Professor Saugata Hazra – CV

1. Personal details

Name	Dr. Saugata Hazra
Present position(s)	Assistant Professor of Department of Biotechnology, IIT-Roorkee (May 2014 – present) Adjunct Faculty, Centre of Nanotechnology, IIT-Roorkee
Employing organisation	Indian Institute of Technology Roorkee
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2. Qualifications

Date of qualification	Title of qualification
2010	PhD in Protein Engineering, Structural Biology & Drug Designing (University of Illinois at Chicago, USA)
2004	MTech in Biotechnology and Biochemical Engineering (IIT-Kharagpur, India)
2002	MSc in Biophysics and Molecular Biology (University of Calcutta, India)

3. Previous positions held

Date of post (start – end)	Job title	Institution
07/2011 – 05/2014	Postdoctoral Research Associate	Albert Einstein College of Medicine, NY, USA
07/2010 – 06/2011	Postdoctoral Research Fellow	St Jude Children's Research Hospital, Memphis, USA

4. Summary of scientific career and selected relevant activities

I completed my PhD in 2010 in the University of Illinois at Chicago (UIC) and was recipient of prestigious GEMS fellowship throughout the program. I then moved to St. Jude Children Cancer Centre as a postdoctoral researcher (2010-2011) and then as research associate (2011-2014) in Albert Einstein Medical College, NY, USA. Major focus of my work was on structural, biophysical and biochemical understanding of enzymes correlating to their function. In this time our work was selected in prestigious international conferences organized by IUCR, EMBO etc. I joined IIT Roorkee Department of Biotechnology in May-2014 as Assistant Professor and was promoted to Senior Assistant Professor in Oct-2017. I was also appointed as an adjunct professor in Center of Nanotechnology, IIT Roorkee on 2015. With my IITR team and collaborators from across the world, I focus on antimicrobial resistance, biochemical assay development, biochemical reaction profile development towards novel diagnostics, therapeutics etc. Antibiotic resistance has been considered as one of the biggest global concern. Without anti-microbials combating deadly pathogens would be beyond our control leading to a situation called as "diagnose for death". Major goal of Hazra lab is to study enzymes which are playing critical role in emergence of antimicrobial resistance. We are taking an interdisciplinary approach to understand catalytic divergence of enzymes involving peptidoglycan synthesis, folate biosynthesis pathway etc. towards development of diagnostics and therapeutics utilizing our above mentioned understandings. I have authored approximately 45 peer reviewed journal papers and published in high impact journals such as *Nature Communication*, *Hypertension*, Different ACS journals like Biochemistry, JMC, ACS Sustainable Engineering, ACS Agriculture and Food Engineering etc. I have one international patents issued and four under processing.

Webpage: http://bit.do/saugata-hazra

5. Selected dissemination activities

- Organized International Symposium on "Antibiotic Resistance – One Health Perspective" at IITR, 5-11 March 2019.
- Organized Short term Course on "Methods and techniques in integrated Structural Biology: Toward structure based drug development" at IITR, 15-20 January, 2018 under MHRD Scheme on Global Initiative on Academic Network (GIAN).

6. Grants (highly selected)

Funding body	Grant title	Grant value awarded	Start &end dates
Govt. Of India	Combating Carbapenem Resistant Enterobacteriacae (CRE): Using combinatorial approach of conventional therapeutics and theranostic nanomedicine	INR 110 Lakh	2019-2021
UKERI	Combating Carbapenem Resistant Enterobacteriacae	INR 12 Lakh	2019-2021
DBT-BIRAC	*Edible oil blend from lignocellulosic pentosans and other inexpensive raw materials.*	INR 43 Lakh	2018-2020
ICMR, India	Developing novel antimicrobial therapeutics by exploring multi-enzyme targets.	INR 50 Lakh	2017-2020
SERB, DST	Development of Novel therapeutics against drug resistant beta-lactamases.	INR 23 Lakh	2015-2019
MHRD, Govt. Of India	Identification and characterization of novel inhibitors against medicinally important beta-lactamase.	INR 10 Lakh	2014-2017

