Roshni Biswas

Computer Science Engineer · Bioinformatician

N232 242-16, NASA Ames Research Center, Moffett Blvd, Mountain View, CA 94035

(914)-645-0124 | contact@roshnibiswas.tech | roshni-b | roshni079 | US Citizen

Summary

I am presently at *NASA Ames Research Center* working in the Earth Science Division and the Space Biosciences Research Division as a post-bac research intern. I have a keen interest in Bioinformatics and am currently pursuing full time opportunities starting in the summer of 2019.

Work Experience

NASA Ames Research Center — *California, USA*

Post-bac Researcher - Biosphere & GeneLab Groups - Dr. Christopher Potter & Dr. Homer Fogle — *Jan 2019 - Present*

- Programming and analysis for global simulation models and MODIS satellite data sets of land cover change
- Bioinformatics support for GeneLab's sequence data processing

NASA Langley Research Center — *Virginia, USA*

Data Science Research Fellow - OCIO Data Science Team - Charles Liles — *Aug. 2018 - Dec. 2018*

- Studied cloud imagery to better understand the formation and indicators of severe weather
- Implemented image processing & deep learning models for detecting and predicting Above Anvil Cirrus Plumes

GapSummit 2018 — *Cambridge, UK*

Leader of Tomorrow - Global Biotech Revolution — *Feb. 2018 - April 2018*

- As part of Team OneLife pitched "Blockchain medical record as a service" at Voices of Tomorrow bio-innovation contest

NASA Jet Propulsion Laboratory — *California, USA*

Research Fellow - Biotech & Planetary Protection Group - Dr. Kasthuri Venkateswaran & Dr. Nitin K. Singh — *May 2017 - Aug. 2017*

- Studied the effect of spaceflight on shotgun sequenced microbial samples from the International Space Station and JPL SAF
- Developed a software pipeline from open source bioinformatics tools for metagenome sequence data analysis

NIT-K Surathkal — *Mangalore, India*

Visting Student Intern - Speech & Audio Processing - Prof. Shashidhar G Koolagudi — *May 2016 - July 1016*

- Implemented and evaluated various pitch detection algorithms using MATLAB
- Developed a tool that records, processes and assesses musical pitch

Education

National Institute of Technology (NIT), Rourkela — *Rourkela, India*

Bachelors of Technology in Computer Science and Engineering — *Jul. 2014 - Jun. 2018*

- Graduated with a First Class Bachelors - 7.0/10
- Bachelor's Thesis: ECG signal analysis, feature extraction and classification of Arrhythmic heartbeats in human beings.

Mahadevi Birla World Academy — *Kolkata*

High School Diploma - Central Board of Secondary Education (CBSE) — *Jul. 2012 - Jun. 2014*

- High school coursework in Math, Physics, Chemistry, Biology and English

Skill-Set

Programming Python · MATLAB · R · C++ · C · HTML · CSS · IDL · LaTeX

Tools/Libraries Tensorflow · Keras · OpenCV · Biopython · Bioconductor · Scikit · Git · ArcGIS

Languages English · Bengali · Hindi

Coursework

Introductory Computer Architecture · Computer Networks · Computer Graphics · Electrical & Electronics · Digital Communication

Intermediate Machine Learning · Discrete Mathematics · Software Engineering · Operating Systems · Data Structures & Algorithms

MOOCs Bioinformatics Methods I (UToronto) · Using Python For Research (HarvardX) · Python for Genomic Data Science (JHU)

Honours & Awards

International

2018	**Top 100**, Leaders of Tomorrow by Global Biotech Revolution	*Cambridge, UK*
2017	**Winner**, Caltech Summer Undergraduate Research Fellowship	*California, USA*
2014	**Top 50**, 4-year Undergraduate SPDC Scholar for Persons of Indian Origin	*Kolkata, India*

Domestic

2017	**Winner**, Leo Omega Club President, Lions International	*Rourkela, India*
2014	**Winner**, CBSE Problem Solving Assessment - 97.8 Percentile	*Kolkata, India*
2011	**Winner**, MBWA Extra Curricular Star of the Year - Krida Kunj	*Kolkata, India*

Projects

Deep Learning on Above Anvil Cirrus Plumes
NASA Langley, USA

Python · OpenCV · Tensorflow · Keras — *Sept. 2018 - Dec. 2018*

- Preprocessed IR imagery & Radar information in OpenCV, NumPy and Pandas; Labelled GOES-16 Satellite imagery using LabelMe
- Implemented U-Net convolutional neural network model using Tensorflow and Keras to predict intense cloud plume formations

ECG Singal Anlaysis & Arrhythmia Classification
NIT Rourkela, India

Python · MATLAB — *Aug. 2017 - April 2018*

- Used MIT-BIH Arrhythmia Dataset to perform signal analysis and detect arrhythmia in human heartbeats
- Used Digital Signal Processing techniques to detect and segment ECG recordings and obtain features for each heartbeat
- Implemented PCA and two ML classification models using neural networks and support vector machines

Space Metagenomic Data Analyzer Pipeline
NASA JPL, USA

Python · R · Trimmomatic · MegaHit · Prokka · MetaPhlAn2 — *May 2017 - July 2017*

- QC, Filtering and Trimming of 420+ shotgun Illumina-sequenced metagenomic samples from ISS & JPL-SAF datasets
- Crafted a software pipeline using open source tools like MegaHit for Assembly, Prokka for Annotation and MetaPhlAn2 for Profiling
- Generated standard compliant outputs with OTU tables & heatmap images explaining seasonal diversity and abundance profiles
- Benchmarking and comparison of processed data with other similarly established pipelines

Pitch Recording and Assessment Tool
NITK Surathkal, India

MATLAB · Python — *May 2016 - July 2016*

- Recorded and collected vocal audio samples from singers of varied expertise to build a dataset for the project
- Implemented a sawtooth waveform inspired pitch estimator to determine and plot fundamental frequency levels
- Objectively analyzed and assessed accuracy levels of singers in units of cents and demonstrated its correlation with expertise

Bird Migration Tracking
Kolkata, India

Python — *Dec, 2016*

- Manipulated, examined and visualized tracked GPS data of 3 migrating seagulls in Python using Pandas, NumPy and Cartopy

Publications

6th International Conference on Advanced Computing, Networking, and Informatics
NIT Silchar, India

Presenter — *April 2018*

- Roshni Biswas, Y. V. Srinivasa Murthy, Shashidhar G. Koolagudi, Vishnu Swaroop G., **"Objective Assessment of Pitch Accuracy in Equal-Tempered Vocal Music Using Signal Processing Approaches"**, Proceedings of the Sixth ICACNI, Springer, 2018

Activities & Interests

Leo Club of Rourkela - Lions International
NIT Rourkela, India

President (2017-18) | Vice President (2016-17) | Core Volunteer — *June 2014 - June 2018*

- Led an 80 member Community Service team under the youth wing of Lions Club International
- Managed 20+ projects for the benefit of the under-privileged in and around the township of Rourkela
- Conceptualised and started an annual pre-Diwali cultural program at Shanti Bhawan old-age home, Missionaries of Charity

Microsoft Campus Club
NIT Rourkela, India

Content Head | Core Member — *Sep. 2014 - Apr. 2018*

- Organized several coding contests, online treasure hunts, appathons and workshops
- Head of the content team and Manager of the tech-blog