

Ashis Biswas, Ph.D

Professor

Room No. 318, Protein Chemistry Laboratory
School of Basic Sciences
Indian Institute of Technology Bhubaneswar, India

Email address: abiswas@iitbbs.ac.in

Telephone No: +91-6747135118

EDUCATIONAL BACKGROUND

Jan 2001 - Jul 2005

Ph.D in Biophysical Chemistry

Bose Institute, Kolkata, India

Jadavpur University, Kolkata, India

Doctoral Dissertation Title: “Interactions, Stability and Substrate Refolding Ability of Molecular Chaperone Alpha-Crystallin”

1996 - 1998

M.Sc. with Specialization in Physical Chemistry

Jadavpur University, India

1993 - 1996

B.Sc. with Chemistry Honors

Jadavpur University, India

RESEARCH/PROFESSIONAL EXPERIENCE

Oct 2023 - Present

Professor

School of Basic Sciences

Indian Institute of Technology Bhubaneswar

India

Nov 2018 - Oct 2023

Associate Professor

School of Basic Sciences

Indian Institute of Technology Bhubaneswar

India

Jan 2010 - Nov 2018

Assistant Professor

School of Basic Sciences

Indian Institute of Technology Bhubaneswar

India

Mar 2009 - Jan 2010

Assistant Professor

Department of Chemistry

National Institute of Technology Rourkela

India

Mar 2007 - Mar 2009

Postdoctoral Research Fellow

Lerner Research Institute

Cleveland Clinic Foundation, USA

Supervisor: Dennis Stuehr, Ph.D

Aug 2005 - Feb 2007

Postdoctoral Research Fellow

Department of Ophthalmology

Case Western Reserve University, USA

Supervisor: Prof. Ram H Nagaraj

Jan 2001 - Jul 2005

Doctoral Student

Bose Institute, Kolkata, India
Jadavpur University, Kolkata, India
Supervisor: Prof. Kalipada Das

GRANTS

Nov 2023 - Nov 2026

Detection of biomarkers of cancers using irradiation engineered 2D-hybrid nanomaterials - **(DBT, India)**

Sept 2021 - May 2024

Load distribution, design and joint configurations for Load Grounding through Human Worn Exo-Frames - **(DIPAS-DRDO, India)**

April 2020 - Dec 2021

Evaluation of natural polyphenols and nucleoside analogues compounds as novel corona virus (SARS CoV-2) main protease (Mpro/ 3CLpro) inhibitors – An *in silico* docking and molecular dynamics simulation study - **(IIT Delhi, HPC, India)**

April 2020 - Dec 2021

Investigation of the therapeutic compound repurposing for COVID19 - **(IIT Delhi, HPC, India)**

July 2018 - Jun 2021

Impact of lysine acetylation in Hsp16.3 on its structure, chaperone function and the growth, survival as well as pathogenesis of *Mycobacterium tuberculosis* - **(SERB DST, India)**

July 2015 - Jun 2018

Molecular design, synthesis and evaluation of novel hydrazone derivatives and their transition metal complexes as potential anticancer agents - **(DBT, India)**

Jun 2012 - Jun 2015

Role of C-terminal region of *Mycobacterium tuberculosis* Hsp16.3 for its structure, stability and chaperone function - A biophysical and site directed truncation study- **(CSIR, India)**

Apr 2010 - Apr 2013

Catalytic activity of endothelial nitric oxide synthase – a probe into the molecular basis of its electron transfer limitation - **(DST SERC FAST TRACK, India)**

Feb 2010 - Feb 2012

Structural basis for the enhancement of chaperone function of alpha crystallin **(Indian Institute of Technology Bhubaneswar, India)**

Jul 2008 - Jun 2010

What is the molecular basis for the low activity of endothelial NO synthase? **(American Heart Association, USA)**

AWARDS

2008 - 2010

American Heart Association (AHA) Postdoctoral Fellowship Award (2008-2010): Principal Investigator, \$88,000 for two years

2005 - 2007

Post-doctoral fellowship-NIH, USA

2001 - 2005

CSIR-UGC (NET) [Eligibility for Lectureship] (1998): CSIR, India

1998	CSIR-UGC (NET) [Eligibility for Lectureship] (1998): CSIR, India
1998	GATE Scholarship [Percentile score 93.04] (1998): MHRD, Govt. of India
1993	National Scholarship (1993): For holding 81st position in Higher Secondary
1991	National Scholarship (1991): For holding 101st position in Secondary Examination

PROFESSIONAL MEMBERSHIP

- Life member, Indian Association for the Cultivation of Science, Kolkata, India
- Life member, Indian Society for Surface Science and Technology, Kolkata, India
- Member, Indian Chemical Society, Kolkata, India
- Member, Association for Research in Vision and Ophthalmology (ARVO), USA
- Member, International Maillard Reaction Society (IMRS), Cleveland, Ohio, USA
- Life member, Society for Biological Chemists, Bangalore, India
- Member of the Board of Studies at Haldia University, Kolkata, India.
- Member of the Board of Studies at Kalinga University, Raipur, India.

