

Siddharth Jhunjhunwala

Current Position

Assistant Professor
Centre for BioSystems Science and Engineering
Indian Institute of Science
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Education

Doctor of Philosophy in Bioengineering University of Pittsburgh, Pittsburgh, USA	2006 – 2011
Bachelor of Technology in Industrial Biotechnology Anna University, Chennai, India	2002 – 2006

Professional Appointments

Assistant Professor Centre for BioSystems Science and Engineering Indian Institute of Science, Bengaluru, India	2016 – Present
Mazumdar-Shaw International Oncology Fellow Laboratories of Prof. Daniel G. Anderson and Prof. Robert Langer Massachusetts Institute of Technology, Cambridge, USA	2013 – 2016
Postdoctoral Associate Laboratories of Prof. Daniel G. Anderson and Prof. Robert Langer Affiliate at Boston Children's Hospital, Harvard Medical School; and Massachusetts Institute of Technology, Cambridge, USA	2012 – 2012
Graduate Student Researcher Laboratory of Prof. Steven R. Little University of Pittsburgh, Pittsburgh, USA	2006 – 2011

Awards

- **Prof. Priti Shankar Teaching Award** 2018
For Assistant Professors in Engineering
Indian Institute of Science
- **R.I. Mazumdar Young Investigator** 2017 – 2018
Centre for BioSystems Science and Engineering
Indian Institute of Science
- **Ramanujan Fellowship** 2016 – 2019
Department of Science and Technology
Government of India

Siddharth Jhunjhunwala

Grants

1. **Wellcome-DBT India Alliance Intermediate Fellowship** 2020 – 2024
2. **Biodesign and Bioengineering Initiative** 2018 – 2021
Collaborative grant, Department of Biotechnology, Govt. of India
3. **RGUHS-IISc Collaborative Grant** 2018 – 2020
Rajiv Gandhi University of Health Sciences, Govt. of Karnataka
4. **Early Career Research Award** 2017 – 2020
Science and Engineering Board, DST, Govt. of India
5. **Ramanujan Fellowship** 2016 – 2019
Department of Science and Technology, Govt. of India

Professional Activities

- Lifetime member of Indian Society of Nanomedicine 2016 – Present
- Independent reviewer for a number of peer-reviewed journals: ACS family of journals, RSC family of journals, Proc. of Natl. Acad. Sci. USA, Acta Biomaterialia, Biophysical Journal
- Session co-chair at the Nanomedicine and Drug Delivery Symposium, Portland, USA September 2018
- BioInformatics National Exam Committee (BINC) (DBT affiliate exam) 2017 – 2018

Publications in the last 5 years (2016 January onwards)

* indicates where Siddharth is corresponding author)

1. Ganesh RA[#], Raghavan JV[#], Sonpatki P, Naik D, Arunachalam P, Shah D, Lakshmikantha A, Pillai S, Chandrachari KP, Mariswamappa K, Sathyanarayana LD, Shah N*, **Jhunjhunwala S.*** High grade glioma infiltrating myeloid cells show grade specific differences in neutrophils and monocytes. *BiorXiv* DOI: 10.1101/2020.09.26.314542. Under Review
2. Sahoo S, **Jhunjhunwala S**, Jolly M K. The Good, The Bad and The Ugly: A Mathematical Model Investigates the Differing Outcomes Among CoVID-19 Patients. *J. Indian Inst. Sci.* 2020; 5: 1-9. DOI: 10.1007/s41745-020-00205-1
3. Duddu A S, Sahoo S, Hati S, **Jhunjhunwala S**, Jolly M K. Multi-stability in cellular differentiation enabled by a network of three mutually repressing master regulators. *J. R. Soc. Interface* 2020; 17(170): 20200631. DOI: 10.1098/rsif.2020.0631
4. Thakur S, Ray S, **Jhunjhunwala S**, Nandi D. Insights into Coumarin Mediated Inhibition of Biofilm Formation in Salmonella Typhimurium. *Biofouling* 2020. 36(4): 479-491. In Press. DOI: 10.1080/08927014.2020.1773447

