil Moisture Active Passive (SMAP) data: A case of 2016 Louisiana flood, *The Sixth International Conference on Agro-Geoinformatics* held on 03 – 07 in Fairfax VA, USA

Poster Presentation

- Classification of cities in Bangladesh based on remote sensing derived spatial characteristics, *Regional Development Planning and the Sustainable Development Goals (SDGs) at a local level in Latin America and the Caribbean (LAC)* held on 08 – 12 July 2019 in Valdivia, Chile

SELECTED PUBLICATIONS

- **Journal Articles**

[23] **Rahman, M.S.,** Paul, K.C., Rahman, M.M., Samuel, J., Thill, J.-C., Hossain, M.A., Ali, G.G.M.N. Pandemic Vulnerability Index of US Cities: A Hybrid Knowledge-based and Data-driven Approach. Sustainable Cities and Societies, Under Review.

[22] Shekhar, H., Rautela, M., Khan, M., Paris, R., de León, R. M. F., Romero-Aguirre, M. F., ... & **Rahman, M. S.** (2022). Are leading urban centers predisposed to a global risks-A review of the global south from a COVID-19 perspective? Habitat International, 102517.

[21] Ali, G.G.M.N., Rahman, M.M., Hossain, M.A., **Rahman, M.S.,** Paul, K.C.; Thill, J.-C., Samuel, J. (2021). Public Perceptions of COVID-19 Vaccines: Policy Implications from US Spatiotemporal Sentiment Analytics. Healthcare, 9, 1110.

[20] Rahman, M. M., Paul, K. C., Hossain, M. A., Ali, G. M. N., **Rahman, M. S.,** & Thill, J. C. (2021). Machine Learning on the COVID-19 Pandemic, Human Mobility and Air Quality: A Review. IEEE Access.

[19] **Rahman, M. S.,** Di, L., Yu, E., Lin, L., & Yu, Z. (2020). Remote Sensing Based Rapid Assessment of Flood Crop Damage Using Novel Disaster Vegetation Damage Index (DVDI). International Journal of Disaster Risk Science, 1-21.

[18] Kafy, A.A., Faisal, A.A., **Rahman, M.S.,** Islam, M., Al Rakib, A., Islam, M.A., Khan, M.H.H., Sikdar, M.S., Sarker, M.H.S., Mawa, J. and Sattar, G.S., 2020. Prediction of seasonal urban thermal field variance index using machine learning algorithms in Cumilla, Bangladesh. Sustainable Cities and Society, p.102542.

[17] Yu, Z., Di, L., **Rahman, M.S.,** & Tang, J. (2020). Fishpond Mapping by Spectral and Spatial-Based Filtering on Google Earth Engine: A Case Study in Singra Upazila of Bangladesh. Remote Sensing, 12(17), 2692.

[16] Rabby, Y. W., Ishtiaque, A., & **Rahman, M.S.** (2020). Evaluating the Effects of Digital Elevation Models in Landslide Susceptibility Mapping in Rangamati District, Bangladesh. Remote Sensing, 12(17), 2718.

[15] Kafy, A. A., **Rahman, M. S.,** Faisal, A.A. Hasan, M. M., & Islam, M. (2020). Modelling future land use land cover changes and their impacts on land surface temperatures in Rajshahi, Bangladesh. Remote Sensing Applications: Society and Environment, 18, 100314.

[14] **Rahman, M. S.,** & Di, L. (2020). A Systematic Review on Case Studies of Remote-Sensing-Based Flood Crop Loss Assessment. Agriculture, 10(4), 131.

[13] Ahmed, B., **Rahman, M. S.,** Sammonds, P., Islam, R., & Uddin, K. (2020). Application of geospatial technologies in developing a dynamic landslide early warning system in a humanitarian context: the Rohingya refugee crisis in Cox's Bazar, Bangladesh. Geomatics, Natural Hazards and Risk, 11(1), 446-468.