RESEARCH PUBLICATIONS

1. Sunil Raghav, Subhasish Prusty, Subhashree Barik, Sourya Nayak, R Divya, Deepak Jena, Kaushik Sen, Alok Panda, Pooja Mahajan, Chayan Mukherjee, Shaktiprasad Mishra, Sakshi Dutta, Mamuni Swain, and **Ashis Biswas**. "Hsp16. Δ C4, a C-terminal truncated mutant, confers strong cellular and humoral immunity against pulmonary tuberculosis." *bioRxiv* (2025).
2. Subhashree Barik, Kunal Shivaji Aldar, Ayon Chakraborty, Alok Kumar Panda, Rajiv K. Kar, and **Ashis Biswas**. "Understanding the structural and functional implications of lysine succinylation in Mycobacterium tuberculosis heat shock protein 16.3." *International Journal of Biological Macromolecules* 307: 142046 (2025).
3. Saswati Soumya Mohapatra, Krishna Singh Bisht, Sakshi Suryawanshi, Shreshth Gupta, Viplov Kumar Biswas, Ayon Chakraborty, Sunil Kumar Raghav, Tushar Kanti Maiti, Rajiv K. Kar, and **Ashis Biswas**. "Decoding Anti-Amyloidogenic and Fibril Neutralizing Action of Gut Microbiota-Derived Indole 3-Acetic Acid on Insulin Fibrillation through Multispectroscopic, Machine Learning, and Hybrid Quantum Mechanics/Molecular Mechanics Approaches." *The Journal of Physical Chemistry B* 129, no. 13: 3281-3296 (2025).
4. Subhashree Barik, Pulak Pritam, Ayon Chakraborty, Sreelipta Das, Sakshi Priyadarsini Dutta, Saswati Soumya Mohapatra, Bhavika Gupta, Alok Kumar Panda, and **Ashis Biswas**. "Mycobacterial Small Heat Shock Proteins: Dissecting Their Roles in Pathogenesis and Development of Therapeutics." *ACS Infectious Diseases* (2025).
5. Ayon Chakraborty, Rajesh Ghosh, Saswati Soumya Mohapatra, Subhashree Barik, **Ashis Biswas**, and Snehasis Chowdhuri. "Repurposing of antimycobacterium drugs for COVID-19 treatment by targeting SARS CoV-2 main protease: An in-silico perspective." *Gene* 922: 148553 (2024).

6. Ayon Chakraborty, Rajesh Ghosh, Subhashree Barik, Saswati Soumya Mohapatra, **Ashis Biswas**, and Snehasis Chowdhuri. "Deciphering inhibitory activity of marine algae *Ecklonia cava* phlorotannins against SARS CoV-2 main protease: A coupled in-silico docking and molecular dynamics simulation study." *Gene*: 148620 (2024).
7. Subhashree Barik, Alok Kumar Panda, Viplov Kumar Biswas, Sheetal Das, Ayon Chakraborty, Shibangini Beura, Rahul Modak, Sunil Kumar Raghav, Rajiv K. Kar, and **Ashis Biswas**. "Lysine acetylation of Hsp16. 3: Effect on its structure, chaperone function and influence towards the growth of *Mycobacterium tuberculosis*." *International Journal of Biological Macromolecules* 268: 131763 (2024).
8. Saswati Soumya Mohapatra, Krishna Singh Bisht, Suchismita Dhar, Viplov Kumar Biswas, Sunil Kumar Raghav, Rajiv Kumar Kar, Tushar Kanti Maiti, and **Ashis Biswas**. "Inhibition of amyloid aggregation of insulin by amino acid conjugated bile acids: An insight into the possible role of biosurfactants in modulating the fibrillation kinetics and cytotoxicity." *Journal of Molecular Liquids* 397: 124142 (2024).
9. Alok Kumar Panda and **Ashis Biswas**. "Influence of mutations, stresses and post-translational modifications on the structure and function of heat shock proteins and their relationship with various diseases." *Frontiers in Molecular Biosciences* 10: 1310272 (2023).
10. Ayon Chakraborty, Saswati Soumya Mohapatra, Subhashree Barik, Ipsita Roy, Bhavika Gupta, and **Ashis Biswas**. "Impact of nanoparticles on amyloid β -induced Alzheimer's disease, tuberculosis, leprosy and cancer: a systematic review." *Bioscience Reports* 43, no. 2: BSR20220324 (2023).
11. Alok Kumar Panda and **Ashis Biswas**- "The Role of Mutations, Stresses and Post-Translational Modifications in the Structure and Function of Small Heat Shock Proteins and Their Relationship with Different Human Diseases" *Frontiers in Molecular Biosciences*, 9 (2022).
12. Sandip Kumar Nandi, Alok Kumar Panda, Ayon Chakraborty, Shivani Rathee, Ipsita Roy, Subhashree Barik, Saswati Soumya Mohapatra and **Ashis Biswas**- "Role of ATP-Small Heat Shock Protein Interaction in Human Diseases" *Frontiers in Molecular Biosciences*, 9 (2022).
13. Ayon Chakraborty, Rajesh Ghosh and **Ashis Biswas**- "Interaction of constituents of MDT regimen for leprosy with *Mycobacterium leprae* HSP18: impact on its structure and function" *FEBS J.*, 289(3), 832-853 (2022).
14. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- "Identification of alkaloids from *Justicia adhatoda* as potent SARS CoV-2 main protease inhibitors: An *in silico* perspective" *J Mol Struct.* 1229, 129489 (2021).
15. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- "Depicting the inhibitory potential of polyphenols from *Isatis indigotica* root against the main protease of SARS CoV-2 using computational approaches" *J Biomol Struct Dyn.* 1-12. (2020).
16. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- "Computer aided identification of potential SARS CoV-2 main protease inhibitors from diterpenoids and biflavonoids of *Torreya nucifera* leaves" *J Biomol Struct Dyn.* 1-16. (2020).
17. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- "Potential therapeutic use of corticosteroids as SARS CoV-2 main protease inhibitors: a computational study" *J Biomol Struct Dyn.* 1-14. (2020).
18. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- "Identification of

