Dr. SOUMYANANDA CHAKRABORTI
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Date of Birth: 30th October 1983; Mobile: +91-9354652349

Present Position

2020 August onwards Ramalingaswami Fellow, National Institute of Malaria Research, New-Delhi, India

Academic Experience

2017-2020 Assistant Professor and Project Manager of Homing grant, Malpolska Center of Biotechnology, Krakow, Poland.
Research Topic: A Programmable Modular, Molecular "Ball-and-Glove" with Potential for Drug Delivery
2016-2017 Assistant Professor at Malpolska Center of Biotechnology, Krakow, Poland.
Research Topic: Development of DNA/protein-based hybrid modular nano-machines for smart therapeutics.

Postdoctoral Work Experience

2015-2016 Research Associate at Department of Chemistry, Indiana University.
Research Topic: Virus like particle engineering for bio-medical application and drug delivery.
2013-2014 Postdoctoral researcher at Institut Curie, Paris, France
Research Topic: Impact of tubulin heterogeneity on biological functions and biophysical properties of microtubules

Education and Previous Experience

2008-2013 Ph.D studentship at Bose Institute (University of Calcutta) India
Thesis Title: The effect of ZnO nanoparticles on proteins and cells, and the recognition of curcumin by tubulin.
Academic Supervisor: Prof. Pinak Chakrabarti
2007-2008 Research engineer in the Biochemistry Dept, Delhi University, India.
2006-2007 Research engineer in the Chemistry Dept, IISC, Bangalore, India.
2004-2006 MSc in Biochemistry from the University of Calcutta
2001-2004 BSc (Hons) in Chemistry from the University of Calcutta

Publications: (Total = 36; Cumulative Impact Factor ~ 180; h-index - 23; Total citation – 1490 (Google Scholar) Total Citation – 1175; (Scopus); h-index – 21 (Scopus). ORCID ID: (https://orcid.org/0000-0002-7384-690X)

1. Rational evaluation of human serum albumin coated mesoporous silica nanoparticles for xenogenic-free stem cell therapies. Ezgi Özliseli, Didem Şen Karaman, **Soumyananda Chakraborti***, Anna Slita, Jessica M. Rosenholm (Colloid Surface A, 2020, 600, 124945-57, DOI: 10.1016/j.colsurfa.2020.124945) (*Corresponding author, Impact factor 3.99)
2. A bacteriophage mimic of the bacterial nucleoid-associated protein Fis. **Soumyananda Chakraborti**, Dhanasekaran Balakrishnan, Alexander J. Trotter, William H. Gittens, Ally W.H. Yange, Joy R. Paterson, Sylwia Świątek, Jacek Plewka, Fiona, A. Curtis, Laura Y. Bowers, Lars-Olof Pålsson, Timothy R. Hughes, Michał Taube, Maciej Kozak, Jonathan G. Heddle and Gary J. Sharples. (Biochem J, 2020, 477, 1345-1362. DOI: 10.1042/BCJ20200146) (Impact factor 4.09)
3. Enzyme Encapsulation by Protein Cages. **Soumyananda Chakraborti**, Ting-Yu Lin, Sebastian Glatt, Jonathan Heddle. (RSC Advances, 2020, 10, 13293-13301, DOI: 10.1039/c9ra10983h). (Impact factor 3.11).
4. A three-dimensional protein cage array capable of active enzyme capture and artificial chaperone activity. **Soumyananda Chakraborti***, Antti Korpi, Mantu Kumar, Piotr Stępień, Mauri A. Kostiainen, Jonathan G. Heddle. **Nano Letters,** 2019, 19, (6): 3918-3924. DOI: https://doi.org/10.1021/acs.nanolett.9b01148, Corresponding author) (Impact factor 11.23)
5. An ultra-stable gold-coordinated protein cage displaying reversible assembly. A. D. Malay, N. Miyazaki, A. Biela, **Soumyananda Chakraborti**, K. Majsterkiewicz, I. Stupka, C. S. Kaplan, A. Kowalczyk, B.M.A.G. Piette, G.K. A. Hochberg, D. Wu, T.P. Wrobel, A. Fineberg, M.S. Kushwah, M. Kelemen, P. Vavpetič, P. Pelicon, P. Kukura, J. L. P. Benesch, K. Iwasaki, J. G. Heddle. **Nature**, 2019, 569(7756): 438-442. DOI: https://doi.org/10.1038/s41586-019-1185-4) (Impact factor 43.07). **Highlighted in Nature News & Views**.
6. Molecular features of interaction involving hen egg white lysozyme immobilized on graphene oxide and the effect on activity. Bera, S; Dhar, J; Dasgupta, R; Basu, G; **Soumyananda Chakraborti**; Chakrabarti, P. *Int J Biol Macromol*, 2018; 120, 2390-2398. DOI: 10.1016/j.ijbiomac.2018.09.007. (Impact factor 5.1)

