

## Education and Academic Experience

### Postdoctoral Researcher

May 2021 – Present

#### Harvard Medical School – Wyss Institute for Biologically Inspired Engineering

Advisor: Dr. Peng Yin

Research themes: programmable nucleic acids as information-rich biopolymer for multiplexed protein sensing and imaging

Research highlights: realized high-throughput protein detection by next-generation sequencing; programmed DNA strands to image protein interaction in single cell (“In-cell” Co-IP)

### Co-founder; research scientist

May 2020 – May 2021

#### Auragent Bioscience LLC (now Brightest Bio, estimated at \$50M)

CEO: Dr. Shaker Sadasivam

### Ph.D.

Aug 2014 – Mar 2020

#### Washington University in St. Louis – Mechanical Engineering & Materials Science

Advisor: Dr. Srikanth Singamaneni

Thesis title: Ultrasensitive Biodetection based on Plasmonically-active Metal Materials

Research themes: artificial antibody based on molecularly imprinted polymer; plasmonic nanomaterials; microneedle; point-of-care sensor; interstitial fluid sensing; plasmon enhanced fluorescence; ultrasensitive protein detection

Research highlights: optimized the structure and composition of molecularly imprinted polymer and realized artificial antibody with improved biorecognition specificity and sensitivity; combined polymer with plasmonic nanostructure for ultrasensitive sensing and imaging; designed microneedle patch for pain-free and blood-draw-free detection of protein biomarkers in interstitial fluid

### Visiting Scholar

Aug 2012 – Dec 2012

#### University of California, Berkeley

Electrical Engineering and Computer Sciences

### Bachelor of Engineering

Sep 2009 – Jun 2013

#### Xi’an Jiaotong University – Electrical and Electronic Engineering

#16 in Best Global Universities for Engineering (U.S. News)

Study themes: *automation; programming*

## Publications

First author paper:

1. Luan, J.; Sheng, K.; Nofel, M.; Hong, F.; Lun, X.; Su, H.; Yin, P., "In-cell Co-immunoprecipitation" based on DNA proximity extension for in-situ imaging of biomolecule interactions. In preparation
2. Luan, J. ‡; Sheng, K. ‡; He, L.; Yin, P., Highly multiplexed sequencing of protein biomarkers in 1µL liquid biopsy. In submission
3. Wang, Z. ‡; Luan, J.‡; Seth, A; Liu, L.; You, M.; Singamaneni, S., Microneedle patch for the ultrasensitive quantification of protein biomarkers in interstitial fluid. *Nature Biomedical Engineering* 2021, 5, page 64-76. (IF: 29)
4. Luan, J.; Seth, A; Gupta, R; Wang, Z.; Derami, H.; Rathi, P; Cao, S.; Singamaneni, S., Ultrabright Plasmonic-fluor as a Cross-platform Nanolabel for Femtomolar Detection of Bioanalytes. *Nature Biomedical Engineering* 2020, 4, 518–530. (IF: 29)
5. Luan, J. ‡; Liang, C. ‡; Wang, Z.; Gupta R.; Cao, S.; Sun, H.; Kharasch, E. D.; Morrissey, J. J.; Singamaneni, S., Gold nanorod Size-dependent Fluorescence Enhancement. *ACS Applied Material and Interface* 2021, 13, 9, 11414–11423. (IF: 10)
6. Luan, J.; Morrissey, J.; Wang, Z.; Derami, H.; Liu, K-K.; Cao, S.; Jiang, Q.; Wang, C.; Kharasch, E.; Naik, R.; Singamaneni, S., Add-on Plasmonic Patch as a Universal Fluorescence Enhancer. *Light: Science & Applications* 2018, 7, 29. (IF: 20)
7. Luan, J.; Xu, T.; Morrissey, J. J.; Kharasch, E. D.; Singamaneni, S., Environmental Stability of Plasmonic Biosensors based on Natural vs. Artificial Antibody. *Analytical Chemistry* 2018, 90, 13, 7880-7887. (IF: 8)
8. Luan, J.; Hu, R.; Tadepalli, S.; Morrissey, J. J.; Kharasch, E. D.; Singamaneni, S., Amplification of Refractometric Biosensor Response through Biomineralization of Metal–Organic Framework Nanocrystals. *Advanced Materials Technologies* 2017, 2 (9). (IF: 5.4)
9. Luan, J.; Liu, K.-K.; Tadepalli, S.; Jiang, Q.; Morrissey, J. J.; Kharasch, E. D.; Singamaneni, S., PEGylated Artificial Antibodies: Plasmonic Biosensors with Improved Selectivity. *ACS Applied Materials & Interfaces* 2016, 8 (36), 23509–23516. (IF: 10)