- polyphenols from *Broussonetia papyrifera* as SARS CoV-2 main protease inhibitors using *in silico* docking and molecular dynamics simulation approaches” *J Biomol Struct Dyn.* 1-14. (2020).
19. Rajesh Ghosh, Ayon Chakraborty, **Ashis Biswas** and Snehasis Chowdhuri- “Evaluation of Green Tea Polyphenols as Novel Corona Virus (SARS CoV-2) Main Protease (Mpro) Inhibitors – An In Silico Docking and Molecular Dynamics Simulation Study” *J Biomol Struct Dyn.* 1-13. (2020).
 20. Alok Kumar Panda, Ayon Chakraborty, Sandip Kumar Nandi, **Ashis Biswas** – “Cover Image” *Proteins*, 88(6), C1-C1 (2020) [*The cover image is based on the Original Article The impact of different mutations at arginine141 on the structure, subunit exchange dynamics and chaperone activity of Hsp16.3 by Ashis Biswas et al.*].
 21. Ayon Chakraborty, **Ashis Biswas** - “Structure, stability and chaperone function of *Mycobacterium leprae* Heat Shock Protein 18 are differentially affected upon interaction with gold and silver nanoparticles” *Int J Biol Macromol*, 152, 250-260 (2020).
 22. Sandip Kumar Nandi, Ayon Chakraborty, Alok Kumar Panda, **Ashis Biswas** - “*M. leprae* HSP18 suppresses copper (II) mediated ROS generation: Effect of redox stress on its structure and function” *Int J Biol Macromol*, 146, 648-660 (2020).
 23. Alok Kumar Panda, Ayon Chakraborty, Sandip Kumar Nandi, **Ashis Biswas** – “The impact of different mutations at arginine141 on the structure, subunit exchange dynamics and chaperone activity of Hsp16. 3” *Proteins*, 88(6), 759-774 (2020).
 24. Ayon Chakraborty, Alok Kumar Panda, Rajesh Ghosh, **Ashis Biswas** – “DNA minor groove binding of a well known anti-mycobacterial drug dapson: A spectroscopic, viscometric and molecular docking study” *Arch Biochem Biophys*, 665, 107-113 (2019).
 25. Ayon Chakraborty, Alok Kumar Panda, Rajesh Ghosh, Ipsita Roy, **Ashis Biswas** – “Depicting the DNA binding and photo-nuclease ability of anti-mycobacterial drug rifampicin: A biophysical and molecular docking perspective” *Int J Biol Macromol*, 127, 187-196 (2019).
 26. Sandip Kumar Nandi, Ayon Chakraborty, Alok Kumar Panda, Rajiv Kumar Kar, Anirban Bhunia, **Ashis Biswas** – “Evidences for zinc (II) and copper (II) ion interactions with *Mycobacterium leprae* HSP18: Effect on its structure and chaperone function” *J Inorg Biochem*, 188, 62-75 (2018).
 27. Ayon Chakraborty, Sandip Kumar Nandi, Alok Kumar Panda, Pinaki Prasad Mahapatra, Sourav Giri, **Ashis Biswas** – “Probing the structure-function relationship of *Mycobacterium leprae* HSP18 under different UV radiations” *Int J Biol Macromol*, 119, 604-616 (2018).
 28. Sudarshana Majumder, Sagarika Pasayat, Alok K Panda, Subhashree P Dash, Satabdi Roy, **Ashis Biswas**, Mokshada E Varma, Bimba N Joshi, Eugenio Garribba, Chahat Kausar, Samir Kumar Patra, Werner Kaminsky, Aurélien Crochet, Rupam Dinda – “Monomeric and Dimeric Oxidomolybdenum(V and VI) Complexes, Cytotoxicity, and DNA Interaction Studies: Molybdenum Assisted C=N Bond Cleavage of Salophen Ligands” *Inorg Chem*, 56, 11190-11210 (2017)
 29. Priyabrata Mukhi, Swapna Sarita Mohapatra, M Bhattacharjee, KK Ray, TS Muraleedharan, A Arun, R Sathyavathi, RR Juluri, PV Satyam, Alok K Panda, **Ashis Biswas**, S Nayak, Sreedhar Bojja, S Pratihari, Sujit Roy – “Mercury based drug in ancient India: The red sulfide of mercury in nanoscale” *J Ayurveda Integr Med*, 8, 93-98 (2017)
 30. Alok Kumar Panda, Ayon Chakraborty, Sandip Kumar Nandi, Abhishek Kaushik, **Ashis Biswas** – “The C-terminal extension of *Mycobacterium tuberculosis* Hsp16.3 regulates its oligomerization,

