UNIVERSITY OF CALCUTTA

FACULTY ACADEMIC PROFILE/ CV

Full name of the faculty member: Dr. Kishor Sarkar

Designation: Assistant Professor

Specialisation : Nonviral Gene Therapy, Drug Delivery, Tissue Engineering

Contact information :

Department of Polymer Science and Technology, UCSTA, 92 A.P.C. Road, Kolkata-700009

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Academic qualifications:

College/ university from which the degree was obtained	Abbreviation of the degree
University of Calcutta	B.Sc.
University of Calcutta	B.Tech.
University of Calcutta	M.Tech.
University of Calcutta	Ph.D.

Positions held/ holding:

July, 2013- April, 2015: Postdoc at Indian Institute of Science (IISc), Bangalore, India.

May, 2015- April, 2016: Postdoc at University of Pittsburgh, Pittsburgh, USA.

June, 2016- Present: Assistant Professor, Department of Polymer Sc. and Tech, University of Calcutta.

Research interests:

- Synthesis of biopolymer by ATRP and RAFT polymerization
- Nonviral Gene Therapy
- Drug Delivery
- Tissue Engineering
- Immune Therapy
- Nanomedicine
- Waste Water Treatment

Research guidance:

Number of researchers awarded M.Phil/ Ph.Ddegrees : NA

Number of researchers pursuing M.Phil/ Ph.D :**6 (Six)**

Current projects:

1. **DST-SERB**, Osteoconductive polyester for bone tissue engineering, **02/2017-01/2020**; **INR 48.8 Lakhs** (**Role:PI**)
2. **DST-SERB**, 3D Scaffold for Interfacial Tissue Engineering, **03/2017-02/2020**; **INR 49.2 Lakhs** (**Role:PI**)
3. **UGC,** Development of Novel Biomaterial from Waste material for Bone Regeneration, **08/2017-07/2019; INR 10 Lakhs (Role: PI)**
4. **UGC-UPE II (CU),** Polymeric Nanofibrous Scaffold for Regenerative Medicine, **07/2017-06/2020; INR 12 Lakhs (Role: PI)**

Select list of publications:

a) ***Journals:***

45. Ghosal, K.; Bhattacharjee, U.; **Sarkar, K.*** Facile Green Synthesis of Bioresorbable Polyester from Soybean Oil and Recycled Plastic Waste for Osteochondral Tissue Regeneration. *European Polymer Journal*. **2019. (In Press)**

44. Saha, R.; Bhayye, S.; Ghosh. S.; Saha, A.; **Sarkar, K.*** Supramolecular assembly of amino acid based cationic polymer for efficient gene transfection efficiency in triple negative breast cancer. *ACS Applied Bio Materials*. **2019**. **(In Press)**

43. Ghosal, K.; **Sarkar, K.*** Poly(ester amide) derived from municipal polyethylene terephthalate waste guided stem cell for osteogenesis. *New Journal of Chemistry*. **2019,** 43, 14166-14178.

42. Dhar, A.; Kumar, N.S.; **Sarkar, K.**; Al-Fatesh, A.S.; Ibrahim, A.A.; Fakeeh, A.H.; Vekariya, R.L. Acidic ionic liquids containing variable cationic head groups for catalytic isomerization of n-hexane. *Journal of Molecular Liquids.* **2019**, 288, 111047.

41. Ghosh, S.; Ghosal, K.; Mohammad, A. Sk.; **Sarkar, K.*** Dendrimer Functionalized Carbon Quantum Dot for Selective Detection of Breast Cancer and Gene Therapy. *Chemical Engineering Journal.* **2019,** 373, 468-484.

40. Ghosal, K.; **Sarkar, K.*** Biomedical Applications of Graphene Nanomaterials and Beyond. *ACS Biomaterials Science & Engineering*. **2018**, 4, 2653-2703.

39. Natarajan, J.; Dasgupta, Q.; Shetty, S. N.; **Sarkar, K.**; Madras, G.; Chatterjee, K. Poly(ester amide)s from Soybean Oil for Modulated Release and Bone Regeneration. *ACS Applied Materials & Interfaces*. **2016,** 8, 25170-25184.

