

## **Bio-Data:**

### **Samir K. Maji, Ph.D.**

Professor, Department of Biosciences and Bioengineering

Institute Chair Professor, IIT Bombay

Professor in-charge, Sunita Sanghi Centre for Aging and Neurodegeneration, IIT Bombay

Email: samirmaji@iitb.ac.in

Phone: +91-22-2576-7774 (office)

Fax: +91-22- 2572-3480

Webpage: <https://www.bio.iitb.ac.in/people/faculty/maji-sk/>

## **POSITIONS AND EMPLOYMENTS**

Sep.2002-Jan.2005	<b>Postdoctoral Fellow</b> , Department of Neurology, Harvard Medical School and Center for Neurologic Diseases, Brigham and Women's Hospital, Boston, MA
Feb.2005-Feb.2006	<b>Postdoctoral Fellow</b> , Department of Neurology, David Geffen School of Medicine, University of California at Los Angeles (UCLA), CA
Feb.2006-Dec.2007	<b>Research Associate</b> , Structural Biology Laboratory, The Salk Institute for Biological Studies, 10010 N. Torrey Pines Rd, La Jolla, CA-92037.
Jan.2008-Dec.2008	<b>Research Associate</b> , Department of Physical Chemistry, ETH-Zurich, Wolfgang-Pauli-Str. 10, 8093 Zurich, Switzerland
Jan.2009-Sep.2014	<b>Assistant Professor</b> , Department of Bioscience and Bioengineering, IIT Bombay, Powai, Mumbai 400 076, India
May 2013-July2013	<b>Visiting Fellow</b> , Lab Fur Physikalische Chemie, ETH Zurich, Switzerland
Sep.2014-Nov.2018	<b>Associate Professor</b> , Department of Biosciences and Bioengineering, IIT Bombay, Powai, Mumbai 400076, India
Dec.2018- Present	<b>Professor</b> , Department of Biosciences and Bioengineering, IIT Bombay, Powai, Mumbai 400076, India
June 2022-Present:	<b>Professor-In-Charge</b> , Sunita Sanghi Centre for Aging and Neurodegenerative diseases (SCAN), ( <a href="https://www.scan.iitb.ac.in">https://www.scan.iitb.ac.in</a> ), IIT Bombay, Powai, Mumbai 400076, India
Jan 2022- Present	<b>Institute Chair Professor</b> , IIT Bombay

## **EDUCATION**

- 2003: Ph.D. in Biological Chemistry from the Department of Biological Chemistry, Indian Association for the Cultivation of Science (IACS), Jadavpur, Kolkata, India.
- 1998: M.Sc. in Chemistry (Major in Organic Chemistry) from the Department of Chemistry, University of Calcutta, Kolkata, India.
- 1996: B.Sc. In Chemistry (Organic, Inorganic and Physical Chemistry), University of Calcutta, Kolkata, India

## **AWARDS AND HONOURS**

1. Selected to receive the Prof. S.C. Bhattacharya Award for Excellence in Pure Science, IIT Bombay, 2023
2. Selected to receive the SASTRA-Obaid Siddiqi award for Life Sciences, 2023
3. Elected fellow of the Indian National Science Academy (INSA), 2023
4. Elected Fellow of Indian Academy of Sciences, Bangalore (IAS), 2022
5. Appointed as the Professor-in-charge of “Sunita Sanghi Centre for Aging and Neurodegeneration” (SCAN) at IIT Bombay, 2022
6. Appointed as the Institute Chair Professor, IIT Bombay, 2022
7. P.B Rama Rao Memorial Award, 2021
8. IIT Bombay Impactful Research Award, 2021
9. Elected Fellow of the Royal Society of Chemistry (FRSC), 2021
10. Elected Fellow of the Royal Society of Biology (FRSB), 2021
11. Elected Fellow of the National Academy of Sciences, India, (FNASc), 2021
12. IIT Bombay Excellence in Teaching Award, 2020
13. TATA Innovation fellowship, Department of Biotechnology, Government of India, 2020
14. NASI-Reliance Platinum Jubilee Award, The National Academy of Sciences, India, 2019
15. Appointed as Research Advisor, Nanyang Academy of Sciences, Singapore (NAAS), 2018
16. Selected as a Member of Royal Society of Chemistry (MRSC), 2018
17. IIT Bombay Research Publication Award, 2016, IIT Bombay
18. National Bioscience Award for Career Development, 2016, Department of Biotechnology, Ministry of Science and Technology, Government of India
19. Young researcher award, Lady Tata Memorial Trust, 2013
20. International fellowship from Swiss National Science Foundation, SNF, 2013
21. Young Investigator Travel Award by Protein Society and Finn World Travel award, 2010
22. DST-SERC Fast Track for Young Scientists, India, 2010, Department of Science and Technology. Govt. of India

## **MEMBERSHIP OF PROFESSIONAL SOCIETIES:**

American Association for the Advancement of Science (AAAS)

The National Academy of Sciences, India

American Society for Biochemistry and Molecular Biology (ASBMB)

American Chemical Society (ACS)

Indian Biophysical Society (IBS)

Society for Biological Chemists (SBC), India

## **EDITORIAL BOARD MEMBERSHIPS**

BBA Proteins and Proteomics

The Journal of Biological Chemistry (JBC)

American Chemical Society Bio & Med Chem Au,

Frontiers in Physics, Frontiers in Physiology and Frontiers in Molecular Biosciences

## **SCIENTIFIC ADVISORY POSITIONS**

*National and Institute level*

2022-Present:	Committee member of DST INSPIRE fellowship in Biology
2022-Present:	Advisory Committee of UG and PG programs in the Faculty of Science, SVKM'S Mithibai College, Mumbai.
2021-Present:	Member of FWO Review College, The Research Foundation – Flanders, Belgium public research council, Brussels,
2020-Present:	Reviewing Panel, ISA, TNQ Awards for Best Paper
2018-Present:	DBT nominee of Biosafety Committee, TIFR, Mumbai
2021-Present:	IRCC advisory committee, IIT Bombay
2019-Present:	Faculty search committee chairperson, Department of Biosciences and Bioengineering, IIT Bombay
2019-Present:	Member of Disciplinary action committee, IIT Bombay
2018-Present:	Institute fellowship committee, IIT Bombay
2018-Present:	Warden of Hostel 18, IIT Bombay
2011-Present:	PhD. Admission coordinator, IIT Bombay

