CURRICULUM VITAE

1. **PERSONAL DATA**
   Muhammad Mahbubur Rahman

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   PubMed: https://www.ncbi.nlm.nih.gov/myncbi/muhammad.rahman.5/bibliography/public
   Google Scholar: https://scholar.google.com/citations?user=EqVbKDgAAAAJ&hl=en&oi=ao

   Research Objective: To leverage AI and big data in translational research to develop robust machine learning and natural language processing methods that can facilitate advancements in the fields of mental health, child and adolescent well-being, and healthcare as a whole.

2. **EDUCATION**

   Undergraduate Education

02/2006	Bachelor of Science in Computer Science (summa cum laude), American International University- Bangladesh, Dhaka, Bangladesh

   Graduate/Medical Education

07/2008	Master of Science in Information Technology, University of Dhaka, Dhaka, Bangladesh
08/2018	Doctor of Philosophy in Computer Science, University of Maryland Baltimore County, Baltimore, MD

   Post-Graduate Training

10/2018 - 09/2019	Postdoctoral Researcher, Center for Language and Speech Processing, Whiting School of Engineering, Johns Hopkins University, Baltimore, MD
10/2019 - 03/2022	Postdoctoral Fellow, National Institute on Drug Abuse, National Institutes of Health, Baltimore, MD

3. **EMPLOYMENT**

01/2009 - 08/2013	Assistant Professor, Department of Computer Science, Faculty of Science and Technology, International University-Bangladesh, Dhaka, Bangladesh
02/2014 - 05/2014	Graduate Assistant, Department of Computer Science and Electrical Engineering, University of Maryland Baltimore County, Baltimore, MD
06/2014 - 08/2018	Research Assistant, Department of Computer Science and Electrical Engineering, University of Maryland Baltimore County, Baltimore, MD
06/2014 - 01/2017	Research Associate, RedShred, LLC, Baltimore, MD
06/2015 - 08/2015	Summer Research Intern, AT&T Labs- Research, Bedminster, NJ
06/2016 - 08/2016	Summer Research Intern, eBay Inc., San Jose, CA
06/2017 - 08/2017	Summer Research Intern, eBay Inc., San Jose, CA
08/2017 - 05/2018	Teacher Assistant, University of Maryland Baltimore County, Baltimore, MD
10/2018 - 09/2019	Postdoctoral Researcher, Center for Language and Speech Processing, Whiting School of Engineering, Johns Hopkins University, Baltimore, MD
10/2019 - 03/2022	Postdoctoral Fellow, National Institute on Drug Abuse, National Institutes of Health, Baltimore, MD
04/2022-Present	Assistant Professor (Tenure-track), Center for Translational Research, Children's National Research Institute, Children's National Hospital, Silver Spring, MD
11/2022-Present	Assistant Professor (Tenure-track), Department of Pediatrics, School of Medicine and Health Sciences, George Washington University, Washington DC
11/2022-Present	Assistant Professor (Secondary), Department of Biostatistics and Bioinformatics, Milken Institute School of Public Health, George Washington University, Washington DC

4. **SCHOLARLY PUBLICATIONS**

Papers in Refereed Journals/ Peer-reviewed Conferences

1. Rahman, M. M., & Nahar, A. (2009). Modified bully algorithm using election commission. MASAUM Journal of computing (Vol. 1, No. 3, pp. 439-446).
2. Islam, M. S., Rahman, M. M., Begum, Z., & Hafiz, M. (2009). Efficient approaches for designing fault tolerant reversible carry look-ahead and carry-skip adders. MASAUM Journal of Basic and Applied Sciences.
3. Islam, M. S., Rahman, M. M., Begum, Z., & Hafiz, M. Z. (2009, July). Fault tolerant reversible logic synthesis: Carry look-ahead and carry-skip adders. IEEE international conference on advances in computational tools for engineering applications (pp. 396-401).
4. Islam, M. S., Rahman, M. M., Begum, Z., Hafiz, M. Z., & Al Mahmud, A. (2009, April). Synthesis of fault tolerant reversible logic circuits. IEEE Circuits and Systems International Conference on Testing and Diagnosis (pp. 1-4).
5. Islam, M. S., Rahman, M. M., Begum, Z., & Hafiz, M. Z. (2009). Low cost quantum realization of reversible multiplier circuit. Information technology journal (Vol. No. 2, pp. 208-213).

6. Islam, M. S., Rahman, M. M., Begum, Z., & Mohd. Zulfiquar Hafiz. (2010, July). Realization of a Novel Fault Tolerant Reversible Full Adder Circuit in Nanotechnology. Int. Arab J. Inf. Technol. (Vol. 7, No. 3, pp. 317-323).