#### Co-author paper:

10. Xiong, R.; Luan, J.; Kang, S.; Ye, C.; Singamaneni, S.; Tsukruk, V. V., Biopolymeric photonic structures: design, fabrication, and emerging applications. *Chemical Society Reviews* 2020, 49(3), 983-1031. (IF: 60)
11. Tian, L.; Luan, J.; Liu, K.-K.; Jiang, Q.; Tadepalli, S.; Gupta, M. K.; Naik, R. R.; Singamaneni, S., Plasmonic Biofoam: A Versatile Optically Active Material. *Nano Letters* 2016, 16 (1), 609-616. (IF: 12)
12. Ye, D.; Luan, J; Pang, H.; Yang, Y.; Nazeri, A.; Robin, J.; Chen, H., Characterization of focused ultrasound-mediated brainstem delivery of intranasally administered agents. *Journal of Controlled Release* 2020, 328, 276-285. (IF: 11)
13. Gupta, R.; Luan, J.; Chakrabartty, S.; Scheller, E. L.; Morrissey, J. J.; Singamaneni, S., Refreshable Nanobiosensor based on Organosilica Encapsulation of Biorecognition Elements. *ACS Applied Materials & Interfaces* 2020, 12, 5420–5428. (IF: 10)
14. Gupta, P.; Luan, J.; Wang, Z.; Cao, S.; Naik, R.; Singamaneni, S., Add-On Plasmonic Patch for On-demand Electromagnetic Hotspots. *ACS Applied Materials & Interfaces* 2019, 11, 37939–37946. (IF: 10)
15. Wang, C.; Luan, J.; Tadepalli, S.; Liu, K.-K.; Morrissey, J. J.; Kharasch, E. D.; Naik, R. R.; Singamaneni, S., Silk-Encapsulated Plasmonic Biochips with Enhanced Thermal Stability. *ACS applied materials & interfaces* 2016, 8 (40), 26493-26500. (IF: 10)
16. Seth, A.; Mittal, E.; Luan, J.; Kolla, S.; Joshi, H.; Gupta, R.; Rathi, P.; Wang, Z.; Morrissey, J. J.; Ernst, D. J.; PortalCelhay, C.; Morley, C. S.; Philips, A. J; Singamaneni, S., High-Resolution Imaging of Protein Secretion at Single-Cell Level using Plasmon-enhanced FluoroDOT assay. *Cell Reports Methods* 2022 Aug 22; 2(8). (IF: 4)
17. Wang, C.; Tadepalli, S.; Luan, J.; Liu, K. K.; Morrissey, J. J.; Kharasch, E. D.; Naik, R. R.; Singamaneni, S., Metal-Organic Framework as a Protective Coating for Biodiagnostic Chips. *Advanced Materials* 2017, 29 (7). (IF: 32)

18. Wang, C.; Sun, H.; **Luan, J.**; Jiang, Q.; Tadepalli, S.; Morrissey, J. J.; Kharasch, E. D.; Singamaneni, S., Metal-Organic Framework Encapsulation for Biospecimen Preservation. *Chemistry of Materials* 2018, 30, 4, 1291-1300. (IF: 10)
19. Liu, L.; Wang, Z.; Wang, Y.; **Luan, J.**; Morrissey, J. J.; Naik, R. R.; & Singamaneni, S., Plasmonically Enhanced CRISPR/Cas13a-Based Bioassay for Amplification-Free Detection of Cancer-Associated RNA. *Advanced Healthcare Materials* 2021, 10(20), 2100956. (IF: 11)
20. Tadepalli, S.; Yim, J.; Madireddi, K.; **Luan, J.**; Naik, R. R.; Singamaneni, S., Gold Nanorod-Mediated Photothermal Enhancement of the Biocatalytic Activity of a Polymer-Encapsulated Enzyme. *Chemistry of Materials* 2017, 29 (15), 6308-6314. (IF: 10)
21. Tian, L.; Jiang, Q.; Liu, K.-K.; **Luan, J.**; Naik, R. R.; Singamaneni, S., Bacterial Nanocellulose-Based Flexible Surface Enhanced Raman Scattering Substrate. *Advanced Materials Interfaces* 2016, 3 (15), 1600214. (IF: 6)
22. Wang, Z.; Zhou, Q.; Seth, A.; Kolla, S.; **Luan, J.**; Jiang, Q.; Rathi, P.; Gupta, P.; Morrissey, J.J.; Naik, R.R.; Singamaneni, S., Plasmonically-enhanced competitive assay for ultrasensitive and multiplexed detection of small molecules. *Biosensors and Bioelectronics* 2022 Mar 15;200:113918. (IF: 12)
23. Qavi, A. J.; Wu, C.; Lloyd, M.; Zaman, M. M. U.; **Luan, J.**; Ballman, C.; ... & Amarasinghe, G. K., Plasmonic Fluor-enhanced antigen arrays for high-throughput, serological studies of SARS-CoV-2. *ACS Infectious Diseases* 2022, 8(8), 1468-1479. (IF: 6)
24. Cao, S.; Tang, R.; Sudlow, G.; Wang, Z; Liu, K.-K.; **Luan, J.**; Tadepalli, S.; Achilefu, S.; Singamaneni, S., Red Blood Cell Mimicking Silk Microcapsules. *ACS Applied Material and Interface* 2019, 11, 5499–5508. (IF: 10)
25. Jiang, Q.; Deoukchen, G.; Tadepalli, S.; Liu, K, K.; Kwon, H.; **Luan, J.**; Min, Y.; Jun, Y.-S.; Singamaneni, S., Photothermally Active Reduced Graphene Oxide/Bacterial Nanocellulose Composites as Biofouling-Resistant Ultrafiltration Membranes. *Environmental science & technology* 2019, 53, 412–421. (IF: 11)
26. Lun, X.; Sheng, K.; Yu, Xue.; Gowri, G.; Zhai, Y.; Su, H.; Kim, Y.; Ingber, D.; Yaffe, M.; Serrata, M.; **Luan, J.**; Jackson, H.; Yin, P., Signal amplification by cyclic primer extension enables high-sensitivity single-cell mass cytometry analysis. *Nature Biotechnology*. Under review