## **REVIEWER OF JOURNALS**

Nature Chemical Biology, Nature Chemistry, Nature Communications, Biomacromolecules, ChemBioChem, Biochemistry, ACS Nano, Science Advance, Journal of the American Chemical Society (JACS), Journal of Biological Chemistry (JBC), Scientific Reports, ACS Chemical Biology, PloS One, ACS Chemical Neuroscience, Human Molecular Genetics,

Journal of Physical Chemistry, Physical Chemistry Chemical Physics, Journal of Basic Microbiology, The FASEB Journal, Indian journal of Medical Research, Current Science

### **PhD THESIS EXAMINER**

Calcutta University, Jadavpur University, Tata Institute of Fundamental Research (TIFR), Mumbai, National Center for Biological Sciences (NCBS), Bangalore, Indian Institute of Science (IISc) Bangalore, IIT Delhi, SP Pune University, NCCS-Pune, Indian Institute of Science Education and Research (IISER) Mohali, Indian Institute of Science Education and Research (IISER-Kolkata), Indian Institute of Chemical Biology (IICB), NISER-Bhubaneswar, Guru Nanak Dev University

### **REVIEWER OF INTERNATIONAL GRANT AGENCIES**

Swiss National Science Foundation (SNF)  
Alzheimer's Association, USA  
Medical Research Council (MRC), London  
European Science Foundation (ESF)  
Flanders Research Foundation (FWO)  
European Research Council (ERC)

### **REVIEWER OF NATIONAL GRANT AGENCIES**

Department of Biotechnology, India  
Department of Science and Technology (DST), India  
Board of Research in Nuclear Sciences (BRNS), India  
BIRAC, DBT  
IMPRINT, DST

### **COURSES TAUGHT**

Biological kinetics and Thermodynamics (BB/BS 409)  
Biophysics Laboratory (BB450)  
Molecular Biophysics (BS400)  
Topics in Biotechnology II (BB/BS 602)  
Biophysical Chemistry (BB617)  
Protein Engineering (BB 648)

## **STUDENTS AND POSTDOCTORAL FELLOWS SUPERVISED:**

### **PhD. students supervised:**

1. Dr. Pradeep K Singh (2015, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **The Rockefeller University**, New York, USA)
2. Dr. A. Anoop (2015, currently a postdoctoral fellow at the **University of Michigan**, Ann Arbor, USA)
3. Dr. Reeba S Jacob (2015, **Dr. Gargi Vishnoi Memorial Best Ph.D. Thesis Award**, currently a postdoctoral fellow at **Weizmann Institute of Science**, Rehovot, Israel.
4. Dr. Dhiman Ghosh (2016, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **ETH Zurich**, Switzerland.
5. Dr. Shruti Sahay (2016, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **University of California at Los Angeles**, UCLA)
6. Dr. Narendra Nath Jha (2017, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **Columbia University**, USA)
7. Dr. Subhadeep Das (2017, **IIT Bombay-Monash Academy best thesis award**, CEO of start-up based on amyloid materials “**Convalesce**”, **San Francisco**, USA)
8. Dr. Srivastav Ranganathan (2018, Co-Guide, Currently a postdoctoral fellow at **Harvard University**, USA)
9. Dr. Ganesh M Mohite (2018, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **Linköping University**, Sweden)
10. Rakesh Kumar (2019, **IIT Bombay best thesis award**, currently a postdoctoral fellow at **Karolinska Institute**, Sweden)
11. Dr. Surabhi Mehra (2020, currently a postdoctoral fellow at **University of Toronto**, Canada)
12. Dr. Ambuja Navalkar (2021, **Dr. Gargi Vishnoi Memorial Best Ph.D. Thesis Award**, currently a postdoctoral fellow at **St. Jude Children's Research Hospital**, Tennessee, USA)
13. Dr. Soumik Ray (2021, currently a postdoctoral fellow at **Technical University of Denmark (DTU)**, Denmark)
14. Dr. Debdeep Chatterjee (2022, currently a postdoctoral fellow at **DZNE, University of Gottingen**, Germany)
15. Dr. Komal Patel (Institute postdoctoral fellow, 2022)
16. Dr. Debalina Datta (Institute postdoctoral fellow, 2022)

17. Dr. Pradeep Kadu (Institute postdoctoral fellow, 2023)

18. Laxmikant Gadhe (Thesis submitted, 2023)

Ongoing PhD. Students

1. Ajay Singh Sawner (2018-)

2. Manisha Poudyal (2018-)

3. Ajoy Paul (2019-)

4. Semanti Mukherjee (2019-)

5. Nitisha Gahlot (2019-)

6. Riya Bera (2019-)

7. Jyoti Badhan (2021-)

8. Ranjit Shaw (2021-)

9. Shouvik Manna (2022-)

10. Arpita Bhattacharyya (2022-)

Postdoctoral Fellow supervised:

1. Dr. Shinjinee Dasgupta (2022, currently Wellcome Trust/DBT India Alliance Early Career Fellow and Assistant Professor at Amity University, Noida, Delhi)

2. Dr. Namrata Singh (2021, currently Research Scientist at Glenmark Pharmaceuticals, Mumbai)

3. Dr. Nitu Singh (2020, currently DBT- Research Associate at Regional Centre for Biotechnology, Faridabad)

4. Dr. Sidharta Maiti (2020, currently Assistant Professor at Vellore Institute of Technology (VIT), Bhopal)

5. Dr. Satya Pandey (2020, currently Junior Scientist at Tata Medicals and Diagnostics)

6. Dr. Purna Chetri (2023)

Ongoing Postdoctoral fellows

1. Dr. Arunima Sakunthala (2017)

2. Dr. Shalaka A. Masurkar (2022)

3. Dr. Debalina Datta (2022)

4. Dr. Komal Patel (2022)

5. Dr. Pradeep Kadu (2022)

6. Dr. Prasad Sulkshane (2023)

M.Phil students supervised:

Saikat Ghosh (2016)

*M.Tech Thesis supervised:*

1. Santosh Kumar P (2014),
2. Reena Gautam (2015),
3. Sneha Kirti (2017),
4. Pratap Singh Markam (2017),
5. Shankha Ghosh Dastidar (2017)
6. Rahul Pramjeet (2020)

*M.Sc. Students supervised:*

1. Amrita Singh (2010, co-guide; Guide Dr. Dulal Panda)
2. Vijay Kumar Gupta (2011)
3. Vasudha Kotia (2011)
4. Bhagwan Das Dhaked (2011, co-Guide, Prof. Ranjith Padinhateeri, BSBE, IITB)
5. Kushal Das (2012, co-guide Prof. Shamik Sen, BSBE, IITB)
6. Tarun K Rai (2012),
7. Sandeep Kumar (2013, co-guide, Prof. Shamik Sen)
8. Amresh Kumar (2013)
9. Kanchana Pandian (2013)
10. Danish Umar (2014)
11. Riddhi Deshmukh (2014, Co-Guide Prof. Santanu Ghosh)
12. Sanjay P Mondal (2014)
13. Saroj Rout (2015)
14. Arindam Ghosh (2016)
15. Nandan J (2016)
16. Kazi Atikur Rahman (2017)
17. Sugandha Narayan (2017)
18. Karan Sharma (2019)
19. Papiya Banik (2019)
20. Abhishek Shaw (2020)
21. Sagar Jaiker (2020)
22. Jyoti Badhan (2021)
23. Preeti Yadav (2021)
24. Shreya Chakraborty (2022)
25. Abhishek Goswami (2022)
26. Krishna Samatia (2023)
27. Abhimanyu Ray (2023)

## **PUBLICATIONS**

(h-index = 42)

1. Sengupta, S., Singh, N., Paul, A., Datta, D., Chatterjee, D., Mukherjee, S., Gadhe, L., Devi, J., Yeshwant, M., Jolly, MK., **Maji, S. K.** (2023), Correlation of p53 amyloid pathology and mutations with cancer grades, **Journal of Cell Science (Accepted for publication)**.
2. Namrata Singh, Komal Patel, Ambuja Navalkar, Pradeep Kadu, Debalina Datta, Debdeep Chatterjee, Semanti Mukherjee, Ranjit Shaw, Nitisha Gahlot, Abhishek Shaw, Sachin Jadhav, **Samir K Maji**, (2023), Amyloid fibril-based thixotropic hydrogels for modeling of tumor spheroids in vitro, **Biomaterials** 295, 122032
3. Poudyal, M., Patel, K., Sawner, A.S., Gadhe, L., Kadu, P., Datta, D., Mukerjee, S., Ray, S., Navalkar, A., Maiti, S., Chatterjee, D., Bera, R., Gahlot, N., Padinhateeri, R. and **Maji, S. K.** (2023), Liquid condensate is a common state of proteins and polypeptides at the regime of high intermolecular interactions, **Nature Communication (Revision submitted)**.
4. Poudyal, M., Sakunthala, A., Mukherjee, S., Gadhe, L., and **Maji, S. K.**, (2022), Phase separation and other forms of  $\alpha$ -Synuclein self-assemblies, **Essays in biochemistry** 66 (7), 987-1000
5. Kadu, P., Gadhe , L., Navalkar, A., Patel, K., Kumar, R., Sastry, M. and **Maji, S. K.**, (2022). Charge and Hydrophobicity of amyloidogenic protein/peptide templates regulate the growth and morphology of gold nanoparticles, **Nanoscale** 14, 5021–15033
6. Mehra, S., Ahlawat, S., Kumar, H., Datta, D., Navalkar, A., Singh, N., Gadhe, L., Kumar, R., Jha, N. N., Sakunthala, A., Sawner, A.S., Padinhateeri, R., Udgaonkar, J.B., Agarwal, V., **Maji, S. K.**, (2022),  $\alpha$ -Synuclein aggregation intermediates form fibril polymorphs with distinct prion-like properties, **Journal of Molecular Biology**, 434(19), 167761
7. Sakunthala, A., Datta, D., Navalkar, A., Gadhe, L., Kadu, P., Patel, K., Mehra, S., Kumar, R., Chatterjee, D., Devi, J., Sengupta, K., Padinhateeri, R., **Maji, S. K.**, (2022), Direct Demonstration of Seed Size-Dependent  $\alpha$ -Synuclein Amyloid Amplification, **Journal of Physical Chemistry Letters** 13 (28), 6427–6438
8. Navalkar, A., Paul, A., Skunthala, A., Pandey, S., Dey, A.K., Saha, S., Sahoo, S., Jolly, M.K., Maiti, T.K., **Maji, S. K.**, (2022), Oncogenic gain of function due to p53 amyloids occurs through aberrant alteration of cell cycle and proliferation, **Journal of Cell Science** 135 (15): jcs260459
9. Mukherjee, S., Sakunthala, A., Gadhe, L., Poudyal, M., Sawner, A.S., Kadu, P., **Maji, S. K.**, (2022), Liquid-liquid phase separation of  $\alpha$ -Synuclein: A new mechanistic insight for



$\alpha$ -Synuclein aggregation associated with Parkinson's disease pathogenesis, **Journal of Molecular Biology** 167713

