

# Md Rafsan Jani (Rafsanjani)

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## Research Areas & Interests

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- **Computational Biology & Bioinformatics:** Genomics, Proteomics, -omics, Cancer Biology
- **Machine Learning:** Deep Neural Networks, Bayesian Learning, Sequence Models
- **Artificial Intelligence:** Probabilistic Graphical Models, Bio-inspired Algorithms, Optimization

## Publications

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### JOURNAL PUBLICATIONS

- **Rafsanjani Muhammad\***, Sajid Ahmed\* et al. "PyFeat: A Python-based Effective Features Generation Tool from DNA, RNA, and Protein Sequences" [Accepted in [Bioinformatics](#), Impact Factor: **5.48**, [Github Repository](#)] (\* denotes the equal contribution)
- **Md Rafsan Jani** et al. "iRecSpot-EF: Effective Sequence Based Features for Recombination Hotspot Prediction" [Accepted in [Computers in Biology and Medicine](#), Impact Factor: **2.29**, [Webserver](#)]
- M.S. Rahman, U. Aktar, **Md Rafsan Jani** et al. "iPromoter-FSEn: Identification of Bacterial sigma70 Promoter Sequences Using Feature Subspace Based Ensemble Classifier" [Accepted in [Genomics](#), Impact Factor: **3.16**, [Webserver](#)]
- M.S. Rahman, U. Aktar, **Md Rafsan Jani** et al. "iPro70-FMWin: Identifying Sigma70 Promoters Using Multiple Windowing and Minimal Features" [Accepted in [Molecular Genetics and Genomics](#), Impact Factor: **2.88**, [Webserver](#)]

### BOOK CHAPTERS

- S. Ahmed, F. Rayhan, A. Mahub, **Md Rafsan Jani** et al. "LIUBoost: Locality Informed Underboosting for Imbalanced Data Classification", [Emerging Technologies in Data Mining and Information Security](#) by A. Abraham et al.

### CONFERENCE PUBLICATIONS

- S. Ahmed, A. Mahub, F. Rayhan, **Md Rafsan Jani** et al. "Hybrid Methods for Class Imbalance Learning Employing Bagging with Sampling Techniques" [Accepted in [CSITSS-2017](#)]
- F. Rayhan, S. Ahmed, A. Mahub, **Md Rafsan Jani** et al. "CUSBoost: Cluster-based Under-sampling with Boosting for Imbalanced Classification" [Accepted in [CSITSS-2017](#)]
- F. Rayhan, S. Ahmed, A. Mahub, **Md Rafsan Jani** et al. "MEBoost: Mixing Estimators with Boosting for Imbalanced Data Classification" [Accepted in [SKIMA-2017](#)]

For details of the publication list, please visit: [Google Scholar](#) and [ResearchGate](#).

## Education

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### United International University (UIU)

United City, Dhaka, Bangladesh

B. Sc. IN COMPUTER SCIENCE AND ENGINEERING (CSE) [OVERALL CGPA: 3.32/4.00, THESIS GPA: 4.00/4.00]

February 2014 – May 2018

**Thesis:** Classifying Multi-Class High-Dimensional Imbalanced Datasets employing Active Learning and Data Balancing Methods

**Supervised and co-supervised by** [Dr. Dewan Farid](#) and [Dr. Swakkhar Shatabda](#) respectively.

## Research Projects

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### Python-based Effective Features Generation Tool from Biological Sequences

United International University (UIU)

**RESEARCH OUTCOME:** [BIOINFOMATICS](#) (JOURNAL)

January 2018 – March 2019

The "PyFeat" is an extensive Python-based tool for generating various numerical feature presentation schemes from DNA, RNA, and protein sequences; select the best feature among from previously created vast amount of features. Afterward, it able to train model, to evaluate the model using various machine learning techniques [[Github Repository](#)].

**Supervised by:** Dr. Iman Dehzangi (Assistant Professor, CS, Morgan State University, Baltimore, MD, USA)

### Recombination Hotspot Prediction using Effective Sequence Based Features

United International University (UIU)

**RESEARCH OUTCOME:** [COMPUTERS IN BIOLOGY AND MEDICINE](#) (JOURNAL)

September 2017 – August 2018

The "iRecSpot-EF" predicts recombination of hot and cold spots, and it has a novel set of features extraction technique (position-specific k-mers, and position-specific gapped k-mers) from the genome sequences. We achieved excellent performance, and it is significantly better than the state-of-the-art methods [[Github Repository](#)].