38. Athira, K.S.; **Sarkar, K.**; Chatterjee, K. Synthesis, Degradation, Biocompatibility and Drug Release Studies of Bis-2-Hydroxy Ethyl Terephthalate-based Poly(Mannitol-Citric-Sebacate) Ester. *Journal of Modern Materials*. 2016, 1, 9-16.

37. Kumar, S.; Raj, S.; **Sarkar, K.**; Chatterjee, K. Engineering a multi-biofunctional composite using poly(ethyleneimine) decorated graphene oxide for bone tissue regeneration. *Nanoscale*. 2016, 8, 6820-6836.

36. Manna, P. J.; **Sarkar, K.**; Mitra, T.; Chatterjee, A.; Gnanamani, A.; Chakraborti, G.; Kundu, P. P. Synthesis of carboxy methylated guar gum grafted polyethyleneimine copolymer as an efficient gene delivery vehicle. *RSC Advances*. 2016, 6, 13730-13741.

35. Banerjee, S. L.; Khamrai, M.; **Sarkar, K.**; Singha, N. K.; Kundu, P. P. Modified chitosan encapsulated core-shell Ag Nps for superior antimicrobial and anticancer activity. *International Journal of Biological Macromolecules*, 2016, 85, 157-167.

34. **Sarkar, K.;** Meka, S. R. K.; Madras, G.; Chatterjee, K. A self-assembling polycationic

nanocarrier that exhibits exceptional gene transfection efficiency. *RSC Advances*. 2015, 5, 91619-91632.

33. **Sarkar, K.**; Madras, G., Chatterjee, K. Dendron conjugation to graphene oxide using click chemistry for efficient gene delivery. *RSC Advances*. **2015**, 5, 50196-50211.

32. Elayaraja, K.; **Sarkar, K.**; Meka, S. R. K., Madras, G; Chatterjee, K. Copolyesters from Soybean Oil for use as Resorbable Biomaterials. *ACS Sustainable Chemistry & Engineering*. **2015**, 3, 880-891. (Cover Page)

31. **Sarkar, K.**; Banerjee, S. L.; Kundu, P. P.; Madras, G.; Chatterjee, K. Biofunctionalized Surface-Modified Silver Nanoparticle for Gene Delivery. *Journal of Materials Chemistry B*. **2015**, 3, 5266-5276.

30. **Sarkar, K.**; Meka, S. R. K.; Bagchi, A.; Krishna, S. H.; Ramachandra, S. G.; Madras, G.; Chatterjee, K. Polyester Derived from Recycled Poly(ethylene terephthalate) Waste for Regenerative Medicine. *RSC Advances*. **2014**, 4, 58805-58815.

29. Mukhopadhyay, P.; **Sarkar, K.**; Bhattacharya, S.; Mishra, R.; Kundu, P. P. Efficient oral insulin delivery by dendronized chitosan. In vitro and In vivo studies. *RSC Advances*. 2014, 4, 43890-43902.

28. Mukhopadhyay, P.; **Sarkar, K.**; Kundu, P. P. pH sensitive N-succinyl chitosan grafted polyacrylamide hydrogel for oral insulin delivery. *Carbohydrate Polymers*. 2014, 112, 627-637.

27. Mitra, P.; **Sarkar, K.**; Kundu, P. P. Carboxymethyl Chitosan modified Montmorillonite for Efficient Removal of Cationic Dye from Waste Water. *Defence Science Journal*. 2014, 64, 198-208.

25. **Sarkar, K.**; Kundu, P. P. PAMAM conjugated Chitosan through naphthalimide moiety for enhanced gene transfection efficiency. *Carbohydrate Polymers*. 2013, 98, 495-504.

25. **Sarkar, K.**; Chatterjee, A.; Chakraborti, G.; Kundu, P. P. Blood compatible N-maleyl chitosan-graft-PAMAM copolymer for enhanced gene transfection. *Carbohydrate Polymers*. **2013**, 98, 596-606.

24. **Sarkar, K.**; Debnath, M.; Kundu, P. P. Preparation of low toxic fluorescent chitosan-graft-polyethyleneimine copolymer for gene carrier. *Carbohydrate Polymers*. 2013, 92, 2048-2057.

