# Nabin Giri

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## Education

**University of Missouri** **January 2021 – December 2025**

*PhD Student in Computer Science, Current GPA: 3.884/4.0* *Columbia, Missouri*

**University of Central Missouri** **May 2018 – May 2020**

*Masters of Science in Computer Science, Overall GPA: 3.58/4.0* *Warrensburg, Missouri*

**Bangalore University** **May 2011 – May 2014**

*Bachelors of Computer Application, First Class Honors* *Bangalore, India*

## Relevant Coursework

- Machine Learning
- Artificial Intelligence
- Advanced Algorithms
- Neural Networks
- Computational Methods in Bioinformatics
- Structural Biology and Biophysics Life Science
- Computational Modeling of Molecular Structures
- Systems Programming

## Research Experience

**Bioinformatics and Machine Learning Lab, Advisor: Dr. Jianlin Cheng** **January 2021 – Present**

*Graduate Research Assistant, University of Missouri* *Columbia, Missouri*

- Developed a deep learning bioinformatics approach to model protein-ligand interaction with cryo-EM data in 2021 Ligand Model Challenge
- Developed and trained transformer model with the self-attention mechanism to reconstruct the 3D structure of protein complex from 3D cryoEM density map
- Trained model on summit supercomputer using distributed data parallel (DDP) and distributed data parallel sharded (DDP-sharded) techniques on multiple GPUs enabled by PyTorch Lightning
- Developed process-based parallelism scripts to preprocess data parallelly utilizing all physical cores of a node in python
- Developed scripts to generate graphs of 3D protein density maps parallelly on multiple nodes (380 nodes). Created 3032 tasks with 4 cores per task running parallelly using message passing interface (MPI) for the python package
- Developed an approach to perform node classification using graph neural networks. Input to the model is the 3D cryoEM density map and the output is the 3D cryoEM map with alpha carbon and backbone atoms classified per voxel

**Master's Thesis, Advisor: Dr. Yui Man Lui** **May 2020**

*Recommendation System Using Factorization Model and MapReduce Framework* *Warrensburg, Missouri*

- Participated and presented research on Three Minute Thesis competition at the University of Central Missouri
- Developed an unified toolkit that can process different collaborative filtering algorithm simultaneously
- Trained model using gradient descent algorithm. Program available at GitHub repository
- Infer phase is deployed in Amazon Elastic MapReduce (Amazon EMR) cluster leveraging distributed computing approach of MapReduce framework

## Professional Experience

**Max International** **March 2017 – April 2018**

*System Engineer, Head of Department* *Kathmandu, Nepal*

- Managed and lead a team of six system and network engineers to coordinate, and complete projects
- Designed and configured failover clustering of ESXi hypervisors, storage and mapped RAID configured storage to VMWare host as datastore
- Configured VMWare vSphere replication for disaster recovery in virtual machines
- Configured clustered active directory domain services and hybrid exchange server with some users in O365 and others in-premises exchange server
- Reconfigured and reimage Dell storage SCv2020 operating system with support from Dell technical team

**Capgemini** **October 2014 – October 2016**

*Software Engineer* *Bangalore, India*

- Developed scripts and formula for BMC remedy tool, Windows Server and excel to automate tasks
- Resolved server issues and provided root cause analysis report (RCA) for system problems
- Single point of contact for windows server patching and providing consolidated patched reports to teams
- Worked on Wintel team as a Windows Server and VMWare infrastructure engineer
- Helped developers to write C++ programs, wrote technical documentation on memory management in C++

## Technical Skills

**Languages**: Python, C++, Bash, SQL
**Tools**: High Performance Computing, PyCharm, Visual Studio, Amazon Web Services, Google Cloud Platform, PyRosetta, UCSF ChimeraX, PyMOL, LaTeX
**Technologies/Frameworks**: PyTorch, PyTorch Lightning, PyTorch Geometric, Deep Graph Library, Linux, GitHub

## Extracurricular

**Nepalese UCM Association** **May 2018 – May 2020**
*President* *University of Central Missouri*

- Led Nepalese community to work towards common goals of preserving and promoting Nepalese culture at the university
- Organized events for domestic and international students to celebrate different festivals of Nepal together
- Assisted new incoming Nepalese student for a smooth transition to American teaching method and culture