5. Bose S, Volpatti LR, Thiono D, Yesilyurt V, McGladian C, Tang Y, Facklam A, Wang A, **Jhunjunwala S**, Veiseh O, Hollister-Lock J, Bhattacharya C, Weir GC, Greiner DL, Langer R, Anderson DG. A retrievable implant for the long-term encapsulation and survival of therapeutic xenogeneic cells. *Nat. Biomed. Engg.* 2020. 4: 814-826. DOI: 10.1038/s41551-020-0538-5
6. Fenton OS, Tibbitt MW, Appel EA, **Jhunjunwala S**, Webber MJ, Langer R. Injectable polymer-nanoparticle hydrogels for local immune cell recruitment. *Biomacromolecules* 2019; 20 (12): 4430-4436
7. Pramanik N, Ranganathan S, Rao S, Kaushik S, Jain S, Rangarajan A, **Jhunjunwala S.*** A composite of hyaluronic acid modified graphene oxide and iron oxide nanoparticles for targeted drug delivery and magneto-thermal therapy. *ACS Omega* 2019. 4 (5): 9284-9293. DOI: 10.1021/acsomega.9b00870
8. Sharma P, Sen D, Neelakantan V, Shankar V, **Jhunjunwala S.*** Disparate effects of PEG or albumin based surface modification on uptake of nano-and micro-particles. *Biomater. Sci.* 2019. 7:1411-1421. DOI: 10.1039/C8BM01545G
9. Mehta K, Chacko LA, Chugh MK, **Jhunjunwala S**, Ananthanarayanan V. Association of mitochondria with microtubules inhibits mitochondrial fission by precluding assembly of the fission protein Dnm1. *J. Biol. Chem.* 2019. 294(10): 3385-3396. DOI: 10.1074/jbc.RA118.006799
10. Singh A, Deshpande N, Pramanik N, **Jhunjunwala S**, Rangarajan A, Atreya HS. Optimized Peptide Based Inhibitors Targeting the Dihydrofolate Reductase Pathway in Cancer. *Sci. Rep.* 2018. 16;8(1): 3190.
11. **Jhunjunwala S.*** Editorial: Immunoengineering—From Biologics to Biomaterials. *J. Indian Inst. Sci.* 2018. 98(1): 3-4.
12. **Jhunjunwala S.*** Biomaterials for Engineering Immune Responses. *J. Indian Inst. Sci.* 2018. 98(1): 49-68. <https://doi.org/10.1007/s41745-018-0063-7>
13. **Jhunjunwala S.*** Neutrophils at the Biological-Material Interface. *ACS Biomater. Sci. Eng.* 2018, 4 (4): 1128-1136.
14. Fenton OS, Kauffman KJ, Kaczmarek JC, McClellan RL, **Jhunjunwala S**, Tibbitt MW, Zeng MD, Appel EA, Dorkin JR, Mir FF, Yang JH, Oberli MA, Heartlein MW, DeRosa F, Langer R, Anderson DG. Synthesis and biological evaluation of ionizable lipid materials for the in vivo delivery of messenger RNA to B lymphocytes. *Adv. Mat.* 2017; 26(33): 1606944
15. Webber M.W., Appel E.A., Vinciguerra B., Cortinas A.B., Thapa L.S., **Jhunjunwala S.**, Isaacs L., Langer R., Anderson D.G. Supramolecular PEGylation of Biopharmaceuticals. *Proc. Natl. Acad. Sci. USA.* 2016; 113(50): 14189-94
16. Kauffman K.J., Mir F.F., **Jhunjunwala S.**, Kaczmarek J., Hurtado J.E., Yang J.H., Webber M.W., Kowalski P.S., Heartlein M.W., DeRosa F., Anderson D.G. Efficacy and immunogenicity of unmodified and pseudouridine-modified mRNA delivered systemically with lipid nanoparticles in vivo. *Biomaterials.* 2016; 109: 78-87
17. **Jhunjunwala S.**, Alvarez D., Aresta-DaSilva S., Tang K., Tang B., Greiner D., Newburger P., von Andrian U., Langer R., Anderson D.G. Splenic progenitors maintain high neutrophil numbers at sites of sterile chronic inflammation. *J. Leuko. Biol.* 2016; 100: 253-60

Book Chapters and Reviews

Book Chapter:

1. Nucleic Acid Nanotherapeutics (Chapter 11) by **Siddharth Jhunjunwala** in Book titled "Molecular Medicines for Cancer" edited by Deepak Chitkara, Anupama Mittal, and Ram I. Mahato. 2018. CRC Press (Taylor Francis Group)

Book Reviews:

1. Book review of Adverse Effects of Engineered Nanomaterials: Exposure, Toxicology, and Impact on Human Health, Second Edition by Fadeel B. et. al. **Siddharth Jhunjunwala**. Current Science, 2018. Vol. 114, No. 11.
2. Book review of Annual Review of Biomedical Engineering – 2016 by Yarmush M.L. et. al. **Siddharth Jhunjunwala**. Current Science, 2017. Vol. 112, No. 10.

