Mohammad R. Amin

Curriculum Vitae

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Current Research Interests

Deep Learning Algorithms for Genome Sequence Analysis
Deep Learning Algorithms for Anomaly Detection
Data Driven Analysis of Large Text Corpora
Scalable Algorithms for High-throughput Genomic Analysis
Natural Language Processing Algorithms

Education

2016 – 2019	**PhD in Computer Science**, *Stony Brook University*, NY, USA.
	PhD Thesis: Homology Based Sequence Alignment and Annotation Algorithms
	Advisor: Professor Steven Skiena
2013 – 2015	**Master of Science in Computer Science**, *Stony Brook University*, NY, USA.
	CGPA: 3.87
2002 – 2007	**Bachelor of Science in Computer Science and Engineering**, *Shahjalal University of Science and Technology (CSE, SUST)*, Sylhet, Bangladesh.
	CGPA: 3.96

Employment

Current	**Assistant Professor**, *Department of CIS, Fordham University*, NY, USA.
	Responsibility: Teaching and Research Activities
Summer 2018	**Research Scientist Intern**, *AWS AI Algorithms, Amazon*, NY, USA.
	Project: "CADENCE: Conditional Anomaly Detection for Events using Noise Contrastive Estimation"
	Manager: Dr. Baris Coskun
Fall 2017	**Research Scientist Intern**, *AWS AI Algorithms, Amazon*, NY, USA.
	Project: "Modeling User Behavior using the CloudTrail Traces in the AWS Environment"
	Manager: Dr. Baris Coskun
Spring 2016	**Research Professor**, *Department of CSE, SUST*, Sylhet, Bangladesh.
	Project: "Bengali Word Embeddings and NLP Applications"
	Host: Professor M Zafar Iqbal
Summer 2015	**Research Assistant**, *Laufer Center for Physical and Quantitative Biology*, Stony Brook University.
	Project: "SHMPrep: Efficient Preprocessing and Error Correction of Paired-end Antibody Sequence"
	Advisor: Professor Thomas MacCarthy
Summer 2014	**Research Assistant**, *Simons Center for Quantitative Biology*, Cold Spring Harbor Lab, NY, USA.
	Project: "Faster Genome Alignment Algorithms for Noisy Oxford Nanopore Sequence"
	Advisor: Professor Michael Schatz
2009 – 2013	**Assistant Professor**, *Department of CSE, SUST*, Sylhet, Bangladesh.
	○ Received 3 Government/Private grants as co-investigator with Professor M Zafar Iqbal (Total Grants: $430,000) for text search engine and screen reading software in Bengali.

- Established the first Bengali Text Retrieval Lab in Bangladesh and launched small scale Bengali News Search Engine, "Pipilika."
- Formed research team to build Bilingual Screen Reading Software, "Mongol Dip," and Bengali Text to Speech Synthesis Software, "Subachan," for visually impaired people.
- Introduced the Machine Learning course in the undergraduate curriculum.

2011 – 2012 **Research Coordinator**, *Center for Research Testing and Consultancy*, CSE, SUST, Bangladesh.

- Launched SMS based registration system for university admission. This system was replicated in every schools in Bangladesh to minimize digital divide across the country.
- Launched cloud platform based centralized National University Admission System for 400 undergraduate colleges to reduce corruption in the admission process at remote colleges.
- Worked as a consultant for the automation of the Bangladesh Inland Water Transportation Authority for Ship Tracking, Accounting Management and Inventory Module.

2007 – 2009 **Team Leader (Software Development)**, *iSearch Team, AfriGIS (Pty) Ltd*, Software development office in Dhaka, Bangladesh.

Contribution: Worked as a team leader of 16 software engineers to develop Location Tagged Information Retrieval system for points of interest (POI) search in South Africa.