7. Invited Presentations (Selected from 2018-2019 only)

- New strategies to combat against Antimicrobial Resistance. *National Conference*, Gurukula Kangri Vishwavidyalaya, Haridwar, March 09, 2019.
- How to combat against drug resistant microorganisms-An Interdisciplinary approach from Hazra Lab. International Conference MSMM2019, Jawaharlal Nehru University, 30th January – 1st February, 2019.
- In-vivo, in-vitro and in-silico approaches for understanding enzyme beta-lactamase towards development of new generation therapeutics - "Probing Biology: in vivo, in vitro and in silico VI", University of Calcutta, 26th February, 2018.
- Modulating **"OM"** using **"OMICS"**: A novel approach to combat against drug resistance beta-lactamase. Annual Lecture Series under DBT STAR Program, Maulana Azad College, Kolkata, 4th August, 2018.

8. Awards and Honours

- Royal Academy of Engineering Award (2017)
- DST-SERB Young Scientist Award (2014)
- University of Illinois at Chicago (UIC), GEMS Scholarship 2004-10 (the most prestigious of the UIC fellowships).
- GATE Scholarship (All India Rank: 3rd, 99.89 Percentile)
- CSIR NET Scholarship (2002)

9. List of Publication:

1. S Bhattacharya, V Junghare, NK Pandey, D Ghosh, H Patra, **Saugata Hazra**. An insight into the complete biophysical and biochemical characterization of novel class A beta-lactamase (Bla1) from Bacillus anthracis. International Journal of Biological Macromolecules, 2020, 145, 510-526
2. G Kalyan, V Junghare, S Bhattacharya, **Saugata Hazra**. Understanding structure-based dynamic interactions of antihypertensive peptides extracted from food sources. Journal of Biomolecular Structure and Dynamics, 2020, 1-15