subunit exchange dynamics and chaperone function" *FEBS J.*, 284(2), 277-300 (2017).

31. Subhashree P. Dash[‡], Alok Kumar Panda[‡], Sarita Dhaka[‡], Sagarika Pasayat, **Ashis Biswas**, Mannar R. Maurya, Paresh Kumar Majhi, Aurélien Crochet and Rupam Dinda - "A study of DNA/BSA interaction and catalytic potential of oxidovanadium(v) complexes with ONO donor ligands" *Dalton Trans*, 45, 18292-18307 (2016).
32. Sandip Kumar Nandi, Ayon Chakraborty, Alok Kumar Panda and **Ashis Biswas** - "Conformational perturbation, hydrophobic interactions and oligomeric association are responsible for the enhanced chaperone function of *Mycobacterium leprae* HSP18 under pre-thermal condition" *RSC Adv*, 6, 62146-62156 (2016).
33. Alok Kumar Panda, Sandip Kumar Nandi, Ayon Chakraborty, Ram H. Nagaraj and **Ashis Biswas** - "Differential role of arginine mutations on the structure and functions of alpha-crystallin", *Biochim Biophys Acta*, 1860, 199-210 (2016).
34. **Ashis Biswas**, Srabani Karmakar, Aritra Chowdhury and K. P. Das - "Interaction of α -crystallin with some small molecules and its effect on its structure function", *Biochim Biophys Acta*, 1860, 211-21 (2016).
35. Sayed Muktar Hossain, Avinash Lakma, Rabindra Nath Pradhan, Ayon Chakraborty, **Ashis Biswas** and Akhilesh Kumar Singh - "Synthesis and characterization of a novel, ditopic, reversible and highly selective, "turn-on" fluorescent chemosensor for Al^{3+} ion", *RSC Adv*, 5, 63338-63344 (2015).
36. Subhashree P. Dash, Alok Kumar Panda, Sagarika Pasayat, Rupam Dinda, **Ashis Biswas**, Edward R. T. Tiekink, Subhadip Mukhopadhyay, Sujit K. Bhutia, Werner Kaminsky and Ekkehard Sinn - "Oxidovanadium(V) complexes of aroylhydrazones incorporating heterocycles: Synthesis, characterization and study of DNA binding, photo-induced DNA cleavage and cytotoxic activities", *RSC Adv*, 5, 51852 – 51867 (2015).
37. Sandip Kumar Nandi, Alok Kumar Panda, Ayon Chakraborty, Sougata Sinha Ray and **Ashis Biswas** - "Role of subunit exchange and electrostatic interactions on the chaperone activity of *Mycobacterium leprae* HSP18", *PLoS One*, 10(6), e0129734 (2015).
38. Saswati, Ayon Chakraborty, Subhashree P. Dash, Alok Kumar Panda, Rama Acharyya, **Ashis Biswas**, Subhadip Mukhopadhyay, Sujit K. Bhutia, Aurelien Crochet, Yogesh P. Patil, Munirathinam Nethaji and Rupam Dinda - "Synthesis, X-ray structure and *in vitro* cytotoxicity studies of Cu(I/II) complexes of thiosemicarbazone: special emphasis on their interactions with DNA", *Dalton Trans*, 44(13), 6140-6157 (2015).
39. Subhashree P. Dash, Alok Kumar Panda, Sagarika Pasayat, Sudarshana Majumder, **Ashis Biswas**, Werner Kaminsky, Subhadip Mukhopadhyay, Sujit K. Bhutia, Rupam Dinda - "Evaluation of the cell cytotoxicity and DNA/BSA binding and cleavage activity of some dioxidovanadium(V) complexes containing aroylhydrazones", *J Inorg Biochem*, 144, 1-12 (2015).
40. Sandip Kumar Nandi, Ayon Chakraborty, Alok Kumar Panda, Sougata Sinha Ray, Rajiv Kumar Kar, Anirban Bhunia and **Ashis Biswas** - "Interaction of ATP with a small heat shock protein from *Mycobacterium leprae*: effect on its structure and function", *PLoS Negl Trop Dis*, 9(3), e0003661 (2015).
41. Michael A. DiMauro, , Sandip Kumar Nandi, Cibin T. Raghavan, Rajiv Kumar Kar, Benlian Wang, Anirban Bhunia, Ram H. Nagaraj and **Ashis Biswas** - "Acetylation of Gly1 and Lys2 promotes aggregation of human gammaD-crystallin", *Biochemistry* , 53(46), 7269-7282 (2014).