10. Krishnan, R., Ranganathan, S., **Maji, S. K.**, Padinhateeri, R., (2022), Role of non-specific interactions in the phase-separation and maturation of macromolecules. **PLOS Computational Biology** doi.org/10.1371/journal.pcbi.1010067
11. Chatterjee, D., Jacob, R.S., Ray, S., Navalkar, A., Singh, N., Sengupta, S., Gadhe, L., Kadu, P., Datta, D., Paul, A., Mehra, S., Pindi, C., Kumar, S., Singru, P.S., Senapati, S.K. and **Maji, S. K.**, (2022), Co-aggregation and secondary nucleation in the life cycle of human prolactin/galanin functional amyloids. **eLife** 11: e73835
12. Deshmukh, P.P., Malankar, G.S., Sakunthala, A., Navalkar, A., **Maji, S. K.**, Murale, D.P., Saravanan R. and Manjare S.T. (2022), Efficient Chemodosimeter for Hg(II) Via Diselenide Oxidation, **Dalton Trans** 51, 2269-2277
13. Gadhe, L., Sakunthala, A., Mukherjee, S., Gahlot, N., Bera, R., Sawner, A.S., Kadu, P. and **Maji, S. K.** (2021), Intermediates of  $\alpha$ -synuclein aggregation: Implications in Parkinson's disease pathogenesis, **Biophysical Chemistry**, 281(2022):106736
14. Mahato, J., Ray, K.K., Das, S., Kadu, P., **Maji, S. K.** and Chowdhury, A. (2021), Investigation of Structural Heterogeneity in Individual Amyloid Fibrils using Polarization-resolved Microscopy, **The Journal of Physical Chemistry B**, 125(49): 13406–13414
15. Mehra, S., Gadhe, L., Bera, R., Sawner, A.S. and **Maji, S. K.** (2021) Structural and functional insights into  $\alpha$ -synuclein fibril polymorphism, **Biomolecules**, 11(10):1419
16. Tikader, B., **Maji, S. K.** and Kar, S., (2021), A generic approach to decipher the mechanistic pathway of heterogeneous protein aggregation kinetics. **Chemical Science**, 12, 13530-13545
17. Sawner, A.S., Ray, S., Yadav, P., Mukherjee, S., Panigrahi, R., Poudyal, M., Patel, K., Ghosh, D., Kummerant, E., Kumar, A., Riek, R. and **Maji, S. K.**, (2021), Modulating  $\alpha$ -Synuclein Liquid–Liquid Phase Separation. **Biochemistry**, 60 (48), 3676–3696
18. Navalkar, A., Pandey, S., Singh, N., Patel, K., Mohanty, B., Jadhav, S., Chaudhari, P. and **Maji S. K.**, (2020), Direct evidence of cellular transformation by prion-like p53 amyloid infection. **Journal of Cell Science**; 134 (11): jcs258316
19. Malankar, G. S., Sakunthala, A., Navalkar, A., **Maji, S. K.**, Raju, S. and Manjare, S.T.,(2021). Organoselenium-based BOPH.Y as a sensor for detection of hypochlorous acid in mammalian cells. **Analytica Chimica Acta**, 1150 (338205)
20. Kadu, P., Pandey, S., Neekhara, S., Kumar, R., Gadhe, L., Srivastava, R., Sastry, M. and **Maji, S. K.**, 2020. Machine-Free Polymerase Chain Reaction with Triangular Gold and Silver Nanoparticles. **The Journal of Physical Chemistry Letters**, 11,10489-10496

21. Joseph J., **Maji S. K.** and Padinhateeri R. (2020), Computational Model for Studying Breakage-Dependent Amyloid Growth. **ACS Chemical Neuroscience**, 11(21):3615-3622
22. Seuring, C., Verasdonck, J., Gath, J., Ghosh, D., Nespovitaya, N., Wälti, M A., **Maji, S. K.**, Cadalbert, R, Güntert, P., Meier, BH and Riek, R. (2020), The 3D structure of  $\beta$ -endorphin amyloid fibrils. **Nature Structural & Molecular Biology**, 27:1178–1184
23. Ray, S and **Maji, S. K.** (2020), Predictable phase-separated proteins. **Nature Chemistry** 12, 787–789 (Invited Commentary article)
24. Sharma, K., Mehra, S., Sawner, AS., Markam, P S., Panigrahi, R., Navalkar, A., Chatterjee, D., Kumar, R., Kadu, P., Patel, K., Ray, S., Kumar, A and **Maji, S. K.** (2020), Effect of disease-associated P123H and V70M mutations on  $\beta$ -synuclein fibrillation. **ACS Chemical Neuroscience**, 11(18):2836–2848
25. Pravin, N., Kumar, R., Tripathi, S., Kumar, P., Mohite, G M., Navalkar, A., Panigrahi, R., Singh, N., Gadhe, LG., Manchanda, S., Shimozawa, M., Nilsson, P., Johansson, J., Kumar, A., **Maji, S. K.** and Shanmugam M. (2020), Benzimidazole based fluorophores for the detection of amyloid fibrils with higher sensitivity than Thioflavin-T. **Journal of Neurochemistry**, 156(6): 1003-1019
26. Kisannagar, R R., Jha, P., Navalkar, A., **Maji, S. K.**, Gupta, D. (2020), Fabrication of Silver Nanowire/Polydimethylsiloxane Dry Electrodes by a Vacuum Filtration Method for Electrophysiological Signal Monitoring. **ACS Omega**, 5(18):10260-10265
27. Madibone, K S., Deshmukh, P P., Navalkar, A., **Maji, S. K.**, Badani, P M., Manjare, ST.(2020), Cyclic Organoselenide BODIPY-Based Probe: Targeting Superoxide in MCF-7 Cancer Cells. **ACS Omega**, 5(23):14186-14193
28. Ray, S., Singh, N., Kumar, R., Patel, K., Pandey, S., Datta, D, Mahato, J., Panigrahi R., Navalkar, A., Mehra, S., Gadhe, L., Chatterjee, D., Sawner AS., Maiti, S., Bhatia, S., Gerez, J., Chowdhury, A., Kumar, A., Padinhateeri, R., Riek, R., Krishnamoorthy, G and **Maji, S. K.** (2020),  $\alpha$ -Synuclein aggregation nucleates through liquid-liquid phase separation. **Nature Chemistry**, 12, 705–716
29. Hymer, W. C., Kennett, M. J., **Maji, S. K.**, Gosselink, K. L., McCall, G. E., Grindeland, R. E., and Kraemer, W. J. (2019), Bioactive growth hormone in humans: Controversies, complexities and concepts. **Growth Hormone & IGF Research**, 50, 9-22
30. Lima, I., Navalkar, A., **Maji, S. K.**, Silva, J. L., de Oliveira, G. A., & Cino, E. A. (2020). Biophysical characterization of p53 core domain aggregates. **Biochemical Journal**, 477(1), 111-120
31. Navalkar, A., Ghosh S., Pandey S., Paul A., Datta D and Maji **S.K.** (2019), Prion-like p53 amyloids in cancer. **Biochemistry**, 59, 2, 146–155. (Invited Perspective)