Manager: Reffat Zaman

Awards

2017 – 2019	**Institute for Advanced Computational Science (IACS) Graduate Student Fellowship** for leading interdisciplinary research projects in high performance computing (HPC).
2018	**IACS Young Writer's Award** for "DeepAnnotator: Genome Annotation with Deep Learning."
2018	**BASIS National ICT Award** for "Pipilika: Bengali Text Search Engine."
2017	**Best Poster Award at CEWIT** for "Word Embeddings for Genome Annotation with Deep Learning."
2017	**Best Poster Award at IEEE R10 HTC** for "Ribo, a Social Humanoid Robot."
2015	**Best Poster Award at CEWIT** for "Long Nanopore Reads Alignment using NanoBLASTer."
2013	**CS Department Chair Fellowship** from Stony Brook University for excellence in Computer Science.
2012	**Prime Minister's Award** for "Screen Reading Software, Mongol Dip" for the visually impaired people.
2011	**Champion at National Software Contest** for "Bengali News and Blogs Search Engine, Pipilika."
2010	**mBillionth South Asia Award** for "SMS based Registration and Paperless Admission System."
2010	**National e-Content Award** for "SMS based Registration and Paperless Admission System."
2007	**UGC Best Student Award** for achieving record CGPA from the Department of CSE, SUST.
2003 – 2006	**University Scholarship from SUST** for achieving best results in every academic year.
1993	**Primary School Talent-pool Scholarship** by UNICEF and the Government of Bangladesh.

Refereed Publications

- **MR Amin**, Pranav Garg, Baris Coskun. *"CADENCE: Conditional Anomaly Detection for Events Using Noise-Contrastive Estimation."* It will appear in 12th ACM Workshop on Artificial Intelligence and Security, 2019.
- Jason Jones, **MR Amin**, Jessica Kim, Steven Skiena. *"Stereotypical Gender Associations in Language Have Decreased Over Time."* It will appear in Sociological Science, 2019.
- **MR Amin**, Alisa Yurovsky, Steven Skiena. *"DeepAnnotator: Genome Annotation with Deep Learning."* 9th ACM Intl. Conference on Bioinformatics, Computational Biology, and Health Informatics, 2018.
- **MR Amin**, Alisa Yurovsky, Yuping Chen, Steven Skiena, Bruce Futcher. *"Re-annotation of 12,495 prokaryotic 16S rRNA $3'$ ends and analysis of Shine-Dalgarno and anti-Shine-Dalgarno sequences."* PloS one, Volume 3, Issue 8, 2018.
- Alisa Yurovsky, **MR Amin**, Justin Gardin, Yuping Chen, Steven Skiena, Bruce Futcher. *"Prokaryotic coding regions have little if any specific depletion of Shine-Dalgarno motifs."* PloS one, Volume 3, Issue 8, 2018.
- **MR Amin**, Steven Skiena, Michael Schatz. *"NanoBLASTer: Fast Alignment and Characterization of Oxford Nanopore Single Molecule Sequence Reads."* 6th International Conference on Computational Advances in Bio and Medical Sciences, 2016.

○ Arzuba Akter, MM Islam, SI Mondal, Zabed Mahmud, NA Jewel, Sabiha Ferdous, **MR Amin**, MM Rahman. *"Computational identification of miRNA and targets from expressed sequence tags of coffee."* Elsevier Saudi Journal of Biological Sciences, Volume 21(1), 2014.

○ ME Rahman, R Islam, S Islam, SI Mondal, **MR Amin**. *"MiRANN: A Reliable Approach for Improved Classification of Precursor MicroRNA using ANN."* Elsevier Genomics, Volume 99(4), 2012.

Manuscript In Preparation

The following manuscripts are now in preparation:

○ **MR Amin**, Baris Coskun, Ramesh Nallapati. *"Modeling User Behavior with CloudTrail Traces."*

○ **MR Amin**, Jeffrey Chen, Thomas MacCarthy. *"SHMPrep: Efficient Preprocessing and Error Correction Algorithms to Improve Mutation Calls for B Cell Receptor Sequence."*

Other Publications

○ **MR Amin**, Madhusodan Chakraborty. *"Algorithm for Bengali Keyword Extraction."* International Conference on Bangla Speech and Language Processing(ICBSLP), IEEE, 2018.

○ Adnan Ahmad, MR Talha, **MR Amin**, Farida Chowdhury. *"Pipilika N-gram Viewer: An Efficient Large Scale N-gram Model for Bengali Text."* International Conference on Bangla Speech and Language Processing(ICBSLP), IEEE, 2018.