42. Subhashree. P. Dash, Alok Kumar Panda, Sagarika Pasayat, Rupam Dinda, **Ashis Biswas**, E. R. Tiekink, Yogesh P. Patil, M. Nethaji, Werner Kaminsky, Subhadip Mukhopadhyay and Sujit K. Bhutia - "Syntheses and structural investigation of some alkali metal ion-mediated LV(V)O₂(-) (L(2-) = tridentate ONO ligands) species: DNA binding, photo-induced DNA cleavage and cytotoxic activities", *Dalton Trans*, 43(26), 10139-10156 (2014).
43. Sandip Kumar Nandi, Elengikal A. A. Rehna, Alok Kumar Panda, Sugathan Shiburaj, Kuppanmuthu Dharmalingam and **Ashis Biswas** – “A S52P mutation in the ' α -crystallin domain' of *Mycobacterium leprae* HSP18 reduces its oligomeric size and chaperone function”, *FEBS J*, 280(23), 5994-6009 (2013).
44. Rooban B. Nahomi, Rong Huang, Sandip Kumar Nandi, Benlian Wang, Smitha Padmanabha, Puttur Santhoshkumar, Slawomir Filipek, **Ashis Biswas** and Ram H. Nagaraj – “Acetylation of lysine 92 improves the chaperone and anti-apoptotic activities of human alphaB-crystallin”, *Biochemistry*, 52(45), 8126-38 (2013).
45. Ram H. Nagaraj, Alok Kumar Panda, Shilpa Shanthakumar, Puttur Santhoshkumar, NagaRekha Pasupuleti, Benlian Wang and **Ashis Biswas** - “Hydroimidazolone modification of the conserved Arg12 in small heat shock proteins: studies on the structure and chaperone function using mutant mimics”, *PLoS One*, 7, e30257 (2012).
46. Ram H. Nagaraj, Rooban B. Nahomi, Shilpa Shanthakumar, Mikhail Linetsky, Smitha Padmanabha, Nagarekha Pasupuleti, Benlian Wang, Puttur Santhoshkumar, Alok Kumar Panda and **Ashis Biswas** - “Acetylation of alphaA-crystallin in the human lens: effects on structure and chaperone function”, *Biochim. Biophys. Acta*, 1822, 120-129 (2012).
47. Zhi-Qiang Wang, Jesús Tejero, Chin-Chuan Wei, Mohammad Mahfuzul Haque, Jerome Santolini, Mohammed Fadlalla, **Ashis Biswas** and Dennis J. Stuehr - “Arg375 tunes tetrahydrobiopterin functions and modulates catalysis by inducible nitric oxide synthase”, *J Inorg. Biochem.*, 108, 203-215 (2012).
48. **Ashis Biswas**, Srabani Karmakar, Victor Banerjee, Sudipa Saha, Madhuchhanda Kundu, Jaya Bhattacharyya, Dipak Chandra Konar and K. P. Das- “Biophysical studies on the molecular chaperone function, structure and interaction of eye lens protein α -crystallin – A review”, *J Indian Chem. Soc.*, 88, 1827-1855 (2011).
49. Jesús Tejero, **Ashis Biswas**, Mohammad Mahfuzul Haque, Zhi-Qiang Wang, Craig Hemann, Cornelius L. Varnado, Zachary Novince, Russ Hille, Douglas C. Goodwin and Dennis J. Stuehr- “Mesohaem substitution reveals how haem electronic properties can influence the kinetic and catalytic parameters of neuronal NO synthase”, *Biochem. J.*, 433, 163 - 174 (2011).
50. Syed Mohsin Waheed, Arnab Ghosh, Ritu Chakravarti, **Ashis Biswas**, Mohammad Mahfuzul Haque, Koustubh Panda and Dennis J. Stuehr- “Nitric oxide blocks cellular heme insertion into a broad range of heme proteins”, *Free Radic. Biol. Med.*, 48, 1548 – 1558 (2010).
51. Monolekha Bhattacharya. **Ashis Biswas** and Amit Kumar Das - “Interaction analysis of TcrX/Y two component system from *Mycobacterium tuberculosis*”, *Biochimie*, 92, 263 – 272 (2010).
52. Jesús Tejero, **Ashis Biswas**, Zhi-Qiang Wang, Richard C. Page, Mohammad Mahfuzul Haque, Craig Hemann, Jay L. Zweier, Saurav Misra and Dennis J. Stuehr - “Stabilization and characterization of a heme-oxy reaction intermediate in inducible nitric oxide synthase”, *J Biol.*