Patent Filed

1. Kotesa R.S. et. al. A method and device for enhanced cell poration. Indian Patent Filed, 2019
2. Sharei A., et. al. US patent application number - 15/523,142. Filed on April 28, 2017. Title – "Delivery of Biomolecules to Immune Cells"
3. Little S.R., **Jhunjunwala S.** US Patent office serial number - PCT/US2013/022518. US patent publication - US10449151B2. Patent Publication Number: 20180021260. Date of Patent: Oct 22, 2019. Title – "Artificial cell constructs for cellular manipulation"

Talks Delivered

1. 18th International Symposium of the Controlled Release Society, India Chapter, 2020. Talk Title - Drug Delivery Systems for Diabetic Foot Ulcer Treatment, 28 Feb. 2020, Mumbai, India.
2. CeNSE DBT Nano-biotechnology Alliance Workshop 2019. Talk Title – Insights on phagocytic immune cell – nanoparticle interactions. 5 Nov. 2019, Bengaluru, India
3. Nanobioteck 2018, Indian Society of Nanomedicine. Talk Title – Impact of Surface Modifications on Immune Cell Uptake of Nano- and Micro- Particles. 26 Oct. 2018, New Delhi, India.
4. ICME Workshop 2018. Talk Title – Immune Responses to Biomedical Implants. 10 Aug. 2018, Bengaluru, India
5. CEP Course, Defence Biomedical and Electromedical Laboratory 2017. Talk Title – Nanoparticles for Drug Delivery. 30 Aug. 2017, Bengaluru, India.

Talks (by students based on work in the laboratory)

1. Society for Leukocyte Biology, Annual Conference, 2020. **Talk Title** – Characterization of aberrant neutrophil phenotype and function in Diabetic Foot Ulcers. Authors – **Jayashree V.**

- Raghavan**, Rebecca Samuel, Shruthi K. S., Vinod Kumar, Priyanka Arunachalam, Kalpana S.R., Chaluvanarayana H. C., Pavan Belahalli, Siddharth Jhunjhunwala. 21 Oct. 2020, Online.
2. Myeloid Cells and Innate Immunity in Solid Tumors, Keystone Symposia, 2020. **Talk Title** - High grade glioma infiltrating myeloid cells show grade specific differences in neutrophils and monocytes. Authors – **Jayashree V. Raghavan**, Raksha A. Ganesh, Pranali Sonpatki, Divya Naik, Priyanka Arunachalam, Darshat Shah, Akhila Lakshmikantha, Shibu Pillai, Komal Prasad Chandrachari, Kiran Mariswamappa, Sathyanarayana L. D., Nameeta Shah, Siddharth Jhunjhunwala. 21 – 23 Sept. 2020, Online.
 3. EU-TERMIS, 2020. **Talk Title** – Neutrophil Activation Affects Healing of Diabetic Wounds. Authors – Jayashree V. Raghavan, Rebecca Samuel, Shruthi K. S., Vinod Kumar, Priyanka Arunachalam, Kalpana S.R., Chaluvanarayana H. C., Pavan Belahalli, **Siddharth Jhunjhunwala**. Accepted, but conference cancelled due to COVID.
 4. World Biomaterials Congress, 2020. **Talk Title** - Altered macrophage function following phagocytic uptake of surface modified micro-particles. Authors – **Preeti Sharma** and Siddharth Jhunjhunwala. Dec. 2020, Online
 5. World Biomaterials Congress, 2020. **Talk Title** - A sequential drug release system to promote healing of diabetic ulcers by altering immune phenotype and function. Authors – **Jayashree V. Raghavan** and Siddharth Jhunjhunwala. Dec. 2020, Online
 6. World Biomaterials Congress, 2020. **Talk Title** - Elucidating the role of neutrophils in immune reactions against biomaterials. Authors – **Alakesh Singh** and Siddharth Jhunjhunwala. Dec. 2020, Online