## Teaching and Mentoring

### Teaching Experience:

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| <b>Summer 2023</b> | Hold seminars for Project Success: scientific introductory education for underrepresented high school students from Boston and Cambridge                                   |
| <b>Spring 2017</b> | Hold ten lab seminars for undergraduate students in Biomedical Engineering department, guiding their graduation project: “artificial antibody for point-of-care detection” |
| <b>Spring 2017</b> | Guest lecturer: Introduction to Polymer Science and Engineering (MEMS 5608)  |
| <b>Spring 2015</b> | Teaching assistant: Modeling, Simulation and Control (MEMS 4301-01)<br>Two lectures; One discussion section per week; One office hour per week; grading assignments        |
| <b>Fall 2014</b>   | Teaching assistant: MECHANICAL ENGINEERING DESIGN PROJECT (MEMS 411X)<br>Lab sessions; one office hour per week; grading assignments                                       |

## Mentoring Experience:

- Liqun He: postdoc@Harvard University, 2022-2023
- Qisheng Jiang: research scientist@Auragent Bioscience LLC, 2019-2020
- Anushree Seth: postdoc@Washington University in St. Louis,
- Zheyu Wang: Ph.D. student@Washington University in St. Louis, 2018-2019 (now Scientist, Bristol Myers Squibb)
- Rohit Gupta: Ph.D. student@Washington University in St. Louis, 2018-2019 (now Senior Scientist at Pfizer)
- Chao Liang: visiting scholar@Washington University in St. Louis, 2017-2018
- Maofeng Zhang: visiting scholar@Washington University in St. Louis, 2017 (now professor, Hefei Gongye University)
- Ting Xu: visiting scholar@Washington University in St. Louis, 2017-2018
- Liz Jahng: undergraduate student@Washington University in St. Louis, 2016-2017
- Rong Hu: visiting scholar@Washington University in St. Louis, 2016-2017
- Congzhou Wang: postdoc@Washington University in St. Louis, 2016 (now associate professor at South Dakota School of Mines and Technology)

## Service Experience:

Summer 2023

Hold scientific and educational seminars for Project Success: scientific introductory education for underrepresented high school students from Boston and Cambridge

## Presentations and Talks

June 2023	Session Talk: <i>Plasmonic nanostructure in biotechnology</i> Project Success: Diversity Inclusion and Community Partnership
Mar 2023	Session Talk: <i>Highly multiplexed single-molecule detection based on Successive Proximity Extension Sequencing</i> Molecular Robotics Initiative
May 2020	Session Talk: <i>Ultrabright Plasmonic-fluor as a Cross-platform Nanolabel for Femtomolar Detection of Bioanalytes</i> North American Materials Colloquium Series
Mar 2020	Session Talk: <i>Simple and cost-effective diagnostics</i> McDonnell International Scholars Academy, PhD-in-3D
Dec 2019	Poster: <i>Ultrabright Plasmonic-fluor as a Cross-platform Nanolabel for Femtomolar Detection of Bioanalytes</i> Center for Science & Engineering of Living Systems
Dec 2017	Session Talk: <i>Dramatic Enhancement of Fluorescence in Bioassays via a Lighting-Up Plasmonic Patch</i> <i>Materials Research Society</i>

Dec 2017

Poster: *PEGylated Artificial Antibodies: Plasmonic Biosensors with Improved Selectivity*  
*Materials Research Society*

## Awards and Honors

Director's fund	2023
Diagnostic Accelerator Award	2022
Wyss Validation Project Award	2021
McDonnell International Scholars Fellowship	2016-2020
PhD in 3D competition: 1 <sup>st</sup> place winner	2020
National undergraduate scholarship	2013

## References

**Srikanth Sigamaneni, Ph.D.**  
(314) 935-5407  
singamaneni@wustl.edu

**Peng Yin, Ph.D.**  
(617) 432-7731  
nicole.gomez@wyss.harvard.edu

**Samuel Achilefu, Ph.D.**  
(314) 935-5660  
sharon.maliyil@utsouthwestern.edu