- Chem.*, 283, 33498 - 33507 (2008).
53. Ashis Biswas, Shawn Lewis, Benlian Wang, Masaru Miyagi, Puttur Santoshkumar, Mahesha Honsigere and Ram H. Nagaraj. - "Chemical modulation of the chaperone function of human α A-crystallin", *J. Biochem.*, 144, 21-32 (2008).
 54. R.H. Nagaraj, A. Biswas, A. Miller. T. Oya-Ito - "The other side of the Maillard Reaction", *Ann. N. Y. Acad. Sci.*, 1126, 107-112 (2008).
 55. Ashis Biswas and Kali P. Das - " Zn^{+2} enhances the molecular chaperone function and stability of α -crystallin", *Biochemistry*, 47, 804-816 (2008).
 56. Ashis Biswas, Benlian Wang, Masaru Miyagi and Ram H. Nagaraj - "Effect of methylglyoxal modification on stress-induced aggregation of client proteins and their chaperoning by human α A-crystallin", *Biochem. J.*, 409, 771-777 (2008).
 57. Shivaprakash Puttaiah*, Ashis Biswas*, Magdalena Staniszewska and Ram H. Nagaraj - "Methylglyoxal inhibits glycation-mediated loss in chaperone function of α -crystallin and synthesis of pentosidine in the lens", *Experimental Eye Research*, 84, 914-921 (2007). * *The first two authors contribute equally.*
 58. Ashis Biswas and K. P. Das - "Differential recognition of natural and non-natural substrate by molecular chaperone α -crystallin – A subunit exchange study", *Biopolymers*, 85, 189-197 (2007).
 59. A. Biswas and K. P. Das - " α -Crystallin assisted refolding of enzyme substrates: optimization of external parameters", *Protein J.*, 26, 247-255 (2007).
 60. Ashis Biswas, Jeffery Goshe, Antonia Miller, Puttur Santhoshkumar, Carol Luckey, Manjunatha B. Bhat and Ram H. Nagaraj - "Paradoxical effects of substitution and deletion mutations of arg56 on the structure and chaperone function of human α B-crystallin", *Biochemistry* 46, 1117-1127 (2007).
 61. Ashis Biswas, Antonia Miller, Tomoko Oya-Ito, Puttur Santhoshkumar, Manjunatha Bhat and Ram H. Nagaraj - "Effect of site-directed mutagenesis of methylglyoxal modifiable arginine residues on the structure and chaperone function of human α A-crystallin", *Biochemistry*, 45, 4569-4577 (2006).
 62. C. Bhattacharjee, S. Saha, A. Biswas, M. Kundu, L. Ghosh and K. P. Das - "Structural changes of β -lactoglobulin during thermal unfolding and refolding – An FT-IR and circular dichroism study", *Protein J.*, 24, 27-35 (2005).
 63. Ashis Biswas and Kali P. Das - "SDS induced structural changes in α -crystallin and its effect on refolding", *Protein J.*, 23, 529 - 538 (2004).
 64. Ashis Biswas and Kali P. Das - "Role of ATP on the interaction of α -crystallin with its substrates and its implications for the molecular chaperone function", *J Biol. Chem.*, 279, 42648 - 42657 (2004).
 65. Ashis Biswas, Sudipa Saha and Kali P. Das - "Structural features of molecular chaperones: A possible micellar connection", *J Surface Sci. Technol.*, 18, 1 - 24 (2002).
 66. Ashis Biswas and Joykrishna Dey - "Ground and excited state ionization behavior of 9-aminocamptothecin: An absorption and fluorescence study", *Indian J. Chem.*, 40A, 1143 – 48 (2001).