32. Mukhopadhyay A., Mehra., Kumar R., Maji **S.K.**, Krishnamoorthy G and Sharma K.P. (2019),  $\alpha$ -Synuclein Spontaneously Adopts Stable and Reversible  $\alpha$ -Helical Structure in Water-Less Environment. **ChemPhysChem**, 20(21): 2783-2790
33. Sharma H., Navalkar A., **Maji S.K** and Agrawal A. (2019), Analysis of drug-protein interaction in bio-inspired microwells. **SN Applied Sciences**,1:819
34. Mehra S., Sahay S and **Maji S.K.** (2019),  $\alpha$ -Synucleinmisfolding and aggregation: Implications in Parkinson's disease pathogenesis. **Biochimica et BiophysicaActa (BBA) – Proteins and Proteomics** ,1867(10):890-908. (Invited Review)
35. Bhattacharyya D., Mohite G.M., Krishnamoorthy J., Gayen N., Mehra S., Navalkar A., Kotler S.A., Ratha B.N., Ghosh A., Kumar R., Garai K., Mandal A.K., **Maji S.K** and Bhunia A.,(2019), Lipopolysaccharide from Gut Microbiota Modulates  $\alpha$ -Synuclein Aggregation and Alters its Biological Function. **ACS Chemical Neuroscience**, 10(5): 2229-2236
36. Jayarajan, R., Kumar, R., Gupta,J., Dev,G., Kadu,P., Chatterjee,D., Bahadur,D., Maiti,D. and **Maji, S. K.**(2019), Fabrication of amyloid fibril-palladium nanocomposite: A sustainable catalyst for C–H activation and electrooxidation of ethanol, **Journal of Materials Chemistry A**, 7(2019), 4486-4493
37. Deshmukh, P.P., Navalkar, A., **Maji, S.K.**, and Manjare, S.T., (2018), Phenylselenyl containing turn-on dibodipy probe for selective detection of superoxide in mammalian breast cancer cell line, **Sensors and Actuators B: Chemical**, 281(2019):8-13
38. Sharma, H., John, K., Gaddam, A., Navalkar, A., **Maji, S.K.**, and Agrawal, A., (2018), A magnet-actuated biomimetic device for isolating biological entities in microwells, **Scientific Reports**, 8:12717
39. Mohite, G. M., Navalkar, A., Kumar, A., Mehra, S., Das, S., Gadhe, L. G., Ghosh, D., Alias, B., Chandrawanshi, V., Ramakrishnan, A., Mehra, S., **Maji, S. K.** (2018) Familial  $\alpha$ -synuclein A53E mutation enhances cell death in response to environmental toxins due to more population of oligomers, **Biochemistry**, 57(33):5014-5028
40. Kirti, S., Patel, K., Das, S., Shrimali, P., Samanta, S., Kumar, R., Chatterjee, D., Ghosh, D., Kumar, A., Tayalia, P. and **Maji, S.K.** (2018), Amyloid fibrils with positive charge enhance retroviral transduction in mammalian cells. **ACS Biomaterials Science and Engineering**, 5(1),126–138
41. Mehra, S., Ghosh, D., Kumar, R., Mondal, M., Gadhe, L.G., Das, S., Anoop, A., Jha, NN., Jacob, RS., Chatterjee, D., Ray, S., Singh, N., Kumar, A., and **Maji S.K.** (2018), Glycosaminoglycans have variable effects on  $\alpha$ -synuclein aggregation and differentially affect the activities of the resulting amyloid fibrils. **Journal of Biological Chemistry**, 293(34): 12975-12991
42. Mohite G.M., Dwivedi, S., Das, S., Kumar, R., Paluri, S., Mehra, S., Ruhela, N., Arunima, S., Jha, N.N. and **Maji S.K.** (2018), Parkinson's disease associated  $\alpha$ -synuclein familial mutants promote dopaminergic neuronal death in *Drosophila melanogaster*. **ACS Chemical Neuroscience**, 9(11):2628-2638

43. Das, S., Kumawat, M.K., Ranganathan, S., Kumar, R., Adamcik, J., Kadu, P., Paadinhaateri, R., Srivastava, R., Mezzenga, R., and **Maji, S.K.** (2018), Cell alignment on graphene-amyloid composites. **Advanced Materials Interfaces**, 5(18) 1800621
44. Mohite, G.M., Kumar, R., Panigrahi, R., Navalkar, A., Singh, N., Datta, D., Mehra, S., Ray, S., Gadhe, L.G., Das, S., Singh, N., Chatterjee, D., Kumar, A and **Maji, S.K.** (2018) Comparison of kinetics, toxicity, oligomers formation and membrane binding capacity of  $\alpha$ -synuclein familial mutations at A53 site including newly discovered A53V mutation, **Biochemistry**, 57(35):5183-5187. (Cover page article)
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## **BOOK CHAPTERS**

