#### **Sutanu Bhattacharya, Ph.D.**

Department of Computer Science and Software Engineering

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## **Education**

## Ph.D. in Computer Science and Software Engineering Fall 2021

Auburn University, USA

Advisor: Dr. Debswapna Bhattacharya

G.P.A: 3.79

M.Tech in Distributed and Mobile Computing June 2014

Jadavpur University, India

Advisor: Dr. Pampa Sadhukhan

C.G.P.A: 8.11

B.Tech in Information Technology June 2011

Bengal Institute of Technology, India

C.G.P.A: 7.67

## **Employment**

**Assistant Professor**, Computer Science and Engineering Department, Chaibasa Engineering College, India, July 2014 – Aug 2017.

**Teaching Experience**

**As a Teaching Assistant at Auburn University** (Fall 2017 – Summer 2020)

1. Fundamental of Computing I (COMP 1210): It introduces the fundamentals of computing as well as certain aspects of software engineering, which enables students to construct logical, readable, and correct programs. I was a lab instructor of this course from Fall, 2017 to Spring, 2019. My supervisor was Dr. James Cross.

2. Computational Intelligence & Adversarial Machine Learning (COMP 5970/6970): It is a graduate-level course, which introduces concepts of Evolutionary Computation, Machine learning techniques such as SVM, NN, Naïve Bayesian Classifiers, Adv Machine learning. I was a TA of this course in Fall, 2019 and my supervisor was Dr. Gerry Dozier.

*ONLINE*

3. Introduction to Computer Science I & II (CPSC 1213 and 1223): These courses are the online version of COMP 1210. I was a (virtual) lab instructor of this course from Fall, 2018 to Spring, 2020. My supervisor was Dr. James Cross.

4. Data Structures (CPSC 1233): It is designed to introduce fundamental data structures and associated algorithms, as well as applications in which they are commonly used. I was a (virtual) lab instructor of this course in the Summer, 2020 and my supervisor was Dr. Dean Hendrix.

**As an Assistant Professor at Chaibasa Engineering College** (July 2014 – August 2017)

1. Discrete Mathematics (MH1401): This course was designed for fourth-semester undergraduate Computer Science and Engineering (C.S.E.) students, which covered Logic, Set, Relation, Function, Induction and Recursion, Counting, Graphs, and Trees. I supervised this course, where the number of enrolled students was 46 (2013-17 batch) and 49 (2014-18 batch).

2. Operating System (CS1504): This course covered Thread, Process Management, Memory Management, and Disk Management. I supervised this course, where the number of enrolled students was 48 (2014-18 batch). This course is designed for fifth-semester undergraduate C.S.E. students.

3. Digital logic (CS1302): This course covered the Combinational Logic circuit as well as the Sequential Logic Circuit with applications. Around 50 third-semester undergraduate students of the C.S.E. department of 2013-17 and 2014-18 batches, respectively, took this course.

4. Data Structure using C (CS1402): Fourth-semester undergraduate C.S.E. students of 2013-17 and 2014-18 batches as well as fifth-semester undergraduate Electrical Engineering (E.E.) students of 2013-17 batch took this course, where Array, Linked List, Stack, Queue, Sorting and Searching, Tree, and Graph were covered in C.

5. Analysis and Design of Algorithm (CS1606): Sixth-semester undergraduate C.S.E. students of 2013-17 batch took this course, where Elementary Data Structures, Sorting, Hashing, Trees, Graphs, Dynamic Programming, and Greedy Algorithms were covered.

6. Formal Language and Automata Theory (CS1501): Fifth-semester undergraduate C.S.E. students of 2013-17 batch took this course where Finite automata, Context-free Grammars, Decidability, and Intractability were covered. The number of enrolled students was 46.

7. Programming in Python: Almost 50 students took this course as their summer training in 2017, and it covered Control flow, Function and Module, Files, Input/Output, List, and Dictionary.

8. Programming in C: I tutored around 20 struggling students in 2015 and 2016. It covered Control flow, Function, Arrays, Pointers, Structures, and Files. Since C was the first programming language that they were learning, I guided students one-to-one to enable them to do well in learning C.

