

PERSONAL DETAILS

Dr. Bani Kanta Sarma
Faculty Fellow (Assistant Professor)
New Chemistry Unit (NCU)
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)
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Gender: Male
DOB: 01-03-1980
Nationality: India



EDUCATION

8/2003 – 8/2008 PhD in chemistry, Indian Institute of Science, Bangalore, India (**Best thesis award**)
4/2001 – 4/2003 MSc. in Chemistry, Indian Institute of Technology, Guwahati, India. (**1st rank**)
8/1998 – 5/2001 BSc. in Chemistry, Cotton College, Gauhati University, India. (**2nd rank**)

POSTDOCTORAL EXPERIENCE

1/2009 – 5/2009 Postdoctoral Research Associate, UT Southwestern Medical Centre, USA.
6/2009 – 1/2014 Postdoctoral Research Associate, The Scripps Research Institute (TSRI) Florida, USA.

ACADEMIC CAREER

14/10/2019-present Faculty Fellow, New Chemistry Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore-560064
03/03/2014-09/10/2019 Assistant Professor, Department of Chemistry, Shiv Nadar University, UP-201314

TEACHING EXPERIENCE

03/03/2014-09/10/2019

(Department of Chemistry, SNU)

Courses Developed and Taught

Organic Reaction and Mechanism (BSc 2nd yr.)
Molecular Spectroscopy (BSc 3rd yr.)
Co-ordination Chemistry (BSc 2nd yr.)
Informatics and Medicinal Chemistry (BSc 3rd yr.)
Biochemistry (BSc 2nd and 3rd yr.)
Organic reaction and synthesis (BSc 3rd and 4th yr.)
Application of analytical techniques (BSc 4th yr.)
Medicinal Chemistry (PhD)
Co-ordination and Bioinorganic Chemistry (PhD)
Application of analytical techniques (PhD)
Physical Methods for Chemists (JNC305)
Organic Spectroscopy (JNC305)

01/2020-05/2020 (JNCASR)

01/2021-present (JNCASR)

SUPERVISORY EXPERIENCE

- PhD produced: 4 from Shiv Nadar University
- Currently supervising 6 PhD students, 1 Int. PhD student and 2 postdocs at JNCASR.

AWARDS/FELLOWSHIPS

2008	"Prof. S. Soundararajan Medal" the Best Thesis Award in Inorganic Chemistry for the academic year 2008-09.
2005	" Best Poster Award " from the Chemical Research Society of India (CRSI) and a citation from the IUPAC. " at the "8 th CRSI National Symposium in Chemistry (NCS-8)", Indian Institute of Technology Bombay, India.
2005	" Best Seminar award " in the Department of Inorganic and Physical Chemistry (IPC), Indian Institute of Science, Bangalore, India.
2003-04	" Best Performance in the Course Work " in the Department of Inorganic and Physical Chemistry (IPC), Indian Institute of Science, Bangalore, India.
8/2003–8/2008	Junior/Senior Research Fellowships awarded by CSIR, India.
2003	Silver Medal-First Position (CPA 9.59/10) in M.Sc. in Chemistry from IIT Guwahati
2002	Qualified GATE and CSIR-JRF .
2001	CTS Fellow , Summer Student Fellowship awarded by the Centre for Theoretical Studies (CTS), IISc, Bangalore.
2001	Silver Medal-Second Position in B.Sc. in Chemistry from Cotton College, Gauhati University [1 st class with distinction].
1996	National Merit Scholarship

Research Grants Received

1. Title: Understanding the role of $n \rightarrow \pi^*$ interactions in the conformational properties of N,N'-diacylhydrazines and azapeptide models: Towards a priori prediction of geometries of aza-oligomer peptidomimetics.

Funding Agency: DST-Science and Engineering Board (SERB)

Scheme: Core Research Grant (CRG)

Status: active

Budget: 55,27,526 (for 36 months; March 2020-March 2023)

2. Title: Development of amyloid fibril/DNA sensors for microfluidic devices using fluorescent molecular rotors.

Funding Agency: DST-Science and Engineering Board (SERB)

Scheme: Indo-Belarus Joint Research Project

Status: active

Budget: 22.56 lakhs (Indian Part for 36 months; March 2017- March 2020)

PI-Belarus: Vitali Stsiapura, Associate Professor, Physics Department Yanka Kupala State University, 22 Ozheshko Str., 230023 Grodno, Belarus