[12] Qian, Y.; Yang, Z.; Di, L.; **Rahman, M.S.;** Tan, Z.; Xue, L.; Gao, F.; Yu, E.G.; Zhang, X. Crop Growth Condition Assessment at County Scale Based on Heat-Aligned Growth Stages. *Remote Sens.* **2019**, *11*, 2439.

[11] Tang, J., Di, L., **Rahman, M. S.,** & Yu, Z. (2019). Spatial-temporal landscape pattern change under rapid urbanization. Journal of Applied Remote Sensing, 13(2), 024503.

[10] **Rahman, M.S.,** Di, L., Yu, E., Lin, L., Zhang, C., & Tang, J. (2019). Rapid Flood Progress Monitoring in Cropland with NASA SMAP. *Remote Sensing, 11*(2), 191.

[9] Lin, L., Di, L., Tang, J., Yu, E., Zhang, C., **Rahman, M.S.,** ... & Kang, L. (2019). Improvement and Validation of NASA/MODIS NRT Global Flood Mapping. *Remote Sensing, 11*(2), 205.

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[8] **Rahman, M.S.**, Di, L., Yu, E., Zhang, C., Mohiuddin, H. (2019) In-Season Major Crop-Type Identification for US Cropland from Landsat Images Using Crop-Rotation Pattern and Progressive Data Classification. *Agriculture*, 9, 17.

[7] **Rahman, M. S.**, Mohiuddin, H., Kafy, A. A., Sheel, P. K., & Di, L. (2018). Classification of cities in Bangladesh based on remote sensing derived spatial characteristics. *Journal of Urban Management*, 8(2), 206-224.

[6] Ahmed, B., **Rahman, M.S.**, Islam, R., Sammonds, P., Zhou, C., Uddin, K., & Al-Hussaini, T. (2018). Developing a Dynamic Web-GIS Based Landslide Early Warning System for the Chittagong Metropolitan Area, Bangladesh. *ISPRS International Journal of Geo-Information*, 7(12), 485.

[5] **Rahman, M. S.**, Yang, R., & Di, L. (2018). Clustering Indian Ocean Tropical Cyclone Tracks by the Standard Deviational Ellipse. *Climate*, 6(2), 39.

[4] **Rahman, M. S.**, Ahmed, B., & Di, L. (2017). Landslide initiation and runout susceptibility modeling in the context of hill cutting and rapid urbanization: a combined approach of weights of evidence and spatial multi-criteria. Journal of Mountain Science, 14(10), 1919-1937.

[3] **Rahman, M. S.**, & Di, L. (2017). The state of the art of spaceborne remote sensing in flood management. Natural Hazards, 85(2), 1223-1248.

[2] Ahmed, Bayes, Kamruzzaman, Md., Zhu, Xuan, **Rahman, M. S.**, Choi, Keechoo. (2013). "Simulating Land Cover Changes and Their Impacts on Land Surface Temperature in Dhaka, Bangladesh." Remote Sens. 5, no. 11: 5969-5998.

[1] **Rahman, M.S.** and Kausel, T. (2013). Disaster as an Opportunity to Enhance Community Resilience: Lesson Learnt from Chilean Coast, Journal of Bangladesh Institute of Planners, Vol 5. pp1-11

▪ **Conference Proceedings**

[11] Patel, N., Cancel, D., Chatterjee, M., & **Rahman, M. S.** (2021, December). Covid-19 digital Contact-tracing: a doorway to well-being or a backdoor to security vulnerabilities?. In 2021 IEEE International Conference on Big Data (Big Data) (pp. 4297-4302). IEEE.

[10] **Rahman, M. S.,** Di, L., Yu, Z., Eugene, G. Y., Tang, J., Lin, L., ... & Gaigalas, J. (2019, July). Crop Field Boundary Delineation using Historical Crop Rotation Pattern. In 2019 8th International Conference on Agro-Geoinformatics (Agro-Geoinformatics) (pp. 1-5). IEEE.

[9] **Rahman, M. S.,** Di, L., Eugene, G. Y., Tang, J., Lin, L., Zhang, C., ... & Gaigalas, J. (2018). Impact of Climate Change on Soil Salinity: A remote sensing-based investigation in Coastal Bangladesh. In the 7th International Conference on Agro-geoinformatics (pp. 1-5). IEEE.