3. Tripti Sharma, Diptarka Dasgupta, Preeti Sagar, Arijit Jana, Neeraj Atray, Siddharth S Ray, Debashish Ghosh, **Saugata Hazra**. Renewable Hydrocarbon from Biomass: Thermo-Chemical, Chemical and Biochemical Perspectives. Frontiers in Soil and Environmental Microbiology, March, 2020, 147-158
4. Swati Mohapatra, Nitish Pandey, Saikat Dey, Diptarka Dasgupta, Parsenjit Mondal, Debashish Ghosh, **Saugata Hazra**. Production of Biodegradable Polymers (PHAs) by Soil Microbes Utilizing Waste Materials as Carbon Source. Frontiers in Soil and Environmental Microbiology, March, 2020, 237-246
5. N Bansal, D Dasgupta, **Saugata Hazra**, T Bhaskar, A Ray, D Ghosh. Effect of utilization of crude glycerol as substrate on fatty acid composition of an oleaginous yeast Rhodotorula mucilagenosa IIPL32: Assessment of Nutritional Indices. Bioresource Technology, April 2020
6. Ayan Banerjee, Tripti Sharma, Abhilek K Nautiya, Diptarka Dasgupta, **Saugata Hazra**, Thallada Bhaskar, Debashish Ghosh. Scale-up strategy for yeast single cell oil production for Rhodotorula mucilagenosa IIPL32 from corn cob derived pentosan. Bioresource Technology April 2020
7. G Kalyan, V Junghare, A Chattopadhyay, P Mitra, **Saugata Hazra**. Parsers, Data Structures and Algorithms for Macromolecular Analysis Toolkit (MAT): Design and Implementation. Biorxiv, 2019
8. Singh R*, Junghare V*, **Hazra Saugata**, Singh U, Sengar G, Raja T, Kumar S, Tyagi S, Das A, Kumar A, Koringa P, Jakhesara S, Joshi C, Deb R. Database on spermatozoa transcriptogram of catagorised Frieswal crossbred (Holstein Friesian X Sahiwal) bulls. Theriogenology; (In Press, Accepted Manuscript).
9. Sheetal Bandhu, Neha Bansal, Diptarka Dasgupta, Vivek Junghare, Arushdeep Sidana, Gazal Kalyan, **Saugata Hazra**, Debashish Ghosh. Overproduction of single cell oil from xylose rich sugarcane bagasse hydrolysate by an engineered oleaginous yeast Rhodotorula mucilaginosa IIPL32; 2019, Fuel 254, 115653
10. Omvir Singh, Tripti Sharma, Indrajit Ghosh, Diptarka Dasgupta, Bhanu Prasad Vempatapu, **Saugata Hazra**, Alexander L Kustov, Bipul Sarkar, Debashish Ghosh. Converting Lignocellulosic Pentosan-Derived Yeast Single Cell Oil into Aromatics: Biomass to Bio-BTX; ACS Sustainable Chemistry & Engineering, 2019, 7 (15), 13437-13445
11. Das V, Bhattacharya S, Chikkaputtaiah C, **Hazra Saugata**[#], Pal M[#]. The basics of epithelial-mesenchymal transition (EMT): A study from a structure, dynamics, and functional perspective. J Cell Physiol. 2019 Feb 5. doi: 10.1002/jcp.28160.
12. Bhattacharya S, Bhattacharya S, Gachhui R, **Hazra Saugata**, Mukherjee J. U32 collagenase from Pseudoalteromonas agarivoransNW4327: Activity, structure, substrate interactions and molecular dynamics simulations. IJBM, 2019; 124:635-650.
13. Padhi A, **Hazra Saugata**. Insights into the role of D-amino acid oxidase mutations in amyotrophic lateral sclerosis. JCB, 2019; 120(2):2180-2197.