7. Rahman, M. M., Alam, A. U., & Mursalin, T. E. (2010, September). A more appropriate protein classification using data mining. Journal of Theoretical and Applied Information Technology (Vol. 19, No. 1, pp. 33-43).

8. Islam, M. S., Rahman, M. M., Begum, Z., & Hafiz, M. (2011, February). Fault tolerant variable block carry skip logic (vbcsl) using parity preserving reversible gates. International Journal of Computer and Electrical Engineering (Vol. 3, No. 1, pp. 1-7).

9. Rahman, M. M. (2012, May). Intellectual knowledge extraction from online social data. In 2012 International Conference on Informatics, Electronics & Vision (ICIEV) (pp. 205-210).

10. Rahman, M. M. (2012, September). Mining social data to extract intellectual knowledge. International Journal of Intelligent Systems and Applications (pp. 15-24).

11. Syed, Z., Finin, T., Rahman, M. M., Kukla, J., & Yun, J. (2015, May). Discovering and Querying Hybrid Linked Data. In Proceedings of the 4th Workshop on Knowledge Discovery and Data Mining Meets Linked Open Data co-located with 12th Extended Semantic Web Conference (Vol. 1365).

12. Syed, Z., Han, L., Rahman, M., Finin, T., Kukla, J., & Yun, J. (2015, May). UMBC_Ebiquity-SFQ: Schema free querying system. In Semantic Web Evaluation Challenges (pp. 199-208).

13. Syed, Z., Han, L., Rahman, M. M., Finin, T., Kukla, J., & Yun, J. (2015, October). Querying Large Linked Data Resources. In 14th International Semantic Web Conference.

14. Rahman, M. M., & Finin, T. (2017, December). Deep understanding of a document's structure. In Proceedings of the Fourth IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (pp. 63-73).

15. Rahman, M. M., & Finin, T. (2018). Understanding and representing the semantics of large structured documents. SemDeep at 17th International Semantic Web Conference (pp. 1-12).

16. Rahman, M. M., Hisamoto, S., & Duh, K. (2019). Query expansion for cross-language question re-ranking. arXiv preprint arXiv:1904.07982.

17. Rahman, M. M., & Finin, T. (2019). Unfolding the Structure of a Document using Deep Learning. arXiv preprint arXiv:1910.03678.

18. Yarmohammadi, M., Ma, X., Hisamoto, S., Rahman, M., Wang, Y., Xu, H., ... & Duh, K. (2019, August). Robust document representations for cross-lingual information retrieval in low-resource settings. In Proceedings of Machine Translation Summit XVII: Research Track (pp. 12-20).

19. Himelein-Wachowiak, M., Giorgi, S., Devoto, A., Rahman, M., Ungar, L., Schwartz, H. A., & Curtis, B. (2021). Bots and misinformation spread on social media: Implications for COVID-19. Journal of Medical Internet Research, 23(5), e26933.

20. Kwarteng, A. E., Rahman, M. M., Gee, D. G., Infante, M. A., Tapert, S. F., & Curtis, B. L. (2021). Child reward neurocircuitry and parental substance use history: Findings from the Adolescent Brain Cognitive Development Study. Addictive Behaviors, 122, 107034.

21. Giorgi, S., Guntuku, S. C., Himelein-Wachowiak, M. L., Kwarteng, A. E., Hwang, S., Rahman, M. M., & Curtis, B.. Twitter Corpus of the #BlackLivesMatter Movement And Counter Protests: 2013 to 2020, International AAAI Conference on Web and Social Media (ICWSM) 2022.

22. Rahman, M. M. (2023). AI for ADHD: Opportunities and Challenges. Journal of Attention Disorders.

Manuscripts Under Review
1. Rahman, M. M., Unlocking the Potential of Wearable Technology: Fitbit-Derived Measures for Predicting ADHD in Adolescents (Nature Translational Psychiatry).

Books Edited or Written
1. Rahman M. M., Protein Classification using Machine Learning Approaches, ISBN-10: 3659108391, ISBN-13:978-3659108396, Publisher: LAP LAMBERT Academic Publishing (April 2012).