7. Effect of ZnO quantum dots on *Escherichia coli* global transcription regulator: A molecular investigation. Saha A; **Soumyananda Chakraborti*****. Int J Biol Macromol, 2018; 117:1280-1288. DOI: 10.1016/j.ijbiomac.2018.06.001. (Impact factor 5.1) (Corresponding Author)

8. Natural and artificial protein cages: design, structure and therapeutic Applications. Heddle JG*, **Soumyananda Chakraborti***, Iwasaki K. *Current opinion in structural Biology*, 2017; 43, 148-155. DOI: 10.1016/j.sbi.2017.03.007. (Impact factor 6.90) (*Contributed equally).

9. PEG-functionalized zinc oxide nanoparticles induce apoptosis in breast cancer cells through reactive oxygen species-dependent impairment of DNA damage repair enzyme NEIL2. **Soumyananda Chakraborti**.; Chakraborty, S.; Saha, S.; Adhikary, A.; Mazumdar, M.; Bhattacharjee, P.; Das, T.; Chakrabarti, P. *Free Radical Biology and Medicine*, 2017; 103: 35-47, DOI: 10.1016/j.freeradbiomed.2016.11.048. (Impact factor 6.1).

10. An emerging role of tubulin heterogeneity in neuronal disorders. **Soumyananda Chakraborti**, Curian, J.; Natarajan, K.; Janke C.; Liu J. *Cytoskeleton*, 2016; 73, 521-550. DOI: 10.1002/cm.21290. (Impact factor 1.7)**.**

11. The antimicrobial activity of ZnO nanoparticles against *Vibrio cholera*: Variation in response depends on biotype. Sarawar S.; **Soumyananda Chakraborti**.; Bera, S.; Ali, I.S.; Hoque, M.K.; Chakrabarti, P. *Nanomedicine: NBM*, 2016, 12, 1499-1509, DOI: 10.1016/j.nano.2016.02.006. (Impact factor 5.57).

12. Shape engineering boost antibacterial activity of mesoporous silica nanoparticle: A mechanistic investigation. Karaman, DS.; Sarwar, S.; Desai1, D.; Björk, EM.; Odén M.; Chakrabarti P.; Rosenholm JM.; **Soumyananda Chakraborti *****. *Journal of Material Chemistry B*, 2016, 4, 3292-3304. DOI: 10.1039/C5TB02526E. (*Corresponding Author) (Impact factor 5.34**)**

13. Antibacterial and DNA degradation potential of silver nanoparticle synthesized via green route. Maji, PK.; Mandal, AK.; **Soumyananda Chakraborti**.; Manna, D.; Chakraborty, R.; Islam, SS.; *International Journal of Biological Macromolecules*, 2015, 80, 455-459. DOI: 10.1016/j.ijbiomac.2015.07.028. (Impact factor 5.1)

14. Flexibility in the N-terminal actin-binding domain: clues from in silico mutation and molecular dynamics. Chakravarty, D*****.; **Soumyananda Chakraborti *****.; Chakrabarti, P. *Proteins*, 2015, 83, 696-710. DOI: 10.1002/prot.24767. (*Contributed equally) (Impact factor 2.82)