3. Title: Toward understanding various aspects of carbonyl to carbonyl $n \rightarrow \pi^*$ noncovalent interaction.

Funding Agency: DST-Science and Engineering Board (SERB)

Scheme: Early Career Research Award

Status: completed

Budget: 22.44 lakhs (for 36 months; March 2016-March 2019)

RESEARCH PAPERS

(Publications as PI from JNCASR)

30. Baruah, K., Kalita, D., Sahariah, B., Das, P., Borah, D.; Sarma, B. K.* Is there an $N_{amide} \cdots H-N_{amide}$ hydrogen bond interaction in peptide and azapeptide beta turn? (*under preparation*)
29. Stabilizing PPII and collagen helices by enforcing *trans* amide geometry to the C-terminal proline. Das, P., Deka, J. K. R., Baruah, K.; Sarma, B. K.* (*under preparation*)
27. Synergistic $n \rightarrow \pi^*$ and $n_N \rightarrow \pi^*_{Ar}$ Interactions in C-terminal Modified Prolines: Effect on Xaa-Pro amide bond cis/trans equilibrium. Deka, J. K. R.; Das, P.; Borah, D.; Vishnoi, P.; Sarma, B. K.* (**Submitted**).
26. Sidechain-Backbone Tetrel Bonding Interactions Provide a General Mechanism for *trans*-Peptoid Stabilization. Baruah, K.; Kalita, D.; Sahariah, B.; Deka, J. K. R.; Vishnoi, P.; Sarma, B. K.* *Chem. Eur. J.* **2023** (**accepted**).
25. Understanding the Cis–Trans Amide Bond Isomerization of N,N'-Diacylhydrazines to Develop Guidelines for A Priori Prediction of Their Most Stable Solution Conformers. Deka, J. K. R.; Sahariah, B.; Sarma, B. K.* *J. Org. Chem.* **2023**. <https://doi.org/10.1021/acs.joc.2c01891>. [This paper has been selected for the Inside **Front Cover Page** of the Journal].
24. Strategies to control cis-trans isomerization of tertiary amide bonds to synthesize conformationally homogeneous peptoid oligomers. Kalita, D.; Sahariah, B.; Mookerjee, S. P.; Sarma, B. K.* *Chem. Asian. J.* (**Invited review**) **2022**, 17, e202200149.
23. Deciphering the Backbone Noncovalent Interactions that Stabilize Polyproline II Conformation and Reduce cis Proline Abundance in Polyproline Tracts. Sahariah, B.; Sarma, B. K.* *J. Phys. Chem. B.* **2021**, 125, 49, 13394-13405.
22. $n_N \rightarrow \pi^*_{Ar}$ interactions stabilize the E-ac isomers of arylhydrazides and facilitate their S_NAr autocyclizations. Deka, J. K. R.; Kalita, D.; Sahariah, B.; Sarma, B. K.* *Chem. Commun.* **2021**, 57, 11236.
21. Stabilization of Azapeptides by N(amide)....HN(amide) Hydrogen Bonds. Kalpita Baruah, Sahariah, B.; Sakpal, S. S.; Deka, J. K. R.; Bar A. K.; Bagchi, S.*; Sarma, B. K.* *Org. Lett.* **2021**, 23, 13, 4949–4954.
20. Evidence of an $nN(amide) \rightarrow \pi^*_{Ar}$ Interaction in N-Alkyl-N,N'-diacylhydrazines. Deka, J. K. R.; Sahariah, B.; Sakpal, S. S.; Bar A. K. Bar; Bagchi, S.*; Sarma, B. K.* *Org. Lett.* **2021**, 23, 18, 7003-7007.
19. Spectroscopic evidence of $n \rightarrow \pi^*$ interactions involving carbonyl groups. Sahariah, B.; Sarma, B. K.* *Phys. Chem. Chem. Phys.* **2020**, 22, 26669-26681.
18. Conformational control of N-methyl-N,N'-diacylhydrazines by noncovalent carbon bonding in solution. Deka, J. K. R.; Sahariah, B.; Baruah, K.; Bar A. K. Bar; Sarma, B.K.* *Chem. Commun.* **2020**, Advance Article. [This paper has been selected for the Inside **Front Cover Page** of the Journal].
17. Solid-Phase Synthesis of Hybrid 2,5-Diketopiperazines Using Acylhydrazide, Carbazate, Semicarbazide, Amino Acid, and Primary Amine Submonomers. Rahim, A.; Sahariah, B.; Baruah, K.; Deka, J. K. R.; Sarma, B. K.* *J. Org. Chem.* **2020**, 85, 2927-2937.