CONFERENCES/SYMPOSIA/INVITED LECTURES

1. Presented an invited poster on “Interaction of constituents of MDT regimen for leprosy with *Mycobacterium leprae* HSP18: Impact on its structure and function” at **2nd Physical Chemistry Symposium** [held at Indian Institute of technology Bombay, during October 22-25, 2024].
2. Presented an invited poster on “Lysine acetylation of Hsp16.3: Effect on its structure, chaperone function and influence towards the growth of *Mycobacterium tuberculosis*” at **46th Indian Biophysical Society Meeting** [held at Tata Institute of Fundamental Research (TIFR), Hyderabad and University of Hyderabad, India, during March 15-17].
3. Delivered an invited talk on “Role of C-terminal region on the structure and chaperone function of *Mycobacterium tuberculosis* Hsp16.3- An insight into developing better tuberculosis vaccines” at **92nd Annual Meeting of the Society of Biological Chemists** [held at BITS Pilani, Goa, India, during Dec 18-20].
4. Delivered an invited talk on “Structure-function studies of *Mycobacterium tuberculosis* Hsp16.3: Tuberculosis biology and vaccination approaches” at **3rd International Conference on Frontiers in Biological Sciences** [held at Department of Life Science, NIT Rourkela, India, during Oct 5-7, 2023].
5. Acted as a Co-Chair in one of the poster sessions at **31st CRSI National Symposium in Chemistry (CRSI NSC-31) along with the CRSI-ACS Symposium Series** (held at Department of Chemistry, NIT Rourkela, India, during Jul 6-8, 2023).
6. Acted as a judge to evaluate a poster session at **91st Annual Meeting of the Society of Biological Chemists (India)** (held at Biswa Bangla Convention Centre, Kolkata, India, during Dec 8-11, 2022).
7. Acted as a judge to evaluate a poster session at **44th Indian Biophysical Society Meeting** (Conceptual Advances in Biophysics and its Applications) (held at ACTREC, Tata Memorial Centre, Navi Mumbai, India, during March 30 - April 1, 2022).
8. Invited Lecture on “Role of C-terminal domain on the structure and function of *Mycobacterium tuberculosis* Hsp16.3 - An insight into developing better tuberculosis vaccines” at **3rd international conference, on “Chemical & Biological Sciences in Drug Discovery -2019, (IC-CBSDD-2019)** (held at PG Department of Chemistry, Berhampur University, India, during 8-10th March 2019).
9. Invited Lecture on “Effect of two well-known nanoparticles on the structure and chaperone function of *Mycobacterium leprae* HSP18: An alternative approach towards the treatment of leprosy” at **6th World Congress on Nanomedical Sciences (ISNSCON 2018)** (held at Vigyan Bhawan, New Delhi, India, during 9-12th December, 2018).
10. Invited Lecture as **Keynote Speaker** on “Structure-function studies of various sHSPs related to several human diseases” at **1st PAN IIT Biotech Meet** (held at Kodaikanal, Tamilnadu during Oct 16-18, 2016).
11. Invited Lecture on “A point mutation in the ‘ α -crystallin domain’ of *Mycobacterium leprae* HSP18 decreases its chaperone function by destabilizing the structural integrity” at **Advances in Chemistry and their Biological and Industrial Relevance 2014 (ACBIR 2014)**, (organized by Department of Chemistry, NIT Rourkela during Jan 10-11, 2014).

12. Invited Lecture on “Effect of *in vitro* Lys⁹² acetylation on the structure and chaperone function of human alphaB-crystallin” at **Asia Annual Meeting of Association for Research in Vision and Ophthalmology (Asia ARVO)** (held at The Ashok, New Delhi, India during Oct 28-31, 2013).
13. Invited Lecture on “Effect of small molecules on the structure and chaperone function of human α A-crystallin” at **Madurai Kamaraj University**, Dec 2012.
14. Invited Lecture on “The role of acetylation on the structure and chaperone function of human α A-crystallin” at **Recent Trends in Chemical Science and Technology**, (held at Indian Institute of Technology Patna during Mar 3-4, 2012).
15. Invited Lecture on “The role of the conserved arginine¹² on structure and chaperone function of human alphaA-crystallin” held at **CIMAP & IGP**, Lucknow during Nov 12-15, 2011.
16. Ram H Nagaraj, Shilpa Shanthakumar, Smitha Padmanabha, Mikhail D Linetsky, Benlian Wang, Alok Kumar Panda, **Ashis Biswas** – “Alpha-crystallin’s structure and function are altered by acetylation”, **Annual Meeting of Association for Research in Vision and Ophthalmology (ARVO)** (held at Building International Collaborations, in Fort Lauderdale, Florida, USA during Sept 7 - 10, 2011).
17. **A. Biswas** and K. P. Das - “Effect of zinc on the structure and chaperone function of alpha-crystallin”, **Asia ARVO Meeting on Research in Vision and Ophthalmology**, 20-22 Jan 2011, followed by SNEC 21st Anniversary Celebrations, Jan 22-23, 2011 (held at World Resort Santosa, Singapore).
18. Invited Lecture on “Effect of porphyrin ring structure on the electron transfer and catalytic activity of neuronal nitric oxide synthase” and **Session Chair Person** of a Scientific Session at **3rd International Congress of Environmental Research conference** (held at **University of Mauritius, Reduit**, Mauritius during Sept 16 - 18, 2010).
19. Ram H. Nagaraj, **Ashis Biswas**, Manjunatha Bhat – “Modulation of the chaperone-like function of small heat shock proteins by methylglyoxal”, **3rd International Congress on Stress Responses in Biology and Medicine and the 2nd International Congress of Stress Research** (held at Budapest, Hungary during Aug 23 - 26, 2007).
20. **A. Biswas**, S. Lewis, B. Wang, M. Miyagi, and R. H. Nagaraj – “Revival and augmentation of the chaperone function of guanidinated human alphaA- crystallin by methylglyoxal”, **Annual Meeting of Association for Research in Vision and Ophthalmology (ARVO)** (held at Building International Collaborations, in Fort Lauderdale, Florida, USA during May 6 - 10, 2007).
21. R. H. Nagaraj, M. Staniszewska, **A. Biswas**, H. Butler, and L. Reneker – “Over-expression of glyoxalase I inhibits AGE formation in the mouse lens”, **Annual Meeting of Association for Research in Vision and Ophthalmology (ARVO)** (held at Building International Collaborations, in Fort Lauderdale, Florida, USA during May 6 - 10, 2007).