23. Mukhopadhyay, P.; **Sarkar, K.**; Chakraborty, M.; Bhattacharya, S.; Mishra, R.; Kundu, P. P. Oral insulin delivery by Self-assembled Chitosan Nanoparticles: In vitro and in vivo studies in diabetic animal model. *Material Science & Engineering C*. 2013, 33, 376-382.

22. Mukhopadhyay, P.; **Sarkar, K.**; Soam, S.; Kundu, P. P. Formulation of pH responsive carboxylethyl chitosan and alginate beads for oral delivery of insulin. *Journal of Applied*

Polymer Science. 2013, 129, 835-845.

21. **Sarkar, K.**; Kundu, P. P. Preparation of Low Molecular Weight N-Maleated Chitosan-graft-PAMAM Copolymer for Enhanced DNA Complexation. *International Journal of Biological Macromolecules*. 2012, 51, 859-867.

20. **Sarkar, K.**; Banerjee, S. L.; Kundu, P. P. Removal of Anionic Dye in Acid Solution by Self Crosslinked Insoluble Dendronized Chitosan. *Hydrology Current Research*. 2012, 3, 133.

19. **Sarkar, K.**; Debnath, M.; Kundu, P. P. Recyclable Crosslinked O-Carboxymethyl Chitosan for Removal of Cationic Dye from Aqueous Solutions. *Hydrology Current Research*. 2012, 3, 138.

Books/ book chapters:

18. Ghosal, K.; Sarkar, P.; Saha, R.; Ghosh, S.; **Sarkar, K.*** Advances in Tissue Engineering and Regeneration. In In B. Li, T.F. Moriarty,T. Webster and M. Xing (Ed.) Racing for the Surface: Antimicrobial and Interface Tissue Engineering. New York City: Springer Publishing. **2019**.

17. Ghosal, Krishanu; Khanna, R.; **Sarkar, K.*** Biopolymer Based Interfacial Tissue Engineering for Arthritis. In Bingyun Li and Thomas Webster (Ed.) Orthopedic Biomaterials: Progress in Biology, Manufacturing and Industry Perspectives. New York City: Springer Publishing. **2018**.

16. **Sarkar, K.**; Xue, Y.; Sant, S. Host response to synthetic versus natural biomaterials. In Corradetti, Bruna (Ed.) The Immune Response to Implanted Materials and Devices. New York City: Springer Publishing. **2017**. PDF

15. Kundu, P. P.; **Sarkar, K.** Natural polymeric vectors in gene therapy. In S. Kalia, & L. Avérous (Eds.), *Biopolymers: Biomedical and Environmental Application* (pp. 575-604). New Jersey: *John Wiley & Sons Inc*. **2011**.

b) ***Conference/ seminar volumes***:

14. Das, P.; **Sarkar, K.*** One-pot Facile Green Synthesis of Gelatin Functionalized Silver Nanoparticle for Bimodal Targeted Therapy of Hepatocellular Carcinoma (Poster) (Best Poster award) International conference on BioMaterials, BioEngineering, BioTheranostics (BioMET- 2018, VIT-Vellore)

13. Ghosal, K.; Bhattacharjee, U.; **Sarkar, K.*** Municipal Plastic Waste Derived Biopolymer for Bone-Cartilage Tissue Regeneration (Poster) International conference on BioMaterials, BioEngineering, BioTheranostics (BioMET- 2018, VIT-Vellore)

12. Saha, R.; Chakraborty, R.; **Sarkar, K.*** Reversible Addition Fragmentation chain Transfer (RAFT) Polymerization mediated cationic poly(amino acid) for efficient gene carrier (Poster) International conference on BioMaterials, BioEngineering, BioTheranostics (BioMET- 2018, VIT-Vellore)

11. Ghosh, D; Ghosal, K.; **Sarkar, K.*** Green Synthesis of Carbon Dot@Silver Nanoparticles: A Potential Nanocomposite for Breast Cancer Theranostics (Poster) International conference on BioMaterials, BioEngineering, BioTheranostics (BioMET- 2018, VIT-Vellore)

10. Das, P.; **Sarkar, K.*** Green Synthesis of Efficient Silver Nanoparticle based Nonviral Vector for Cancer Gene Therapy (Oral) (2nd Prize award) International Conference on Nanotechnology: Ideas, Innovations & Initiatives (ICN-3i- 2017)