(Publications as PI from Shiv Nadar University)

16. Relative Orientation of the Carbonyl Groups Determines the Nature of Orbital Interactions in Carbonyl-Carbonyl Short Contacts. Sahariah, B.; Sarma, B. K.* *Chem. Sci.* **2019**, 10, 909-917.

15. N,N'-Di(acylamino)-2,5-diketopiperazines: Strategic Incorporation of Reciprocal $n \rightarrow \pi^*$ Interactions in a Druglike Scaffold. Rahim, A.; Sahariah, B.; **Sarma, B. K.*** *Org. Lett.* **2018**, *20*, 5743–5746.
14. Reciprocal Carbonyl-Carbonyl Interactions in Small Molecules and Proteins. Rahim, A.; Saha, P.; Jha, K. K.; Sukumar, N.; Sarma, B. K.* *Nat. Commun.* **2017**, *8*(1), 78. doi:10.1038/s41467-017-00081-x.

(Publications from PhD and Postdoc)

13. Identification of Potent and Selective Platelet-Activating Factor Acetylhydrolase 1b2 Inhibitor from the On-bead Screening of an Oxadiazolone Tethered Library. **Sarma, B. K.**; Liu, X.; Kodadek, T.* *Bioorg. Med. Chem.* **2016**, *24*, 3953-3963. (Special Issue: Chemistry and Chemical Biology of Therapeutically Important Compounds).
12. Solid Phase Synthesis of 1,3,4-oxadiazin-5 (6R)-one and 1,3,4-oxadiazol-2-one Scaffolds from Acyl Hydrazides. **Sarma, B. K.**, Liu, X.; Wu, Hao; Gao, Y.; Kodadek, T.* *Org. Biomol. Chem. (communication)* **2015**, *13*, 59–63.
11. Redox Regulation of Protein Tyrosine Phosphatase 1B (PTP1B): Importance of Steric and Electronic Effects on the Unusual Cyclization of the Sulfenic Acid Intermediate to a Sulfenyl Amide. **Sarma, B. K.*** *J. Mol. Struct.* **2013**, *1048*, 410–419.
10. Sub-monomer Synthesis of A Peptoid-Aza-peptoid Library. **Sarma, B. K.**; Kodadek, T.* *ACS Comb. Sci.* **2012**, *14*, 558–564.
9. Acyl hydrazides as peptoid sub-monomers. **Sarma, B. K.**; Yousufuddin, M.; Kodadek, T.* *Chem. Commun.* **2011**, *47*, 10590-10592.
8. Synthesis, Structure, Spirocyclization Mechanism and Glutathione Peroxidase-like Antioxidant Activity of Stable Spirodiazaselenurane and Spirodiazatellurane. **Sarma, B. K.**; Manna, D.; Minoura, M.; Mugesh, G.* *J. Am. Chem. Soc.* **2010**, *132*, 5364-5374.
7. Theoretical Investigations on the Effect of Different Nitrogen Donors on $Se \cdots N$ Intramolecular Interactions. **Sarma, B. K.**; Mugesh, G.* *ChemPhysChem* **2009**, *10*, 3013-3020.
6. Antioxidant Activity of the Anti-inflammatory Compound Ebselen: A Reversible Cyclization Pathway via Selenenic and Seleninic Acid Intermediates. **Sarma, B. K.**; Mugesh, G.* *Chem. Eur. J.* **2008**, *14*, 10603-10614.
5. Thiol Cofactors for Selenoenzymes and Their Synthetic Mimics. **Sarma, B. K.**; Mugesh, G.* *Org. Biomol. Chem.* **2008**, *6*, 965-974. [This work has been featured inside Cover Page of the Journal].
4. Redox Regulation of Protein Tyrosine Phosphatase 1B (PTP1B): A Biomimetic Study on the Unexpected Formation of a Sulfenyl Amide Intermediate. **Sarma, B. K.**; Mugesh, G.* *J. Am. Chem. Soc.* **2007**, *129*, 8872-8881.
3. Biomimetic Studies on Selenoenzymes: Modeling the Role of Proximal Histidines in Thioredoxin Reductases. **Sarma, B. K.**; Mugesh, G. *Inorg. Chem.* **2006**, *45*, 5307-5314.
2. Selenium-containing Enzymes in Mammals: Chemical Perspectives. Roy, G.; **Sarma, B. K.**; Phadnis, P. P.; Mugesh, G.* *J. Chem. Sci.* **2005**, *117*, 287-303. [This paper has been featured on the Cover Page of the Journal].
1. Glutathione Peroxidase (GPx)-like Antioxidant Activity of the Organoselenium Drug Ebselen: Unexpected Complications with Thiol Exchange Reactions. **Sarma, B. K.**; Mugesh, G.* *J. Am. Chem. Soc.* **2005**, *127*, 11477-11485.