9. Introduction to Computing (CS1201): This was an introductory course offered to freshman undergraduate students. The number of enrolled students was 92, 94, and 87 in 2014, 2015, and 2016, respectively.

## **Research Experience**

Ph.D. dissertation research Fall 2017 – Present

Advisor: Dr. Debswapna Bhattacharya, Assistant Professor

Title:New computational and data-driven methods for protein homology modeling (Publication in Nature Scientific Reports, PROTEINS, PLOS, Bioinformatics, Frontiers; and two other manuscripts under review)

Institute: Auburn University

Part-time research December 2015 – April 2017

Advisor: Dr. Bivas Mitra, Associate Professor

Title: Impact of mentioning in Twitter and modelling retweet dynamics using Hawkes process

Institute: Indian Institute of Technology, Kharagpur, India

M.Tech thesis July 2013 – April 2014

Advisor: Dr. Pampa Sadhukhan, Assistant Professor

Title: Impact of the placement strategies of access points on the performance of clustering-based fingerprinting localization system

Institute: Jadavpur University, India

## **Technical Skills**

*Data Science Tools:* Python3, TensorFlow 2.0, Keras, scikit-learn, R

*Data Visualization Tools:* Matplotlib, Seaborn, Microsoft Excel

*Molecular Visualization Tools:* PyMOL, Chimera

*Languages known:* Python, C, C++, Java, Perl, R

*Misc.:* Academic Research, Teaching

## **Honors and Awards**

(6) Our work has been awarded **Best Poster** in the 11th ACM-BCB conference (Virtual), Sept 21-24, 2020.

(5) Our work has been selected for [**Highlight Talk**](https://doi.org/10.1145/3307339.3342624)in the 10th [ACM-BCB](http://acm-bcb.org/2019/index.php) conference, Niagara Falls, NY, Sept 7-10, 2019.

(4) Paper got published as the [**Front Cover Article**](https://doi.org/10.1002/prot.25705) in the July 2019 issue of PROTEINS: Structure, Function, and Bioinformatics journal.

(3) Awarded [**Young Research Excellence Award**](https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-020-03580-9) (2nd place) at 16th Annual MCBIOS Conference, Birmingham, USA, 2019.

(2) Awarded Travel grant to attend 16th Annual MCBIOS Conference, Birmingham, USA, 2019.

(1) A.I.C.T.E. **National Scholarship** for M.Tech at Jadavpur University, Kolkata, India [2012 – 2014].

#### **Peer-reviewed Publications**

*Book Chapter*

(1) **S. Bhattacharya,** R. Roche, M. H. Shuvo, D. Bhattacharya, “Contact-assisted threading in low-homology protein modeling”, Methods in Molecular Biology, by **Springer Nature**, 2021 (Under revision). *(Impact Factor: 10.71)*

*Journals*

(7) **S. Bhattacharya,** R. Roche, M. H. Shuvo, D. Bhattacharya, “Recent advances in protein homology detection propelled by inter-residue interaction map threading”, **Frontiers in Molecular Biosciences**, 8, 377 (2021). *(Impact Factor: 3.590)*

(6) R. Roche, **S. Bhattacharya**, D. Bhattacharya, “Hybridized distance- and contact-based hierarchical structure modeling for folding soluble and membrane proteins”, **PLOS Computational Biology, 17(2): e1008753**, (2021). *(Impact Factor: 4.428)*

(5)A. McGehee, **S. Bhattacharya**, R. Roche, D. Bhattacharya, “PolyFold: An interactive visual simulator for distance-based protein folding”, **PLoS ONE**, 15(12): e0243331 (2020). [**Best Poster Award**]. *(Impact Factor: 2.740)*

(4) **S. Bhattacharya**, R. Roche, D. Bhattacharya, “DisCovER: distance- and orientation-based covariational threading for weakly homologous proteins”, **bioRxiv**, (2020). (Under revision) [**First method to utilize inter-residue orientation into threading**].