9. Saha, R.; **Sarkar, K.*** Recycled waste poly(ethyleneterephthalate) derived novel polyester/nano hydroxyapatite composite for Bone Regeneration (Oral) International Conference on Nanotechnology: Ideas, Innovations & Initiatives (ICN-3i- 2017, IIT-Roorkee)

8. Tripathy, S.; Battacharjee, U.; **Sarkar, K.*** Dendrimer Functionalized Nano Graphene Oxide by "Click Chemistry" for Cancer Gene Therapy (Poster) International Conference on Nanotechnology: Ideas, Innovations & Initiatives (ICN-3i- 2017, IIT-Roorkee)

7. **Sarkar, K.***; Madras, G.; Chatterjee, K. (Oral) Trash to Tissue: Recycled Polyethylene Terephthalate Waste derived Biopolymer for Tissue Regeneration. International Conference on Advances in Polymer Science & Technology (APA- 2017, IIT-Delhi)

6. Ghosal, K.; **Sarkar, K.*** Soybean Oil and Recycled Polyethylene Terephthalate Waste Derived Biopolymer for Tissue Engineering Application. (Poster) International Conference on Advances in Polymer Science & Technology (APA- 2017, IIT-Delhi)

5. **Sarkar, K.**; Krishnan, H. V.; Sant, V.; Kumar, G. V.; Babu, K. S.; Sant, S. Folic acid conjugated amine functionalized cerium oxide nanoparticle for cancer targeted gene therapy. (Oral) World Biomaterial Congress (WBC-2016, Canada). Link

4. **Sarkar, K.**; Madras, G.; Chatterjee, K. RGD-functionalized Chitosan Capped Silver Nanoparticles for Efficient Gene Delivery with Reduced Toxicity. (Poster) International Conference on Advancement in Polymeric Materials (APM-2015, IISc-Bangalore).

3. **Sarkar, K.**; Meka, S.; Bagchi, A.; Krishna, S. H.; Ramachandra, S. G.; Madras, G.; Chatterjee, K. From Trash to Tissue: Novel Polyester Derived from Poly(ethylene terephthalate) Waste for Tissue Regeneration. (Poster) International symposium on Polymer Science and Technology (MACRO- 2015, IACS-Kolkata).

2. **Sarkar, K.**; Kundu, P. P. Novel chitosan based non viral vector for efficient gene delivery to cervical cancer cell. (Poster). 3rd International Cancer Research Symposium 2012. Abstract published on Journal of Cell Communication and Signaling. Link

1. **Sarkar, K.**; Kundu, P. P. Development of novel chitosan-graft-polyethyleneimine copolymer through naphthalimide moiety for efficient DNA delivery vehicle. (Poster) A National Symposium on Polymer & Rubber Technology for 21st Century 2012

Membership of Learned Societies:

Editorial Board Member of "*Journal of Gene Therapy*"

Reviewer of following journals

1. *ACS Biomaterials Science & Engineering*
2. *New Journal of Chemistry* 3. *Carbohydrate Polymers*
4. *RSC Advances* 5. *Molecular Pharmaceutics* 6. *Plos One*
7. *Journal of Applied Polymer Science*
8. *Journal of Inorganic and Organometallic Polymers and Materials*
9. *ACS Applied Nano Materials*
10. *Communications Chemistry (Nature Publishing)*

Patents :

- **Sarkar, K.;** Madras, G., Chatterjee, K. Gelatin Conjugated Polyethyleneimine for Non-viral Gene Transfection. ***Indian Patent Filed (9259/RQ-CHE/2014)***

Awards:

- Early career research award, DST-SERB, India, **2017**
- Dr. D. S. Kothari Postdoctoral Fellowship award, University Grants Commissions (UGC), India, **2013**
- Rajiv Gandhi National Fellowship award, University Grants Commissions (UGC), India, **2009**
- Senior Research Fellowship, Centre Research in Nanoscience and Nanotechnology, University of Calcutta, Kolkata, India, **2009**
- Graduate Aptitude Test Examination (GATE) in Chemistry, MHRD, India, **2007**