PATENTS/COPYRIGHT OBTAINED/ FILED

Title	Name	Role	Patent Details			Remarks
			Country	No.	Year of Application	
A PROTEIN SUBUNIT VACCINE COMPOSITION AGAINST MYCOBACTERIUM TUBERCULOSIS	Sunil Kumar Raghav; Ashis Biswas; Subhasish Prusty; Subhashree Barik and Alok Kumar Panda	Inventor	International	PCT/IN2026/050371	2026	Filed
Hsp16.3ΔC4 subunit protein as a vaccine candidate for tuberculosis	Subhasish Prusty, Subhashree Barik, Alok Kumar Panda, Ashis Biswas and Sunil Kumar Raghav.	Inventor	India	202531019685	2025	Filed. Under Review
Arginine 141 mutants of Hsp16.3 as a candidate for second generation tuberculosis vaccine	Alok Kumar Panda and Ashis Biswas	Principal Investigator	India	202331007738	2023	Published. Final validation is pending.

INDUSTRIAL COLLABORATION

Title	Process	Collaborating Institute	Technology Transferred to	Transfer Date (mm/yyyy)
HSP Subunit Vaccine in Adjuvant (DDA) Against <i>Mycobacterium tuberculosis</i>	Technology transfer	Institute of Life Sciences (ILS), Bhubaneswar	Techinvention Lifecare Limited	11/2025

RESEARCH GUIDANCE

Level	Completed	Ongoing
Doctoral	05	04
M.Sc.	22	01
B.Tech.	03	-

LIST OF COURSES TAUGHT**At Undergraduate Level: ITP & B.TECH**

- Preparatory Chemistry (CY0L001)
- Introduction to Physical Chemistry (CY1L303)
- Thermodynamics and Colligative Properties (CY2L301)
- Physical Chemistry Laboratory – I (CY1P302)
- Chemistry Theory (CY1L001)
- Chemistry Laboratory (CY1P001)
- Genetic Engineering (CY3L001)
- Introduction to Bioscience and Technology (ID2L002)
- Chemistry Theory (CY101) (at NIT Rourkela)
- Chemistry Laboratory CY170) (at NIT Rourkela)

At Postgraduate Level: M.Sc.

- Thermodynamics and Chemical Equilibrium (CY5L005)
- Physical Chemistry Laboratory (CY5P003)
- Biophysical Chemistry (CY7L021)
- Physical Methods and Inorganic Chemistry (CY7L006)
- Application of Fluorescence Spectroscopy in Chemistry and Biology (CY7L017)
- Seminar (CY5S001)
- Thermodynamics and Chemical Equilibria (CY531) (at NIT Rourkela)
- Cell and Protein Processing Laboratory (BM673) (at NIT Rourkela)

ADMINISTRATIVE EXPERIENCE**At Institute Level:**

Responsibility	University / Organization	From mm/yy	To mm/yy	Total Period (years/months)
Dean, Alumni, Corporate and International Relations	IIT Bhubaneswar	06/2025	Continuing	0.6 years
Associate Dean, Alumni Affairs & International Relations	IIT Bhubaneswar	06/2022	06/2025	3years

Member, Recruitment & Promotion Committee (Non-Teaching Staff)	IIT Bhubaneswar	05/2024	Continuing	1.9 years
Member, Biosafety Committee	IIT Bhubaneswar	11/2017	Continuing	7.4 years
Chairman, Institute Market and Management Committee	IIT Bhubaneswar	10/2021	03/2024	2.42 years
Chairman, Central Library	IIT Bhubaneswar	02/2010	03/2012	2.08 years
Member, Rate Contract committee	IIT Bhubaneswar	02/2010	03/2015	5.08 years

At School Level:

Responsibility	University / Organization	From mm/yy	To mm/yy	Total Period (years/months)
Member, ITEP implementation committee for Chemistry discipline	IIT Bhubaneswar	06/2023	Continuing	2.8 years
Member, Purchase Committee (Chemistry)	IIT Bhubaneswar	08/2024	Continuing	1.6 years
Faculty Coordinator (Chemistry Discipline)	IIT Bhubaneswar	04/2014	04/2024	10 years
Member, Academic Committee	IIT Bhubaneswar	03/2010	03/2020	10 years
Member, Fire Safety Committee	IIT Bhubaneswar	11/2016	11/2018	2 years
UG & PG lab in-charge	IIT Bhubaneswar	04/2014	03/2019	4.91 years
Member, Purchase Committee	IIT Bhubaneswar	03/2010	07/2011	1.33 years