Conference Abstracts and Posters
1. Rahman, M. M., Mursalin, T. E., & Kabir, A. (2006, December). Automation system of Protein Databank (PDB) with new classification using clustering. Systems Biology and Computational Proteomics.
2. Rahman, M. M., & Finin, T. (2014, April). A study on Facebook: spam apps and privacy. UMBC Graduate Research Conference.
3. Rahman, M. M., Syed, Z., Finin, T., Kukla, J., & Yun, J. (2015, February). Extracting Information from RFPs. IBM Beyond Watson conference.
4. Rahman, M. M. (2015, March). Open Information Extraction and Topic Modeling on Academic Profiles. UMBC Graduate Research Conference.
5. Rahman, M. M., Syed, Z., Finin, T., Kukla, J., & Yun, J. (2015, March). Semantic Information Extraction from RFP Documents. UMBC Graduate Research Conference.
6. Rahman, M. M., & Rowland, J. (2015, June). Contextual Unstructured Data Anonymization. AT &T Labs- Research (Summer Poster Session).
7. Rahman, M. M., Finin, T., Kukla, J., & Yun, J. (2016, March). Semantic Section Identification from Vertical Domains. UMBC Graduate Research Conference.
8. Rahman, M. M., & Finin, T. (2017, April). Understanding the Logical and Semantic Structure of Large Documents. SIAM International Conference on Data Mining (Doctoral Forum).
9. Kwarteng, A. E., Rahman, M. M., Gee, D. G., Infante, M. A., Tapert, S. F., Himelein-Wachowiak, M. L., Smitterberg, C. W., & Curtis, B. L. (2020, April). The Impact of Familial Substance Use History on Reward Processing in the Adolescent Brain. APA annual meeting.
10. Rahman, M. M., Morizono H. (2023, April). Distinguishing ADHD from Comorbid Anxiety Disorders Using Self-Reported Social Media Posts. CN Research, Education, and Innovation Week.

5. **PRESENTATIONS**
   1. Rahman, M.M. (2012, May). Intellectual Knowledge Extraction from Online Social Data. IEEE International Conference on Informatics, Electronics & Vision (ICIEV), Dhaka, BD
   2. Rahman, M.M. (2014, March). A study on Facebook: spam apps and privacy. Graduate Research Conference (GRC), University of Maryland, Baltimore County, Baltimore, MD.
   3. Rahman, M.M. (2015, February). Extracting Information from RFPs. IBM Beyond Watson conference, Baltimore, MD.
   4. Rahman, M.M. (2015, March). Open Information Extraction and Topic Modeling on Academic Profiles. Graduate Research Conference (GRC), University of Maryland, Baltimore County, Baltimore, MD.
   5. Rahman, M.M. (2016, March). Semantic Section Identification from Vertical Domains. Graduate Research Conference (GRC), University of Maryland, Baltimore County, Baltimore, MD.

6. Rahman, M.M. (2016, June). Contextual Unstructured Data Anonymization. AT &T Labs-Research, Bedminster, NJ.
7. Rahman, M.M. (2017, April). Understanding the Logical and Semantic Structure of Large Documents. SIAM International Conference on Data Mining, Houston, TX.
8. Rahman, M.M. (2017, December). Deep Understanding of a Document's Structure. IEEE International Conference on Big Data Computing, Austin, TX.
9. Rahman, M.M. (2018, October). Understanding and representing the semantics of large documents. International Semantic Web Conference (ISWC), Monterey, CA.
10. Rahman, M.M. (2021, March). AI for Document Understanding and Public Health. University of South Carolina, Columbia, SC.
11. Rahman, M.M. (2021, December). Understanding the structure of large documents using AI. University of North Florida, Jacksonville, FL.
12. Rahman, M.M. (2021, December). Understanding the structure of large documents using AI. Georgia Southern University, Statesboro, GA.
13. Rahman, M.M. (2022, January). AI for Social Good: Translational Research in Public Health. Children's National Hospital, Washington, DC.
14. Rahman, M.M. (2023, February). AI for Social Good: Making Big Data Actionable. GWU Biostatistics Center, Rockville, MD.

6. OTHER RESEARCH AND DEVELOPMENT INITIATIVES
<u>Research Study</u>
Mindfulness study
- Conducting a mindfulness study focused on measuring the effect of a mindfulness intervention on social support during COVID-19
- Leading the development of computer tools to facilitate the study.
- Responsible for maintaining servers including aware, amazon cloud, and database.

Covid-19 study at NIH
- Member of the technical team for a COVID-19 study focused on measuring the effect of COVID-19 on people with substance use disorders.
- Developing field tools to support the COVID-19 study.

Drug language detection
- Developing a deep learning-based drug language detection tool
- Predicting and analyzing drug terms/slang with confidence scores

AI-powered conversational agent
- Prototyping an AI-powered clinical conversational agent
- Developing Q/A datasets from public sources and NIDA chat day
- Building a rule-based conversational agent using bluelight data

<u>Project Development</u>
Slot discovery and linking
- Developing an algorithm to discover slots and fillers from RFP documents.
- Utilizing Microsoft cognitive Services, Wikipedia Miner, and DBpedia knowledge graph.