**Supervised by:** Dr. Swakkhar Shatabda (Associate Professor, CSE, United International University, Bangladesh)

## Bacterial $\sigma$ 70 Promoter Sequences Analysis using Machine Learning

United International University (UIU)

RESEARCH OUTCOME: [GENOMICS](#) (JOURNAL), AND [MOLECULAR GENETICS AND GENOMICS](#) (JOURNAL)

January 2018 – June 2018

The “iPromoter-FSEn” is a novel predictor for identification of sigma70 promoter sequences. Employing feature subspace based ensemble classifier, our predictor significantly improves over the state-of-the-art sigma70 promoter sequence predictors [[Github Repository](#)]. We worked “iPro70-FMWin” after completing the previous one with the minimal feature and multi-windowing approach; again, we improve the performances are significantly better than the state-of-the-art methods [[Github Repository](#)].

**Supervised by:** Dr. Swakkhar Shatabda (Associate Professor, CSE, United International University, Bangladesh)

## Professional Experience

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### United International University (UIU)

United City, Dhaka, Bangladesh

RESEARCH ASSISTANT (RA) AT [BIOINFORMATICS RESEARCH LAB](#); AND TEACHING ASSISTANT (TA)

June 2017 – Today

- Under Dr. S. Shatabda (**Project:** DNA Fragment Assembly Problem employing Meta-heuristic Approaches)
- Under Dr. D. Farid (**Course:** Pattern Recognition [[Course Website](#)])

### International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b)

Mohakhali, Dhaka, Bangladesh

RESEARCHER (INTERN) AT GENOMICS AND BIOINFORMATICS LAB

January 2019 – March 2019

- **Project:** Developing a bioinformatics tool for resistance gene identifier for E. coli bacteria [[Github Repository](#)]

## Trainer / Instructor

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### ODIN Offshore Outsourcing

Gulshan, Dhaka, Bangladesh

INSTRUCTOR (BIG DATA WITH PYTHON)

December 2018 – May 2019

- **Course:** Big Data with Python [[Course Website](#), [Lecture Videos](#)]

### Noakhali Science and Technology University (NSTU)

Noakhali, Bangladesh

TRAINER (BIOINFORMATICS AND MACHINE LEARNING)

2 Days Workshop (March 21-22, 2019)

- **Slides:** [[Bioinformatics](#)], [[Machine Learning-1](#), [Machine Learning-2](#)]

## Technical Skills

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- **Programming Languages:** Well-versed in Python, among others (C/C++, Java, R, Shell-Script)
- **Machine Learning Research Tools:** scikit-learn, PyTorch, Keras, NumPy, pandas, matplotlib, MLxtend, NLTK
- **Bioinformatics Research Tools:** BioPython, BLAST (command-line based)
- **Research Writing Tools:** LaTeX, Git/GitHub, Markdown
- **Web Technologies:** Flask Web Framework (based on Python), MySQL, Redis Queue
- **Operating Systems:** Linux-based OS (Ubuntu, Debian) with the firm command line skills and Linux-server configuration
- **Miscellaneous:** Mathematical-Algorithmic Visualization

## Awards & Achievements

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2017 **Champion**, National Robotech Festival [Core: Artificial Intelligence]

Dhaka, Bangladesh

2017 **2<sup>nd</sup> Runner-Up**, National Robotech Festival [Core: Machine Learning]

Dhaka, Bangladesh

## References

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### Dr. Swakkhar Shatabda

United International University (UIU)

ASSOCIATE PROFESSOR, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

United City, Dhaka, Bangladesh

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### Dr. Abdollah ‘Iman’ Dehzangi

Morgan State University

ASSISTANT PROFESSOR, DEPARTMENT OF COMPUTER SCIENCE

Baltimore, Maryland, USA

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### Dr. Dewan Farid

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### Dr. Alok Sharma

Griffith University

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Queensland, Australia

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