SCIENTIFIC MEETINGS ATTENDED

1. Gave an invited talk on “**Leveraging Local Interactions to Affect Global Structures of Peptides and Peptidomimetics**” at the fourth edition of the Leaders in the Field Symposium, **ChemSci-2023**, organized by the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore in association with the Royal Society of Chemistry (RSC) Chemical Science journal from January 23 to 25, 2023.
2. Gave an invited talk on “**Understanding the conformational properties of aza-peptidomimetics**” in the 8th Indian Peptide Symposium, March 24-26 2021 (IPS-2021) organized by IISc Bangalore.
3. Gave an invited talk on “**Understanding the conformational properties of aza-peptidomimetics**” at the Annual Faculty Meeting and In-House Symposium JNCASR, during 26th-27th November 2020, held at JNCASR Bangalore.
4. Gave an invited talk on “**Carbonyl-carbonyl $n_N \rightarrow \pi^*$ and n_N (amide) $\rightarrow \pi^*/\sigma^*$ interactions in small molecules, peptides and peptidomimetics**” in the Workshop on Hydrogen Bonding (One Hundred Years of Hydrogen Bonding) at IISc Bangalore during 9-10 January 2020.
5. Gave an invited talk on “**Understanding the various aspects of carbonyl-carbonyl interactions**” at the fifth edition of “Kaleidoscope: A Discussion Meeting in Chemistry” to be held at The International Center Goa during the period of 05-08, July 2018
6. Gave an invited talk “**Understanding the role of carbonyl-carbonyl interactions in the stabilization of polyproline II and collagen triple helices**” in the Modern Trends in Inorganic Chemistry XVII (MTIC XVII) 2017 held at NCL/IISER Pune from 11-14 Dec 2017.
7. Member of Advisory Committee of the One Day Symposium on *Emerging Trends in Translational Research in India*” organized by the School of Natural Sciences, Shiv Nadar University, India on 12th April 2014 and gave a talk on “**Rapid construction and high-throughput screening of novel combinatorial libraries to identify bioactive molecules.**”
8. Member of Advisory Committee of the One Day Symposium on “*Current Trends in Drug Discovery Research in India*” organized by the Department of Chemistry, School of Natural Sciences, Shiv Nadar University, India on 11th April 2015.
9. Gave an invited talk on “**Bead-Based High-throughput Screening and Identification of Bioactive Compounds from Novel Combinatorial Libraries**” at the *Young Investigator Meeting, October 6-8, 2012, Boston (YIM-Boston 2012)*.
10. Gave an invited talk on “**Peptoids as Tools to Monitor and Manipulate the Proteome**” Talk at the 7th peptoid summit during Aug 9-10, 2010 at The Molecular Foundry, *Lawrence Berkeley National Laboratory, California*.
11. Presented a poster on "Antioxidant Activity of the Anti-inflammatory Drug Ebselen and Related Derivatives" in the "8th CRSI National Symposium in Chemistry" at *Indian Institute of Technology (IIT), Bombay, INDIA* during Feb. 03-05, 2006. (Received the **Best Poster Award** from the Chemical Research Society of India (CRSI) and a citation from the IUPAC).
12. Presented a poster on "Redox Regulation of Protein Tyrosine Phosphatase 1B (PTP1B): A Biomimetic Study on the Unexpected Formation of a Sulfenyl Amide Intermediate" in the "Inhouse Symposium IPC-2007" at the IPC Department, *Indian Institute of Science, Bangalore, INDIA* on March 22, 2007.
13. Participated in the "9th International Conference on the Chemistry of Selenium and Tellurium (ICCST-9)" during Feb. 23-27, 2004 at the *Indian Institute of Technology (IIT), Bombay, INDIA*.