Cross-lingual information retrieval in low resource language
- Developing a robust document representation system for a cross-lingual setting.
- Designing and implementing query expansion techniques using deep learning and DBpedia.
- Working with minimal training data to achieve robust modeling in a low resource language.

Schema-agnostic query systems
- Developing an NLP engine to understand natural language questions.
- Designing a component to generate unistructural natural answers.
- Implementing concept level association knowledge (CAK) to convert queries into graphs.

7. PROFESSIONAL REGISTRATIONS, LICENSES, CERTIFICATIONS
05/2009   Cisco Certified IT Essential Instructor

8. GRANTS
<u>Current Research Support</u>
- Language Matters: Understanding the Use of Stigmatizing Language in the Electronic Health Record and the Impact on Pediatric Emergency Care, CTR Pilot, December 2023 - June 2024, Amount: $25,000 US, Role: Principal Investigator.
- Machine learning to identify children with sickle cell disease at high risk for return emergency visits after Vaso occlusive crisis, Pfizer Inc, October 2023 - September 2024, Amount: $100,000 US, Role: Co-Investigator.
- Machine learning to improve outcomes among Emergency Department Youth at Risk for Suicide, Pediatric Pandemic Network (PPN), October 2023 - September 2025, Amount: $100,000 US, Role: Co-Investigator.
- Startup Research Package, Children's National Hospital, April 2022 - June 2025, Amount: $800,000 US, Role: Principal Investigator.

<u>Under Review</u>
- AI-driven ADHD Management: Extracting Treatment Insights and Building a Knowledge Graph, National Institutes of Health (NIH), April 2024 - March 2026, Amount: $500,500 US, Role: Principal Investigator.

9. SOCIETIES AND HONORS
2003-2006	Merit award for undergraduate program
2014-2018	Research Assistant award for PhD program
Summer 2015	Semantic Web Challenge award
Summer 2016	Runner-up, eBay Hackathon
March 2017	UMBC GSA travel grant
April 2017	NSF travel grant
November 2017	UMBC GSA travel grant
December 2017	NSF travel grant, December
Summer 2018	Dissertation Fellowship award
October 2018	ISWC Travel grant

10. ADMINISTRATIVE DUTIES & UNIVERSITY ACTIVITIES
Developing NIH DMS Guideline for Children's National Research Institute

Developing NIH DMS Template for Children's National Research Institute
Organizing CTSI-CN workshop on NIH DMS for Genomic data, Date: 11/28/22
Organizing CTSI-CN workshop on NIH DMS for Imaging data, Date: 12/13/22
Organizing CTSI-CN workshop on NIH DMS for Neuroimaging data, Date: 1/17/23
Developing NLP for Healthcare Course Curriculum for DBB at GW School of Public Health

11. EDUCATIONAL ACHIEVEMENTS

<u>Courses Taught</u>
Artificial Intelligence and Expert System (Course Co-Developer)
Introduction to Programming (Course Co-Developer)
Programming Language 1: C (Course Co-Developer)
Programming Language 2: C++ (Course Co-Developer)
Algorithms (Course Co-Developer)
Data Structure (Course Co-Developer)
Business Mathematics 1 (Course Co-Developer)
Business Mathematics 2 (Course Co-Developer)
Machine Learning (Teaching Assistant)
Introduction to Artificial Intelligence (Teaching Assistant)

<u>Students/Fellows Supervision</u>
2019 – 2021	Amy Kwarteng (Post-baccalaureate trainee)
2020 – 2021	Karan Luthria (Intern)
2021-2022	Sophia Lou (Post-baccalaureate trainee)
2021-2022	Zachary Demko (Post-baccalaureate trainee)

12. SERVICE TO COMMUNITY

Planning and Management subcommittee	International Conference on Computer and Information Technology (ICCIT)
Reviewer	Journal of Social Network Analysis and Mining (SNAM)
Program Committee Member	Association for the Advancement of Artificial Intelligence (AAAI)
Program Committee Member	Association for Computational Linguistics (ACL)
Program Committee Member	North American Chapter of the Association for Computational Linguistics (NAACL)
Program Committee Member	European Chapter of the ACL (EACL)
Program Committee Member	Empirical Methods in Natural Language Processing (EMNLP)
Program Committee Member	Asia-Pacific Chapter of the Association for Computational Linguistics (AACL-IJCNLP)
Program Committee Member	Representation Learning for NLP (RepL4NLP)
Program Committee Member	Advanced Data Mining and Applications (ADMA)
Reviewer	Advances in Science, Technology and Engineering Systems Journal (ASTESJ)
Reviewer	ACM Computing Surveys