14. Wang Wang, Mengcheng Shen, Conrad Fischer, Ratnadeep Basu, **Saugata Hazra**, Pierre Couvineau, Manish Paul, Faqi Wang, Sandra Toth, Doran S Mix, Marko Poglitsch, Norma P Gerard, Michel Bouvier, John C Vederas, Josef M Penninger, Zamaneh Kassiri, Gavin Y Oudit. Apelin protects against abdominal aortic aneurysm and the therapeutic role of neutral endopeptidase resistant apelin analogs.; 2019, Proceedings of the National Academy of Sciences 116 (26), 13006-13015
15. Dasgupta D, Jhungare V, Nautiyal A, Jana A, **Hazra Saugata**, Ghosh D. Xylitol production from lignocellulosic pentosans: a rational strain engineering approach towards a multiproduct biorefinery. JAFC,2019, 67 (4), pp 1173–1186.
16. Patel V, Zhabyeyev P, Chen X, Wang F, Paul M, Fan D, McLean B, Basu R, Zhang P, Shah S, Dawson J, Pyle W, Hazra M, Kassiri Z, **Hazra Saugata**, Vanhaesebroeck B, McCulloch C, Oudit G. PI3Kα-regulated gelsolin activity is a critical determinant of cardiac cytoskeletal remodeling and heart disease. Nature Communications. 9, Article number: 5390 (2018).
17. Sengar G, Deb R, Singh U, Junghare V, **Hazra Saugata**, Raja T, Alex R, Kumar A, Alyethodi R, Kant R, Jakshara S, Joshi C. Identification of differentially expressed microRNAs in Sahiwal (Bos indicus) breed of cattle during thermal stress. Cell Stress and Chaperones, Available online 18 May 2018.
18. Pal M, Bhattacharya S, Kalyan G, **Hazra Saugata**. Cadherin profiling for therapeutic interventions in Epithelial Mesenchymal Transition (EMT) and tumorigenesis. Experimental Cell Research, Available online 16 April 2018.
19. Singh R, Sengar G, Singh U, Deb R, Junghare V, **Hazra Saugata**, Kumar S, Tyagi S, Das A, Raja T, Kumar A.Functional proteomic analysis of crossbred (Holstein Friesian × Sahiwal) bull spermatozoa. Reproduction in Domestic Animals. 2018.
20. Bandhu S, Khot M, Sharma T, Sharma O, Dasgupta D, Mohapatra S, **Hazra Saugata**, Khatri O, Ghosh D. Single Cell Oil from Oleaginous Yeast Grown on Sugarcane Bagasse-Derived Xylose: An Approach toward Novel Biolubricant for Low Friction and Wear. ACS Sustainable Chemistry & Engineering. 2017;6(1):275-283.
21. Bandekar D, Chouhan O, Mohapatra S, Hazra M, **Hazra Saugata**, Biswas S. Putative protein VC0395_0300 from Vibrio cholerae is a diguanylate cyclase with a role in biofilm formation. Microbiological Research. 2017;202:61-70.
22. Das V, Kalyan G, Pal M, **Hazra Saugata**. Understanding the role of structural integrity and differential expression of integrin profiling to identify potential therapeutic targets in breast cancer. Journal of Cellular Physiology. 2017;233(1):168-185.
23. Bharatiy S, Hazra M, Paul M, Mohapatra S, Samantaray D, Dubey R, Sanyal S, Datta S, **Hazra Saugata**. In Silico Designing of an Industrially Sustainable Carbonic Anhydrase Using Molecular Dynamics Simulation. ACS Omega. 2016;1(6):1081-1103.
24. Wang W, McKinnie S, Farhan M, Paul M, McDonald T, McLean B, Llorens-Cortes C, **Hazra Saugata**, Murray A, Vederas J, Oudit G. Angiotensin-Converting Enzyme 2 Metabolizes and Partially Inactivates Pyr-Apelin-13 and Apelin-17Novelty and Significance. Hypertension. 2016;68(2):365-377.