○ Sunny Chowdhury, KMS Islam, SN Mohammad, **MR Amin**, Choudhury Wahid. *"Analysis on Lightning News and Correlation with Lightning Imaging Sensor (LIS) Data."* Emerging Technologies in Data Mining and Information Security, Springer, 2017.

○ Noushad Sojib, Saiful Islam, MH Rupok, Sajid Hasan, **MR Amin**, MZ Iqbal. *"Design and development of the social humanoid robot named Ribo."* IEEE R10 Humanitarian Technology Conference, 2017.

○ SN Mohammad, Sakhawat Hossain, MM Rahman, Mithun Das, **MR Amin**. *"Sachetan: A Crowdsource-Based Personal Safety Application."* Emerging Technologies in Data Mining and Information Security, Springer, 2017.

○ Adnan Ahmad, **MR Amin**. *"Bengali Word Embeddings and it's Application in Solving Document Categorization Problem."* 19th International Conference on Computer and Information Technology, IEEE, 2016.

○ **MR Amin**, Bijan Paul, FA Khan. *"Bi-lingual audio assistance supported screen reading software for the people with visual impairments."* 15th International Conference on Computer and Information Technology, IEEE, 2012.

○ **MR Amin**, AM Samir, Madhusodan Chakraborty, MM Rahman. *"An Efficient Unicode based Sorting Algorithm for Bengali Words."* International Journal of Computer Applications, Vol 24, 2011.

○ Abu Naser, Devojyoti Aich, **MR Amin**. *"Implementation of Subachan: Bengali text to Speech Synthesis Software."* 4th International Conference on Electrical and Computer Engg., IEEE, 2010.

Posters

○ **MR Amin**, Davide Bagnara, Thomas MacCarthy. *"Ultra-Fast Identification of V(D)J Segments using Deep Learning."* Presented in the Meeting of B Cells: Mechanisms in Immunity and Autoimmunity (E4), 2018.

○ **MR Amin**, Jeewoen Shin, Sergio Roa, Jeffery Chen, Anne Geradon, Stephen Meier, Tom MacCarthy. *"SHMPrep: A Fast and User-Friendly Program for Preprocessing Paired-end Immunoglobulin Sequence from Illumina Platforms."* Presented in the Meeting of B Cells and T Follicular Helper Cells: Controlling Long-Lived Immunity (D2), 2017.

○ Noushad Sojib, Saiful Islam, MH Rupok, Sajid Hasan, **MR Amin**, MZ Iqbal. *"Design and development of the social humanoid robot named Ribo."* Presented in the IEEE R10 Humanitarian Technology Conference, 2017.

○ Alisa Yurovsky, **MR Amin**, Steven Skiena. *"Word Embeddings for Genome Annotation with Deep Learning."* Presented in the 13th International Conference & Expo on Emerging Technologies for a Smarter World, 2017.

○ **MR Amin**, Steven Skiena, Michael Schatz. *"NanoBLASTer: Fast Alignment and Characterization of Oxford Nanopore Single Molecule Sequence Reads."* Presented in the 12th International Conference & Expo on Emerging Technologies for a Smarter World, 2015.

Talks

August 2018	**MR Amin**, *DeepAnnotator: Genome Annotation with Deep Learning*, at ACM-BCB Conference.
August 2018	**MR Amin**, *Anomaly Detection in High Cardinality Discrete Space using Noise Contrastive Estimation*, at Amazon NYC Office.
January 2018	**MR Amin**, *Modeling User Behavior in CloudTrail Traces*, at Amazon NYC Office.
August 2016	**MR Amin**, *NanoBLASTer: Fast Alignment and Characterization of Oxford Nanopore Single Molecule Sequence Reads*, at IEEE ICCABS Conference.
May 2016	**MR Amin**, *Application of Deep Learning to Improve NLP Tasks in Bengali*, in the Seminar on Cotemporary Topics at Shahjalal University of Science and Technology, Bangladesh.
April 2013	**MR Amin**, *Pipilika: Search Engine for Websites of Bengali Domain*, in the Pipilika launching ceremony held at Hotel Sheraton, Organized by GrameenPhone Information Technology, Bangladesh.
December 2012	**MR Amin**, *Success Story: Cloud Computing in Bangladesh*, in the Digital World 2012 at Bangabandhu International Conference Center, Bangladesh.