**James C Kirkpatrick Library** **May 2018 – May 2020**
*Graduate Student Worker* *University of Central Missouri*

- Migrated physical rhetor books of library to an online repository – Amazon Glacier
- Managed digital materials of the library by Sierra Library System and cloud-based Ex Libris Alma service platform
- Led meetings and discussion sections with team members and faculty about managing the library during off-hours
- Provided training to new team members on using Ex Libris Alma service to manage library materials
- Advised graduate students about research materials and workshops at the library

**Graduate International Student Services** **August 2018 – August 2019**
*International Students Ambassador* *University of Central Missouri*

- Lead a team of six members for organizing and managing International Education Week 2018 at the university
- Organized and presented event's agenda to student experience and engagement office to generate funds for the events
- Hosted international student orientation and assisted international students' requests for two academic semesters

**Graduate Education and Research** **December 2019**
*Graduate Research Workshop Series* *University of Central Missouri*

- A semester long graduate research workshop on topics to perform literature review, performing research on graduate level and paper citing formats

## Awards and Memberships

**Spring 2022 Research Forum** **April 2021**
*Undergraduate research abstract reviewer* *University of Missouri*

- Liaised with undergraduate research department to review and advise undergraduates on their research abstracts

**IEEE/ACM Transactions on Computational Biology and Bioinformatics** **December 2021 - Present**
*Manuscript Reviewer* *IEEE/ACM*

- Review manuscripts related to bioinformatics and machine learning

**Member of Upsilon Pi Epsilon-Gamma Chapter** **September 2021 - Present**
*An Honor Society in Computer Science* *University of Missouri*

**Graduate Education and Research** **May 2020**
*Graduate Research Award* *University of Central Missouri*

- Research grant for using Amazon Web Services (AWS) for master's thesis especially, the Amazon EMR Cluster

**Strata Data Conference** **March 2019**
*Conference Scholarship - Gold Pass* *O'Reilly Media, Inc*

- Three-day conference gold pass and gift card to attend Strata Data Conference

**Graduate Housing Scholarship** **January 2020 – May 2020**
*Webb Housing* *University of Central Missouri Graduate School*

- Graduate housing scholarship based on academic performance

**Microsoft Partner Meet** **January 2020 – May 2020**
*Second place in competition* *Microsoft Partner Meet Nepal*

- Designed solution to the problem with three team members using Microsoft system center components (ranked $2^{nd}$ among 15 teams)

## Publication

- **Nabin Giri** and Jianlin Cheng (2021). **A Deep Learning Bioinformatics Approach to Modeling Protein-Ligand Interaction with cryo-EM Data in 2021 Ligand Model Challenge** *Manuscript in preparation*
- Mu Gao, Peik Lund-Andersen, Alex Morehead, Sajid Mahmud, Chen Chen, Xiao Chen§, **Nabin Giri**, Raj S. Roy, Farhan Quadir, T. Chad Effler, Ryan Prout, Subil Abraham, Jeffery Skolnick, Jianlin Cheng, Ada Sedova (2021). **High-Performance Deep Learning Toolbox for Genome-Scale Prediction of Protein Structure and Function** *2021 IEEE/ACM Workshop on Machine Learning in High Performance Computing Environments (MLHPC)*

## Conferences

**$S^2C^2$ CryoEM Map Modeling and Validation Workshop** **September 8 – September 10, 2021**

*Stanford-SLAC Cryo-EM Center* *Stanford University*

- Discussed the latest developments of tools for building, refining, and validating models of cryoEM maps
- Tutorials on improving maps, building, refining, and validating models using different functions of PHENIX tool
- Tutorials to fetch, search, predict models using AlphaFold in UCSF ChimeraX, and map model overlay
- Tutorials on deposition, validation, biocuration at WWPDB and protein data bank file format

**Strata Data Conference** **March 25 – March 28, 2019**

*O'Reilly Media, Inc* *Moscone Center, California*

- Sessions attended and learned on spark, evaluation of machine learning algorithms, and kubernetes

**Strata Data Conference** **September 12 – September 13, 2018**

*O'Reilly Media, Inc* *Javits Center, New York*

- Moderator between speaker and audience at the conference. Volunteered as a room host
- Training attended on using deep learning approach for recommendation system

**Dell EMC Storage Training** **April 2018**

*DELL Technologies* *Cyberjaya, Malaysia*

- Three day rigrous training on VxRail, Unity and SC Series All-Flash Storage of Dell