15. Microtubule +TIP Protein EB1 Binds to GTP and Undergoes Dissociation from Dimer to Monomer on Binding GTP. Gireesh K.K.; Sreeja, S.J.; **Soumyananda Chakraborti**.; Thomas, G.E.; Gupta, H.; Manna, T. *Biochemistry*, 2014, 53, 5551-5557, DOI: 10.1021/bi5007942. (Impact factor 2.86)

16. Bactericidal effect of polyethyleneimine capped ZnO nanoparticles on multiple antibiotic resistant bacteria harboring genes of high-pathogenicity island. **Soumyananda Chakraborti**.; Madal, AK.; Sarwar, S.; Singh, P.; Chakraborty, R.; Chakrabarti, P. *Colloid and Surface B* 2014, 121, 44-53, DOI:10.1016/j.colsurfb.2014.03.044. (Impact factor 4.38)

17. Stable and potent analogs derived from the modifications of the dicarbonyl moiety of curcumin. **Soumyananda Chakraborti**.; Dhar, G.; Dwivedi, V.; Das, A.; Poddar, A.; Chakraborti, G.; Basu, G.; Chakrabarti, P.; Surolia, A.; Bhattacharyya, B. *Biochemistry*, 2013, 52, 7449-7460, DOI:10.1021/bi400734e. (Impact factor 2.86)

18. Green synthesis of silver nanoparticles using glucan 1 from mushroom and study of antibacterial activity. Sen, IK.; Mandal, AK.; **Soumyananda Chakraborti**.; Dey, B.; Chakraborty, R.; Islam, SS. *International Journal of Biological Macromolecule*, 2013, 62, 439-449, DOI: 10.1016/j.ijbiomac.2013.09.019. (Impact factor 5.1)

19. The effect of the binding of ZnO nanoparticle on the structure and stability of α-Lactalbumin: a comparative Study. **Soumyananda Chakraborti *****.; Sarwar S.; Chakrabarti, P*. *Journal of Physical chemistry B*, 2013, 117(43), 13397-13408, DOI: 10.1021/jp404411b. (*Corresponding Author) (Impact factor 2.85).

20. The molecular basis of inactivation of metronidazole-resistant *Helicobacter pylori* using polyethyleneimine functionalized ZnO nanoparticles. **Soumyananda Chakraborti**.; Bhattacharya S.; Chowdhury, R.; Chakrabarti, P. *Plos one*, **2013**, 8, e70776. doi:10.1371/journal.pone.0070776. (Impact factor 2.77)

21. Partial characterization and flocculating behavior 1 of an exopolysaccharide produced in nutrient poor medium by a facultative oligotroph *Klebsiella sp.* PB12. Mandal, A.K.; Yadav, K.K.; Sen, I.K.; Kumar, A.; **Soumyananda Chakraborti.**; Islam, S.S.; Chakraborty, R. *Journal of Bioscience and Bioengineering*, **2013**, 115, 76-81, DOI: 10.1016/j.jbiosc.2012.08.006. (Impact factor 2.03)

22. Discrimination of ligands of different flexibility resulting from the plasticity of the binding site in tubulin. **Soumyananda Chakraborti**.; Chakravarty, D.; Gupta, S.; Chatterjee, B.P.; Dhar, G.; Poddar, A.; Panda, D.; Chakrabarti, P.; Dastidar, S.G.; Bhattacharyya, B. *Biochemistry*, **2012**, 51(36), 7138-7148, DOI: 10.1021/bi300474q. (Impact factor 2.86)

23. Flocculating property of extracellular polymeric substances produced by a biofilm-forming bacterium Acinetobacter junii BB1A. Yadav, K.K.; Mandal, A.K.; Sen, I.K.; **Soumyananda Chakraborti**.; Islam, S.S.; Chakraborty, R. *Appl. Biochem. Biotechnol*. **2012**, 168, 1621-1634, DOI: 10.1007/s12010-012-9883-5. (Impact factor 2.1)