1. Ray, S., Singh, N., Patel, K., Krishnamoorthy, G., and **Maji, S.K.** FRAP and FRET Investigation of  $\alpha$ -Synuclein Fibrillization via Liquid-Liquid Phase Separation In Vitro and in HeLa Cells, (2022), **Methods in Molecular Biology** (MIMB, Volume 2551), 395–423
2. Mahato, J., Ray S., **Maji S.K.**, and Chowdhury, A. and **Maji, S.K.** Spectrally Resolved FRET Microscopy of  $\alpha$ -Synuclein Phase-Separated Liquid Droplets, (2022) **Methods in Molecular Biology** (MIMB, Volume 2551), 425–447
3. Jacob, R.S., Das, S., Singh, N., Patel, K., Datta, D., Sen, S., and **Maji, S.K.** Amyloids are novel cell adhesive matrices. **Springer Nature**, (2018), 1112:79-97
4. Jacob, R.S., Anoop, A. and **Maji, S.K.** Protein nanofibrils as storage forms of peptide drugs and hormones in Biological and Bio-inspired Nanomaterials: Assembly Mechanisms and Properties. (Knowles, T., Buell, A., Perrett, S., Ed) **Springer Nature**, (2018)
5. Jacob R.S., Anoop A., Singh P.K., and **Maji S.K.** Native functions of amyloid in Protein Aggregation. **Protein Aggregation**, (Stein, D.A. Ed.), Nova Science publishers Inc., New York. (2011) 79-109.
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## **TECHNOLOGY DEVELOPMENT AND TRANSFER:**

1. *Blood based detection of Parkinson's disease:* Development of blood-based assay to detect Parkinson's disease possibly for early diagnosis and/or confirmatory test for the disease. Based on this technology developed, an Indian patent (patent No. 202121018108) and US application (17/724,168) have been filed.
2. *Development of amyloid based hydrogel for tumor spheroid modelling in vitro: Drug evaluation and personalised medicine in Cancer.* This invention demonstrates the application of functional amyloid based hydrogel for 3D tumoroid model for drug testing, optimisation of drug dosage and patient derived-organoid. Indian patent (201921000523) as well as US application (17/263,278) have been filed for this technology.
3. *Amyloid based hydrogels for Stem cell differentiation.* Development of amyloid-derived hydrogel for differentiation of stem cells in to neuronal lineage. Some of such smart technologies have already been translated to industry. This smart hydrogel technology of stem cell differentiation has led to a start-up, Convalesce Inc., California, USA, by one of the former PhD students (Indian patent no. 20172107280, granted).

## **DETAILS OF PATENTS:**

1. Alpha-Synuclein mutants and uses thereof  
Inventors: Prof. Samir K Maji, Laxmikant Gadhe, Rakesh Kumar, Soumik Ray  
Indian patent no: 202121018108  
US Application no.- 17/724,168
2. Plasmonic triangular gold and silver nanoparticles as tools for machine-free nucleic acid amplification assays  
Inventors: Prof. Samir K Maji, Pradeep Kadu, Satyaprakash Pandey, Prof.Murali Sastry, Prof. Rohit Srivastava  
Indian patent no: 202021046398 (**Granted**)
3. Functional amyloid hydrogels and applications there of  
Inventors: Prof. Samir K. Maji, Namrata Singh, Komal Patel, Reeba S. Jacob  
Indian patent no.-201921000523  
PCT application no.-PCT/IB2020/050026  
US Application no- 17/263,278
4. Hydrogel for neural tissue engineering (**Licensed to Convalesce Inc., San Francisco, USA**)  
Inventors: Subhadeep Das, Prof. Samir K Maji, Dr. John S Forsythe, Dr. David Finkelstein  
Indian patent no. 3712/MUM/2015

5. Amyloid mediated cell line transformation  
Inventors: Prof. Samir K Maji, Saikat K Ghosh, Shinjinee Sengupta, Shimul Salot, Ambuja Navalkar, Subhadeep Das, Reeba S Jacob  
Indian patent no. 201721014784 (**Granted**)
6. Hydrogel for targeted differentiation of stem cells towards neurons (**Licensed to Convalesce Inc., San Francisco, USA**)  
Inventors: Subhadeep Das, Prof. Samir K Maji  
Indian patent no. 20172107280 (**Granted**)

### **INVITED TALKS**

1. “Liquid-Liquid phase separation of proteins in diseases and native functions” invited talk at Chemistry and Biochemistry Seminar, April 14<sup>th</sup> 2023 at University of Southern Mississippi, Hattiesburg.
2. Chaired interactive sessions at BIO-Remedi (Biomaterials, Regenerative Medicine and Devices), December 17<sup>th</sup> 2022, organised by the IIT Guwahati.
3. Invited talk at 91 Annual Meeting of Society of Biological Chemists (India), December 8<sup>th</sup>-11<sup>th</sup> 2022, organised by the Biswa Bangla Convention Centre, Kolkata.
4. Delivered a talk at the International Conference on Smart Materials for Sustainable Technology (SMST-2022), October 13<sup>th</sup>-16<sup>th</sup> 2022, organized by IIT Bombay, Mumbai, India.
5. Delivered a talk at the 33rd Mid-Year Meeting of the Indian Academy of Sciences, July 8<sup>th</sup>-9<sup>th</sup> 2022, held at the Indian Institute of Science, Bengaluru.
6. Invited talk at the Asia-Pacific-Protein-Association and Asian-Biophysics-Association meeting (APA-ABBA) of 14th International Congress of Cell Biology (ICCB) on Protein phase separation, June 22-26<sup>th</sup> 2022 held at Tapei.
7. Invited talk on Biomaterials at “Advances in Basic and translational research in Biology (ABTRiB)”, March 12<sup>th</sup> 2022 organised by the Department of Molecular Biology and Biotechnology, Tezpur University.
8. Seminar talk at Clark University, USA, February 4<sup>th</sup> 2022.
9. “Prion-like p53 amyloids in cancer pathogenesis”, PB Rama Rao Memorial Award lecture, December 17<sup>th</sup> 2021 at 19<sup>th</sup> SBCI meeting organised by Society for Biological Chemists.
10. “Amyloids as functional biomaterial” at International conference on Advanced Nanomaterials and Nanotechnology (ICANN 2021)”, December 15<sup>th</sup> 2021 organised by IIT Guwahati.
11. “Engineered amyloid as functional Bio-materials” Complex fluid (CompFlu 2021), December 13<sup>th</sup>-15<sup>th</sup> 2021, organised by Indian Society of Rheology.