(3)M. H. Shuvo, **S. Bhattacharya**, D. Bhattacharya, “QDeep: distance-based protein model quality estimation by residue-level ensemble error classifications using stacked deep residual neural networks", **ISMB Proceedings**, **Bioinformatics**, 36(S1): i285-i291 (2020). *(Impact Factor: 5.610)*

(2) **S. Bhattacharya**, D. Bhattacharya, “Evaluating the significance of contact maps in low-homology protein modeling using contact-assisted threading”, **Nature** **Scientific Reports**, 10(1), 1-13 (2020). *(Impact Factor: 3.998)*

(1) **S. Bhattacharya**, D. Bhattacharya, “Does inclusion of residue‐residue contact information boost protein threading?”, **Proteins: Structure, Function, and Bioinformatics**, 87(7): 596-606 (2019). [**Front Cover Article**], [**Highlight Talk**], [**Top Downloaded Paper** of 2018-2019 by WILEY]. *(Impact Factor: 2.499)*

*Abstracts*

(2) **S. Bhattacharya**, D. Bhattacharya, “How Effective is Contact-assisted protein threading?”, **BCB’19**: Proceedings of the 10th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics, September 2019, Pages 553 (2019).

(1) **S. Bhattacharya**, D. Bhattacharya, “Contact-assisted protein threading: an evolving new direction”, **BCB’19**: Proceedings of the 10th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics, September 2019, Pages 536 (2019).

**Posters**

(6) **S. Bhattacharya**, R. Roche, D. Bhattacharya, “A new distance- and orientation-based covariational threading methods for remote-homology threading”, 29th ISMB/ECCB conference, Virtual Event, July 25-30, 2021. (Accepted)

(5) A. McGehee, **S. Bhattacharya**, R. Roche, D. Bhattacharya, “PolyFold: An interactive visual simulator for distance-based protein folding”, 11th ACM-BCB Conference, Virtual Event, Sept 21-24, 2020. (**Best Poster Award**)

(4) **S. Bhattacharya**, D. Bhattacharya, “Contact-assisted protein threading: an evolving new direction”, 2019 Graduate Engineering Research Showcase, Auburn University, USA, November 7, 2019.

(3) **S. Bhattacharya**, D. Bhattacharya, “Contact-assisted protein threading: an evolving new direction”, 10th [ACM-BCB](http://acm-bcb.org/2019/index.php) Conference, Niagara Falls, NY, Sept 7-10, 2019. [[pdf](http://webhome.auburn.edu/~szb0134/files/AU_GERS_2019_v1.0.pdf)]

(2) **S. Bhattacharya**, D. Bhattacharya, “Does inclusion of residue‐residue contact information boost protein threading?”, 16th Annual MCBIOSConference, Birmingham, USA, March 28-30, 2019. [[pdf](http://webhome.auburn.edu/~szb0134/files/poster_MCBIOS2019.pdf)]

(1) **S. Bhattacharya**, D. Bhattacharya, “A new contact-assisted threading approach for predicting more accurate protein 3D structure”, 2018 Graduate Engineering Research Showcase, Auburn University, USA, October 28, 2018.

**Oral Presentations**

(4) **S. Bhattacharya**, R. Roche, D. Bhattacharya, “DisCovER: distance- and orientation-based covariational threading for weakly homologous proteins”, 29th ISMB/ECCB conference, Virtual Event, July 25-30, 2021. (Accepted)

(3) **S. Bhattacharya**, D. Bhattacharya, “How Effective is Contact-assisted Protein Threading?”, 10th [ACM BCB](http://acm-bcb.org/2019/index.php) Conference, Niagara Falls, NY, Sept 7-10, 2019. (**Highlight Talk**)

(2) **S. Bhattacharya**, D. Bhattacharya, “Does contact information powered by deep learning boost protein threading?”, Student Symposium, Auburn University, USA, April 9, 2019.

(1) **S. Bhattacharya**, D. Bhattacharya, “Does inclusion of residue‐residue contact information boost protein threading?”, 16th Annual MCBIOSConference, Birmingham, USA, March 28-30, 2019. (**Won 2nd place in student oral presentation**). [[News](https://eng.auburn.edu/news/2019/04/sutanu-bhattacharya-mcbios.html), [Proceedings](https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-020-03580-9)]

#### **Service & Outreach**

(1) External reviewer at IEEE-BIBM conference, San Diego, CA, USA. 2019

#### **Professional Memberships**

(1) International Society for Computational Biology (ISCB) Since 2021

#### **References**

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