24. Interaction of polyethyleneimine functionalized ZnO nanoparticles with bovine serum albumin. **Soumyananda Chakraborti.**; Joshi, P.; Chakravarty, D.; Shanker, V.; Ansari, Z.A.; Singh, S.P.; Chakrabarti, P. *Langmuir*, **2012**, 28(30), 11142-11152, DOI: 10.1021/la3007603. (Impact factor 3.55)
25. CIL-102 binds to tubulin at colchicine binding site and triggers apoptosis in MCF-7 cells by inducing monopolar and multinucleated cells. Gireesh, K.K.; Rashid, A.; **Soumyananda Chakraborti**.; Panda, D.; Manna, T. *Biochem. Pharmacol.* **2012**, 84(5), 633-645, DOI: 10.1016/j.bcp.2012.06.008. (Impact factor 4.96)
26. The anticancer activity of chloroquine-gold nanoparticles against MCF-7 breast cancer cells. Joshi, P.;* **Soumyananda Chakraborti**.;* Shanker, V.; Ansari, Z.A.; Singh, S.P.; Chakrabarti, P. *Colloids Surf. B.* **2012**, 95,195-200, DOI: 10.1016/j.colsurfb.2012.02.039. (*Contributed equally) (Impact factor 4.38).
27. ZnO nanoparticles as an antibacterial agent against *E.coli.* Joshi, P.; **Soumyananda Chakraborti**.; Chakrabarti, P.; Singh, S.P.; Ansari, Z.A.; Husain, M.; Shanker, V. *Sci. adv. Mater.* **2012**, 4, 173-178, DOI:10.1166/sam.2012.1269. (Impact factor 1.31)
28. Curcumin recognizes a unique binding site of tubulin. **Soumyananda Chakraborti.;** Das, L.; Kapoor, N.; Das, A.; Dwivedi, V.; Poddar, A.; Chakraborti, G.; Janik, M.; Basu, G.; Panda, D.; Chakrabarti, P.; Surolia, A.; Bhattacharyya, B. *J. Med. Chem*. **2011**, 54 (18), 6183-6196, DOI:10.1021/jm2004046. (Impact factor 6.2)
29. A multiple antibiotic and serum resistant oligotrophic strain, Klebsiella pneumoniae MB45 having novel dfrA30, is sensitive to ZnO QDs. Kumar, A.; **Soumyananda Chakraborti**.; Joshi, P.; Chakrabarti, P.; Chakraborty, R. *Ann. Clin. Microbiol. Antimicrob*. **2011**, 10, 19, DOI: 10.1186/1476-0711-10-19. (Impact factor 2.92)
30. Contrasting effect of gold nanoparticles and nanorods with different surface modifications on the structure and activity of bovine serum albumin. **Soumyananda Chakraborti**.; Joshi, P.; Shanker, V.; Ansari, Z.A.; Singh, S.P.; Chakrabarti, P. *Langmuir*, **2011**, 27 (12), 7722-7731, DOI:10.1021/la200787t. (Impact factor 3.55)
31. Binding of chloroquine-conjugated gold nanoparticles with bovine serum albumin. Joshi, P*.; **Soumyananda Chakraborti** *.; Dey, S.; Shanker, V.; Ansari, Z.A.; Singh, S.P.; Chakrabarti, P. *J. Colloid Interface Sci*. **2011**, 2 (355), 402-409, DOI: 10.1016/j.jcis.2010.12.032. (*Contributed equally) (Impact factor 7.48)
32. The effect of zinc oxide nanoparticles on the structure of the periplasmic domain of the *Vibrio cholerae* ToxR protein. Chatterjee, T.; **Soumyananda Chakraborti**.; Joshi, P.; Gupta, V.; Singh, S.P.; Chakrabarti, P.; *FEBS J.* **2010**, 277 (20), 4184-4194, DOI: 10.1111/j.1742-4658.2010.07807.x.. (Impact factor 4.8)
33. Structure and activity of lysozyme on binding to ZnO nanoparticles. **Soumyananda Chakraborti**.; Chatterjee, T.; Joshi, P.; Poddar, A.; Bhattacharyya, B.; Gupta, V Singh, S.P.; Chakrabarti P. *Langmuir*, **2010**, 26 (5), 3506-3513. DOI:10.1021/la903118c. (Impact factor 3.55)
34. Role of surface adsorbed anionic species in antibacterial activity of ZnO quantum dots against Escherichia coli. Joshi, P.; **Soumyananda Chakraborti.**; Chakrbarti, P.; Haranath, D.; Shanker, V.; Ansari, Z.A; Singh, S.P.; Gupta, V. *J. Nanosci. Nanotechnol.* **2009**, 9(11), 6427-6433, DOI: 10.1166/jnn.2009.1584. (Impact factor 1.35)