25. Chouhan O, Bandekar D, Hazra M, Baghudana A, **Hazra Saugata**, Biswas S. Effect of site-directed mutagenesis at the GGEEF domain of the biofilm forming GGEEF protein from Vibrio cholerae. AMB Express. 2016;6(1).
26. **Hazra Saugata**, Kurz S, Wolff K, Nguyen L, Bonomo R, Blanchard J. Kinetic and Structural Characterization of the Interaction of 6-Methylidene Penem 2 with the β-Lactamase from Mycobacterium tuberculosis. Biochemistry. 2015;54(36):5657-5664.
27. Kurz S*, **Hazra Saugata***, Bethel C, Romagnoli C, Caselli E, Prati F, Blanchard J, Bonomo R. Inhibiting the β-Lactamase of Mycobacterium tuberculosis (Mtb) with Novel Boronic Acid Transition-State Inhibitors (BATSIs). ACS Infectious Diseases. 2015;1(6):234-242. (* contributed equally)
28. Basu R, **Hazra Saugata**, Shanks M, Paterson D, Oudit G. Novel Mutation in Exon 14 of the Sarcomere Gene MYH7 in Familial Left Ventricular Noncompaction With Bicuspid Aortic Valve. Circulation: Heart Failure. 2014;7(6):1059-1062.
29. **Hazra Saugata**, Xu H, Blanchard J. Tebipenem, a New Carbapenem Antibiotic, Is a Slow Substrate That Inhibits the β-Lactamase from Mycobacterium tuberculosis. Biochemistry. 2014;53(22):3671-3678.
30. Hadi T*, Hazra **Saugata***, Tanner M, Blanchard J. Structure of MurNAc 6-Phosphate Hydrolase (MurQ) from Haemophilus influenzae with a Bound Inhibitor. Biochemistry. 2013;52(51):9358-9366. (* contributed equally)
31. Kurz S, Wolff K, **Hazra Saugata**, Bethel C, Hujer A, Smith K et al. Can Inhibitor-Resistant Substitutions in the Mycobacterium tuberculosis β-Lactamase BlaC Lead to Clavulanate Resistance?: a Biochemical Rationale for the Use of β-Lactam–β-Lactamase Inhibitor Combinations. AAC. 2013;57(12):6085-6096.
32. Paul M, Hazra M, Barman A, **Hazra Saugata**. Comparative molecular dynamics simulation studies for determining factors contributing to the thermostability of chemotaxis protein "CheY". JBSD. 2013;32(6):928-949.
33. Quartararo C, **Hazra Saugata**, Hadi T, Blanchard J. Structural, Kinetic and Chemical Mechanism of Isocitrate Dehydrogenase-1 from Mycobacterium tuberculosis. Biochemistry. 2013;52(10):1765-1775.
34. Xu H, **Hazra Saugata**, Blanchard J. NXL104 Irreversibly Inhibits the β-Lactamase from Mycobacterium tuberculosis. Biochemistry. 2012;51(22):4551-4557.
35. **Hazra Saugata**, Szewczak A, Ort S, Konrad M, Lavie A. Post-Translational Phosphorylation of Serine 74 of Human Deoxycytidine Kinase Favors the Enzyme Adopting the Open Conformation Making It Competent for Nucleoside Binding and Release. Biochemistry. 2011;50(14):2870-2880.
36. **Hazra Saugata**, Konrad M, Lavie A. The Sugar Ring of the Nucleoside Is Required for Productive Substrate Positioning in the Active Site of Human Deoxycytidine Kinase (dCK): Implications for the Development of dCK-Activated Acyclic Guanine Analogues. JMC. 2010;53(15):5792-5800.
37. **Hazra Saugata**, Ort S, Konrad M, Lavie A. Structural and Kinetic Characterization of Human Deoxycytidine Kinase Variants Able To Phosphorylate 5-Substituted Deoxycytidine and Thymidine Analogues. Biochemistry. 2010;49(31):6784-6790.
38. **Hazra Saugata**, Sabini E, Ort S, Konrad M, Lavie A. Extending Thymidine Kinase Activity to the Catalytic Repertoire of Human Deoxycytidine Kinase. Biochemistry. 2009;48(6):1256-1263.
39. Sabini E, **Hazra Saugata**, Konrad M, Lavie A. Elucidation of Different Binding Modes of Purine Nucleosides to Human Deoxycytidine Kinase. JMC. 2008;51(14):4219-4225.
40. Sabini E, Hazra S, Ort S, Konrad M, Lavie A. Structural Basis for Substrate Promiscuity of dCK. JMB,2008;378(3):607-621.
41. McSorley T, Ort S, **Hazra Saugata**, Lavie A, Konrad M. Mimicking phosphorylation of Ser-74 on human deoxycytidine kinase selectively increases catalytic activity for dC and dC analogues. FEBS Letters. 2008;582(5):720-724.
42. Sabini E, **Hazra Saugata**, Konrad M, Lavie A. Nonenantioselectivity Property of Human Deoxycytidine Kinase Explained by Structures of the Enzyme in Complex with L- and D-Nucleosides. JMC. 2007;50(13):3004-3014.
43. Sabini E, **Hazra Saugata**, Konrad M, Burley S, Lavie A. Structural basis for activation of the therapeutic L-nucleoside analogs 3TC and troxacitabine by human deoxycytidine kinase. NAR. 2006;35(1):186-192.

10. **Book Chapters:**
Microbial CYP450: An Insight into Its Molecular/Catalytic Mechanism, Production and Industrial Application. (2018).
Oleaginous Yeasts: Lignocellulosic Biomass Derived Single Cell Oil as Biofuel Feedstock. (2018).
11. **Patents:**
Identification of functional internal ribosomal entry sites (IRES) at bovine heat shock protein 90. (Application Number: 201711042562)