12. “Amyloid as functional Biomaterials”, (Invited guest lecture), August 28<sup>th</sup> 2021, organised by Department of Chemistry, BITS Pilani, Goa.
13. “Amyloids as novel biomaterials” at International conference on Advanced Materials for Better Tomorrow (AMBT 2021), July 13-17, 2021(Virtual talk) organised by IIT BHU and SIRMB.
14. “ Liquid-liquid phase separation: implications in biology and disease”, Meeting on phase separating systems, April 6<sup>th</sup>-9<sup>th</sup> 2021, organised by IISER Pune and Journal of Biosciences, Indian Academy of Science, Bangalore.
15. “p53 amyloid formation associated with cancer” at The ZOOMinar series on “Molecular Basis of Proteinopathies”, March 13, 2021.
16. “ $\alpha$ -synuclein aggregation associated with Parkinson’s disease: Liquid-liquid phase separation and amyloid fibril polymorphism” at BSBE Colloquium (online seminar series) organised by Biological Sciences and Bioengineering Department, IIT Kanpur, September 16, 2020
17. “Amyloid as novel biomaterials for tissue engineering and nano technological applications” at the International Conference on Smart Materials for Sustainable Technology (SMST-2020) held at Bogmallo Beach Resort, Goa, February 22 -25, 2020
18. “Role of p53 amyloid formation in cancer: Is Cancer a class of prion-like diseases?” at 10<sup>th</sup> Annual Meeting of PSI & International Conference on Proteomics for Cell Biology and Molecular Medicine, held at NCCS, Pune, December 12-14, 2018
19. “Altered site-specific dynamics of soluble and membrane bound  $\alpha$ -Synuclein by its familial mutations” at National Workshop on Fluorescence and Raman Spectroscopy held at IIT Guwahati, Dec 17-21, 2017
20. “Role of p53 amyloid formation in Cancer” at the International Conference on Intrinsically Disordered Proteins (IDP 2017), held at IISER Mohali Dec 9-12, 2017
21. “Understanding the mechanism of  $\alpha$ -Synuclein amyloid formation: therapeutic approach against Parkinson’s disease” at The 23rd INPEC meeting: Protein structure, function and Engineering, Bose Institute, Kolkata, November 9-11, 2017
22. “Amyloids as cell adhesive matrix” at 11th International Symposium on Cell Surface Macromolecules, Department of Biological Sciences, IISER Mohali, February 24-28, 2017
23. “Amyloids as functional biomaterials” at International Conference on Advances in Biological Systems and Materials Science in NanoWorld (ABSMSNW), IIT (BHU)-Varanasi, February 19-22,2017
24. “Amyloids as functional biomaterials” at Recent Advances in Molecular Chemistry and its Application, School of Biotechnology and Bioinformatics, D. Y. Patil University, Navi Mumbai, TIFR, on October 1, 201

25. "Amyloids fibrils associated with diseases and functional materials" at National Workshop on Scanning Probe Microscopy Techniques, NCL Pune, August 11-13, 2016
26. "Local and global structural transition of  $\alpha$ -synuclein in amyloid formation" at International Society on Optics within Life Sciences (OWLS) meeting 2016, TIFR, on March 16-19, 2016
27. "Novel Tissue engineering scaffolds based on amyloid hydrogels" at Polymer-Solvent Complexes and Intercalates (POLYSOLVAT-11), IACS, Kolkata, on January 27-30, 2016 (Invited speaker).
28. "Amyloid fibrils" at NMR Meets Biology: An Interaction Week, Kerala, on January 14-19, 2016
29. American Society for Cell Biology Meeting Dec 12-16, 2015 (Poster presentation).
30. "Amyloids as Biomaterials", International Conference on Electron Microscopy and XXXVI Annual Meeting of the Electron Microscope Society of India (EMSI) on July 9, 2015
31. "Amyloids: Diseases, functions and applications", Kaleidoscope, Goa, India: A Discussion Meeting in Chemistry, on July 2-5 2015
32. " $\alpha$ -synuclein aggregation associated with Parkinson's disease" at TIFR Hyderabad May 27, 2015
33. "Amyloids as novel biomaterials" at Departmental one-day symposium entitled "Challenges for Translational Research". March 21, 2015
34. "Understanding the mechanism of Alpha-synuclein aggregation associated with Parkinson's disease" at National Symposium on Biophysics & Golden Jubilee Meeting of Indian Biophysical Society, Centre for Interdisciplinary Research in Basic Sciences, JamiaMilliaIslamia, India, February 14-17, 2015
35. "Amyloids for biomaterial applications" at 17th CRSI National Symposium in Chemistry at NCL Pune Feb 6-8, 2015
36. "Alpha-synuclein aggregation associated with Parkinson's disease," Society for Biological Chemists of India Tata Institute of Fundamental Research, Mumbai 11 Oct 2014
37. "Amyloid fibrils in Nanobiotechnology," IMNANO 2nd in-house symposium of Centre for Research in Nanotechnology and Science (CRNTS) IIT Bombay 5th October 2014
38. "Amyloids as biomaterials," Indo-German Symposium on Bioinspired Chemistry Indian Institute of Science, Bangalore 10 September 2014
39. "Probing protein aggregation using computer simulations," Accelerating Biology 2014: Computing Life C-DAC, Pune 18 Feb 2014

40. “Amyloids: Functions, neurodegenerative diseases,” Inauguration and Mini-Symposium On NMR & Related Topics IIT Bombay 11 Feb 2014
41. “Understanding the mechanism of alpha-synuclein aggregation and its modulation: therapeutic approach against PD,” 32 Indian Academy of Neurosciences Annual Meeting National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru 1st January 2014
42. “Amyloids: Diseases, functions, and applications.” April 2011, TIFR, DCS Talk
43. “Amyloids: Functions, neurodegenerative diseases, and nanotechnology”, 1st Biophysics-Paschim meet, TIFR Mumbai
44. International Conference on Nano Science and Technology (ICONSAT-2010), Feb. 17-20, 2010, IIT Bombay, Powai, India
45. Emerging Concepts in Biotechnology (ECB-2009) December 11-12, 2009, National Institute of Technology, Calicut, Kerala, India
46. Young Explorers in Indian Biology (YEIB), Sep 2009, Tata Institute of Fundamental Research, Mumbai, India
47. International Symposium on Emerging areas in Biosciences and bioengineering” (ISEABB), Feb 2009, IIT Bombay, Mumbai, India