Book Chapters

35. Self-assembly of ferritin: Structure, biological function and potential application in nanotechnology. **Soumyananda Chakraborti,** Pinak Chakrabarti. Advances in Experimental Medicine and Biology series, (2019), 1174:313-329. DOI: 10.1007/978-981-13-9791-2_10. ISBN 978-981-13-9790-5. Publisher by Springer Nature and edited by Sarah Perrett, Alexander Buell, and Tuomas Knowles.
36. Electrostatic Self-Assembly of Protein Cage Arrays. **Soumyananda Chakraborti**, Antti Korpi, Jonathan G. Heddle* Mauri A. Kostiainen*. Methods Mol Biol. 2021; 2208:123-133. DOI: 10.1007/978-1-0716-0928-6_8. Book Title: Polypeptide Materials; ISBN:978-1-0716-0927-9. publisher Springer Nature.

ORAL PRESENTATIONS / WORKSHOP / CONFERENCE POSTER

1. Participated at ARBRE-MOBIEU/INSTRUCT Training School on Quality Control of Protein Samples for Structural Biology (October 14-18, 2019) at Institute Pasteur, Paris.
2. Invited as a keynote speaker at European Material Society Fall meeting, Warsaw (2019) and delivered a lecture on the topic "Ferritin: The most interesting bionano component?"
3. Participated in III interdisciplinary FNP Conference (2019) and presented a poster on the topic "A DNA-protein programmable nano-machine for smart drug delivery"
4. Selected for flash talk on the topic "Ferritin: The most interesting bio Nano component" at "Molecular Biophysics: ABC of the puzzle of Life, ARBRE-MOBIEU Plenary Meeting Zagreb, March 18-20, 2019
5. Organizers of "Krakow Interdisciplinary Science Seminar (KISS) 2019" and presented a poster on the topic "Ferritin: The most interesting bio Nano component".
6. Delivered a keynote lecture on the topic "Ferritin: The most interesting bio Nano component" at International conference On Chemistry and Applied Research (2018), held at Prague, Czech Republic.