[8] Lin, L., Di, L., Yang, R., Zhang, C., Yu, E., **Rahman, M. S.**, ... & Tang, J. (2018). Using Machine Learning Approach to Evaluate the PM2. 5 Concentrations in China from 1998 to 2016. In the 7th International Conference on Agro-geoinformatics (pp. 1-5). IEEE.

[7] **Rahman, M.S.**, Di, L., Esraz-Ul-Zannat, M. (2017). The role of big data in disaster management, In the International Conference on Disaster Risk Mitigation (ICDRM 2017), Dhaka, Bangladesh.

[6] Eugene, G. Y., Di, L., **Rahman, M. S.,** Lin, L., Zhang, C., Hu, L., ... & Yang, G. (2017). Performance improvement on a Web Geospatial service for the remote sensing flood-induced crop loss assessment web application using vector tiling, the 6th International Conference on Agro-Geoinformatics, (pp. 1-6). IEEE.

[5] **Rahman, M. S.**, Di, L., Shrestha, R., Eugene, G. Y., Lin, L., Zhang, C., ... & Yang, Z. (2017). Agriculture flood mapping with Soil Moisture Active Passive (SMAP) data: A case of 2016 Louisiana flood. In the 6th International Conference on Agro-Geoinformatics (pp. 1-6). IEEE.

[4] Shrestha, R., Di, L., Eugene, G. Y., **Rahman, M. S.**, Lin, L., Hu, L., & Tang, J. (2017). Crop Fraction Layer (CFL) datasets derived through MODIS and Landsat for the continental US from the year 2000–2016. In the 6th International Conference on Agro-Geoinformatics (pp. 1-7). IEEE.

[3] Zhang, C., Di, L., Sun, Z., Eugene, G. Y., Hu, L., Lin, L., ... & **Rahman, M. S.** (2017). Integrating OGC Web Processing Service with cloud computing environment for Earth Observation data. In the 6th International Conference on Agro-Geoinformatics, (pp. 1-4). IEEE.

[2] Eugene, G. Y., Di, L., Kang, L., Shrestha, R., **Rahman, M. S.**, Lin, L., ... & Yang, Z. (2016). Online parameterization for WOFOST for the United States using open geospatial standards. In the Fifth International Conference on Agro-Geoinformatics (pp. 1-6). IEEE.

[1] **Rahman, M. S.**, Di, L., Shrestha, R., Eugene, G. Y., Lin, L., Kang, L., & Deng, M. (2016, July). Comparison of selected noise reduction techniques for MODIS daily NDVI: An empirical analysis of corn and soybean. In the Fifth International Conference on Agro-Geoinformatics (pp. 1-5). IEEE.

- **Book chapters**

[2] Rahman, S., Huq, F. F., Ahmed, B., **Rahman, M.S.,** & Al-Hussaini, T. M. (2022). Assessing Social Vulnerability to Landslide Disasters in Chittagong City, Bangladesh. In *Impact of Climate Change, Land Use and Land Cover, and Socio-economic Dynamics on Landslides* (pp. 301-318). Springer, Singapore.

[1] Shrestha, R. M., **Rahman, M. S.** (2021). Flood Monitoring and Crop Damage Assessment. In Di, L; and Üstündağ, B. (Eds.), Agro-geoinformatics: Theory and Practice, (1st ed., pp. 321–350). Springer.

* For more on publications please visit:
https://scholar.google.com/citations?user=kU2kWzEAAAAJ&hl=en

PROFESSIONAL MEMBERSHIPS

Member: American Geophysical Union (AGU)
Member: Association of American Geographers (AAG)
Member: Bangladesh Institute of Planners (BIP), ID # M 565
Life Member: Association of BUET Alumni (ABUETA)
Member: BUETPlanners, Association of BUET Graduate Planners
Life Member, Alumni Association of German Universities in Bangladesh
Member, SPRING International Association of Development Planners (SIADP)
Member, ITC Student Alumni

REFERENCES

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New Jersey City University
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