## **FUNDING**

### **As Principal Investigator:**

1. Understanding and modulating the alpha-synuclein aggregation in Parkinson's disease, 2010-2013, **Rs. 14.6 lakhs**; Department of Science and Technology (DST), India, 1st Track.
2. Sequence-dependent oligomerisation of  $\alpha$ -synuclein: Relevance to Parkinson's disease, 2010-2013, **Rs. 22.6 lakhs**; Council of Scientific and Industrial Research (CSIR), India.
3. Oligomerization of  $\alpha$ -synuclein in Parkinson's Disease, 2011-2014, **Rs. 53.1 lakhs**; Department of Biotechnology (DBT)-Basic Science.
4. Understanding the formation of neurotoxic  $\alpha$ -synuclein oligomers associated with PD, 2011-2015, **Rs. 85.2 lakhs**; Department of Biotechnology (DBT)-Neuroscience task force.
5. Designing peptide inhibitors against  $\alpha$ -synuclein aggregation: Therapeutic approach for Parkinson, 2012-2015, **Rs. 34 lakhs**; Indian Council of Medical Research (ICMR), India.
6. Development of novel amyloid-based material for drug delivery, 2015, **Rs. 15 lakhs**; Wadhwani Research Center for Bioengineering (WRCB), IITB.



7. Hydrogel derived from non-toxic amyloid nanofibrils for tissue engineering applications, 2015-2018, **Rs. 85.5 lakhs**; Department of Biotechnology (DBT)-Nanotechnology Task Force.
8. p53 Amyloid: A possible cause of p53 loss of function in Cancer – Young researcher award, 2013-2018, **Rs.40 lakhs**; Lady Tata Memorial Trust (LTMT).
9. Study of the molecular basis of neurotoxicity induced by PD associated  $\alpha$ -Synuclein mutations using neuronal cell line, 2015-2018, **Rs.15 lakhs**; Council of Scientific and Industrial Research (CSIR), India.
10. p53 amyloid formation leading to its loss of tumour suppressor functions in cancer, 2015-2018, **Rs. 27.9 lakhs**; Department of Science and Technology (DST), India.
11. Development of novel amyloid-based hydrogels for sustained release of insulin, 2018-2019, **Rs. 15 lakhs**; Wadhvani Research Center for Bioengineering (WRCB), IIT Bombay.
12. Functional amyloid derived Hydrogels as a scaffold for three-dimensional in vitro tumor model for evaluating anti-cancer therapeutics, 2018-2019, **Rs. 35 lakhs**; Biotechnology Industry Research Assistance Council, Department of Biotechnology, India (DBT-BIRAC).
13. Development of a biochemical assay for diagnosis of Parkinson's disease from blood in the pre-motor stage. 2018-2020, **Rs. 12 lakhs**; TATA Centre IIT Bombay seed grant.
14. Strain property of  $\alpha$ -Synuclein fibrils: Implications in synucleopathies, 2018-2021, **Rs. 71.2 lakhs**; Department of Biotechnology-Basic Sciences.
15. Altered site specific dynamics of membrane bound  $\alpha$ -Synuclein by its familial mutations, 2018-2023, **Rs. 5 lakhs**; IRCC sponsored project.
16. Hydrogels from amyloid nanofibrils for neural tissue engineering, 2018-2021, **Rs. 15 lakhs**; Department of Biotechnology, National Bioscience award.
17. Consequences of wild type p53 amyloid formation in cancer and p53 disaggregation as a potential therapeutic approach, 2020-2023, **Rs. 52.5 lakhs**, Department of Science and Technology, Government of India.
18. Establishing stem cell differentiation to dopaminergic neurons using functional amyloid hydrogel, 2020-2023, **Rs. 24 lakhs**; DBT Tata Innovation Fellowship Grant.
19. Liquid-liquid phase separation of  $\alpha$ -Synuclein leading to amyloid fibril formation: Implications in Parkinson's disease pathology, 2022-2025, **Rs. 1.7 Cr**; Scientific and Useful Profound Research Advancement (SUPRA), Department of Science and Technology (DST), Government of India.
20. Sustained release of bioactive insulin and other drugs using amyloid hydrogel *in vivo* for various diseases, 2022-2024, **Rs.45 lakhs**; Department of Biotechnology (DBT).

21. A novel approach in finding the potential biomarker for detecting Parkinson's disease using Protein Misfolding cyclic amplification technique, 2022-2025, **Rs. 90 lakhs**, Department of Biotechnology (DBT).

### **Funding**

#### **As Co-Investigator:**

1. Effects of tau glycation and phosphorylation on stability and dynamics of microtubules and on differentiation of neuronal cells: Therapeutic implications for neuropathies, 011-2014, **Rs.52 lakhs**; Department of Biotechnology (DBT)-Neuroscience Task force.
2. Mechanobiological regulation of embryonic stem cell self-renewal and differentiation, **Rs.53 lakhs**; Department of Biotechnology (DBT).
3. Cellular programming using Bioactive scaffolds for immunotherapy, **Rs.53 lakhs**; Department of Biotechnology (DBT).
4. Probing the bidirectional cross talk between matrix metalloproteinases (MMPs) and the actomyosin cytoskeleton, and its relevance to cancer, **Rs.53 lakhs**; Department of Biotechnology (DBT).
5. Interplay of spatiotemporal synaptic drive and spike propagation in shaping electrical activity of urinary bladder smooth muscle: A computational investigation, **Rs.35 lakhs**; Department of Biotechnology (DBT).