7. Delivered a talk on the topic "Ferritin: The most interesting bio Nano component at 2nd Bionano workshop 2018", held in Krakow, Poland. (https://bionanomeeting.org/participants-and-program)
8. Selected for ERC grant writing workshop in Warsaw (2018) jointly organized by Cambridge university and Polish academy of Science, held in Warsaw, Poland.
9. Delivered a invited talk at 1st Summer school, Zakopane (2018) organized by Malpolska Centrum Biotech, Krakow, Poland
10. Delivered a invited lecture at II interdisciplinary FNP Conference (2017), on the topic "A DNA-protein programmable nano-machine for smart drug delivery"
11. Delivered a invited talk at Euro-Biotech, Krakow (2017) on the topic "unusual mechanical stability of an artificial model protein cage". Chaired "session 17" of the same conference.
12. Delivered a invited talk at IPROMED, Malta (2017) on the topic "A Novel Way to Kill Pathogenic Bacteria by Combining Nanoparticles with Antimicrobial Peptides".
13. Delivered a invited talk at winter school, Zakopane (2017) organized by faculty of Biochemistry, Biophysics and Biotechnology of Jagiellonian University, Krakow, Poland
14. Attended Gordon research Conference on physical virology held at Ventura Beach Marriott, CA, USA from January 25-30, 2015
15. Presented a poster in FEBS-EMBO conference held at Paris, France, From August 30-Sep 4, 2014
16. Presented a poster in EMBO conference series of "Microtubules: Structure, regulation and Function" Held at EMBL Heidelberg, Germany, From July 28-31, 2014
17. Attended International Conference on Yeast Genetics and Molecular Biology at Frankfurt University, Germany, during Aug 29 – Sept 3, 2013.
18. Delivered a invited talk at "Labex Retreat 2013" (La Colle Sur Loup, France) during Oct 14-16 2013. (http://www.labex-celtisphybio.fr/article-1-article-1-article-1-article-1-article-) on the topic "Impact of tubulin heterogeneity on biological functions and biophysical properties of microtubules.
19. Delivered a talk at National Symposium on Micro and Macro Resources in Biomolecular Technology, organized by Department of Biotechnology, North Bengal University, held at Siliguri, during February 25-26, 2013. (Best Oral Presentation Award)
20. Presented a poster in International Conference on Biomolecular Forms and Functions organized by Molecular Biophysics Unit, Indian Institute of Science, held at Bangalore during January 8-11, 2013. (Received Travel Grant Award)
21. Presented a poster in "Colloid and Nanomedicine 2012", organized by Elsevier held at Amsterdam, Netherland during July 15th-17th, 2012.
22. Presented a poster in 2nd International Conference on "Perspective of Cell Signaling and Molecular Medicine", organized by Bose Institute held at Bose Institute, Kolkata, during January 8th -11th, 2012. (Best poster award)
23. Presented a poster in "Conference on Informatics & Integrative Biology (CIIB-2011)", organized by: Centre for Bioinformatics, Bose Institute held at Bose institute, Kolkata, during December 14th – 16th, 2011. (Best poster award)
24. Presented a poster 7th Asian Biophysics Association (ABA) symposium and annual meeting of the Indian Biophysical Society (IBS), organized by: Indian Biophysical Society held at Indian Habitat Centre, New Delhi, during January 30th -2nd February 2011.
25. Attended EMBO world lecture course on "Recent Development in Macromolecular Crystallography" held at National Chemical Laboratory (NCL), Pune, during 9 -14th November 2008. Jointly organized by NCL, Pune and European Molecular Biology Laboratory, Hamburg, Germany.

AWARDS AND HONORS

1. Recipient of prestigious **Ramalingaswami Re-entry Fellowship** (2019-2020) by Department of Biotechnology, Government of India.
2. Awarded for scientific excellence (2019) by Rector (Chancellor) of Jagiellonian University, Poland for outstanding publications.
3. Recipient of prestigious **"HOMING" grant** (2017) by FNP (Foundation for Polish Science, Poland). The grant budget was ~ 0.2 million Euro to conduct independent research in the field of synthetic biology. The title of the project was "**A Programmable Modular, Molecular "Ball-and-Glove" with Potential for Drug Delivery**" (https://www.fnp.org.pl/en/homing-grant-winners-competition-32017/)
4. Awarded Postdoctoral fellowship (2014) from Third World Academy of Science (TWAS) to conduct postdoctoral research at Institute of Biophysics, China.
5. Awarded 3 years VATAT Postdoctoral fellowship (2014) to conduct research at Weizmann Institute of technology from the Ministry of Higher Education, Israel.

6. Awarded 1year Postdoctoral Fellowship by the Labex consortium (2013) Paris, France. (http://www.labex-celtisphybio.fr/post-doc-1-post-doc-1-post-doc-1-post-doc-1/)
7. Professor **BB Biswas outstanding student award** (2011) from Bose Institute, India.
8. Vidyasagar College (Undergraduate College) – Proficiency Award for B.Sc. Examination, October 2005.

Other Scientific Activities:

1. Member of Polish Biochemical Society.
2. Editorial Board member of Bioengineering International (https://bioengineering.international/journal-info/editorial-board/).
3. Topic editor of journal Crystals, MDPI journal (https://www.mdpi.com/journal/crystals/topic_editors)
4. Member of ARBRE-MOBIEU biophysics network in Europe (COST Action) (https://arbre-mobieu.eu)
5. Member of Cancer Nanomedicine COST network (Nano2Clinic; www.nano2clinic.eu)