Grants

- Title: "Pipilika: Search Engine for Websites of Bengali Domain"
  PI: Dr. M Zafar Iqbal, Professor of CSE, SUST
  Co-Pi: **MR Amin**, Research Professor of CSE, SUST
  Agency: Access to Information Programme, Prime Minister's Office, Bangladesh
  Duration: July, 2017 - June, 2019
  Amount: $250, 000

- Title: "Pipilika: Small Scale News Search Engine"
  PI: Dr. M Zafar Iqbal, Professor of CSE, SUST
  Co-Pi: **MR Amin**, Assistant Professor of CSE, SUST
  Agency: GrameenPhone IT and Accenture, Bangladesh
  Duration: January, 2012 - June, 2013
  Amount: $150, 000

- Title: "Bilingual Screen Reading Software for Visually Impaired People"
  PI: Dr. M Zafar Iqbal, Professor of CSE, SUST
  Co-Pi: **MR Amin**, Assistant Professor of CSE, SUST
  Agency: Ministry of Science and Technology, Bangladesh
  Duration: July, 2011 - June, 2013
  Amount: $30, 000

Open Source Software

- **NanoBLASTer:** Fast Alignment Algorithms for Oxford Nanopore Noisy Reads. Hosted at Github: `https://github.com/ruhulsbu/NanoBlaster`
- **SHMPrep:** A Fast and User-Friendly Program for Preprocessing Paired-end Immunoglobulin Sequence from Illumina Platforms. Hosted at Github: `https://github.com/ruhulsbu/SHMPrep`
- **DeepAnnotator:** Genome Annotation with Deep Learning. Hosted at Github: `https://github.com/ruhulsbu/DeepAnnotator`
- **GenderAssociations:** Stereotypical Gender Associations in Language Have Decreased Over Time. Hosted at Github: `https://github.com/ruhulsbu/GenderAssociations`
- **BengaliWordEmbeddings:** Bengali Word Embeddings and NLP Applications. Hosted at Github: `https://github.com/ruhulsbu/BengaliWordEmbeddings`
- **MongolDip:** Bi-lingual Audio Assistance Supported Screen Reading Software for the People with Visual Impairments. Hosted at Github: `https://github.com/foru007/Mongol-Dip`
- **Subachan:** Bengali Text to Speech Synthesis Software. Hosted at Github: `https://github.com/foru007/Subachan`

Courses Taught

- NoSQL Database Systems
- Machine Learning
- Algorithm Design & Analysis
- Artificial Intelligence

- ○ Structured Programming Language
- ○ Database System
- ○ Object Oriented Programming Language
- ○ Software Engineering

Advising

- ○ **Nian Liu**, Graduate Research Assistant, 2019.
- ○ **Henry Gorelick**, Graduate Research Assistant, 2019.
- ○ **Kezheng Ziang**, Graduate Research Assistant, 2019.

Programming Competition

- ○ **ACM ICPC World Finals 2012, Poland**: Participated as co-trainer of team SUST Palindrome.
- ○ **SIUPC - 2011, Sylhet, Bangladesh**: Problem setter and member of judging panel for contest.
- ○ **ACM ICPC Regional Contest (Dhaka) 2006**: Placed 5th as contestant among 90 teams.
- ○ **National Programming Competition (Bangladesh) 2005**: Placed 8th among 108 teams.

Skills

C/C++, Java, R, Python, Prolog, LaTeX

MXNet, PyTorch, Keras, OpenMPI

References

- ○ **Professor Xiaolan Zhang**, Department of Computer and Information Science, Fordham University, NY 10458, USA. Email: xzhang@fordham.edu
- ○ **Professor Steven Skiena**, Department of Computer Science, Stony Brook University, NY 11794, USA. Email: skiena@cs.stonybrook.edu
- ○ **Professor Jason Jones**, Department of Sociology, Stony Brook University, NY 11794, USA. Email: jason.j.jones@stonybrook.edu
- ○ **Professor Bruce Futcher**, Department of Molecular Genetics and Microbiology, Stony Brook University, NY 11794, USA. Email: bruce.futcher@stonybrook.edu
- ○ **Professor M Zafar Iqbal**, Department of Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet 3114, Bangladesh. Email: mzi@sust.edu