

# Bharath Bangalore Rajeeva

A206, 2501 Lake Austin Blvd, Austin, TX 78703 | 5129038842 | [bharath.rajeeva@utexas.edu](mailto:bharath.rajeeva@utexas.edu) | <https://www.linkedin.com/in/brbharath/>

## EDUCATION

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- **The University of Texas at Austin, Austin, TX** *Aug 2014-Dec 2018*
  - Ph. D. in Materials Science and Engineering, Dept. of Mechanical Engineering GPA: 4/4
- **Birla Institute of Technology and Science (BITS), Pilani, India** *Aug 2008-Jul 2013*
  - M.Sc. (Hons.) Chemistry GPA: 8.4/10
  - B.E. (Hons.) Electrical and Electronics

## PROFESSIONAL EXPERIENCE

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- **Research Intern, Oculus Research/Facebook Reality Labs, Redmond, WA, USA** *June 2017 – August 2017*  
*Manager: Dr. Matthew Colburn*
  - Design and nanofabrication of optical devices for augmented reality heads-up display.
- **Graduate student, University of Texas at Austin, Austin, TX, USA** *August 2014 – present*  
*Advisor: Prof. Yuebing Zheng*
  - Optical design and fabrication of dual-mode visible and mid IR plasmonic sensor.
  - Development of optical and software setup (via LabView) for bubble printing of quantum dots and catalytically-active nanoparticles to realize large-area printing with sub-micron linewidth. Extension of the technique to enable haptic input.
  - Design of a light mediated technique for printing hydrogels on single nanoparticles with 10nm accuracy.
  - 2 Patents, 17 Journal papers (>230 citations, h-index = 9), 10 Conference presentation and posters, 3 book chapters.
  - Exploration of technology commercialization during NSF I-Corps Summer program and relevant coursework.
  - Numerous journal covers and media reports on popular sites: Discovery Channel, IEEE Spectrum, Material Views, etc.
  - Teaching assistant for Materials Engineering Laboratory (ME 134L) for 2 years. Average rating: 4.8/5.
  - Assisted in writing multiple proposals to secure >\$500,000 in funding.
- **Application Engineer, Applied Materials Inc., Bangalore, India** *August 2013 – July 2014*  
*Manager: Mr. Sujit Jha*
  - Successful validation of LINK™ server worth \$1 million at Global Foundries, Germany.
  - Responsible for providing CAD based solution in wafer inspection products (UVision). The technology is currently integrated into UVision 7 as Marker™.
  - On-site support, training and client meetings at *Global Foundries, Germany* and *Samsung, Korea*.
- **Student assistant, University of Alberta, Edmonton, Canada** *January 2013 – June 2013*  
*Advisor: Prof. Karthik Shankar*
  - Fabricated and researched the opto-electronic properties of semiconductor metal-oxide thin films.
- **Student assistant, Forschungszentrum Juelich, Juelich, Germany** *July 2012 – December 2012*  
*Advisor: Dr. Friedhelm Finger*
  - Developed *nip* solar cells with  $\mu\text{-SiC}$  window layer using the dual hot-wire CVD arrangement.

## SKILLS

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- Experience in nanofabrication, optical engineering and hardware integration.
- Extensive knowledge in plasmonics, colloidal nanoparticles, laser-mediated synthesis, and biosensors.
- Experienced user of process and characterization tools such as SEM-EDS, UV-Vis, FTIR, thermal CVD, PECVD and RIE.
- Software skills: MATLAB, LabView, PhotoShop, 3D Max, Origin. Basic usage of Lumerical FDTD and COMSOL.

## PROFESSIONAL MEMBERSHIPS

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- Optical Society of America (OSA). Student member, 2015-Present.
- Materials Research Society (MRS). Student member, 2015-Present.

## AWARDS / HONOURS

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- 2017: Invitation to join Phi Kappa Phi
- 2016-17 Friends of Alec Graduate Student Fellowship, Cockrell School of Engineering, UT Austin.
- Fall 2015 Professional Development Award, Office of Graduate Studies, UT Austin.
- 2015-16 George J. Heuer, Jr. Ph.D. Endowed Graduate Fellowship, Cockrell School of Engineering, UT Austin.
- 2014-15 Harris L. Marcus Graduate Fellowship in Materials Science and Engineering, UT Austin.
- 2012-13 Canadian Commonwealth scholarship 2012-13 by the Government of Canada.
- 2011 Indian Academy of Science (IAS) Summer Research Fellowship (SRF) by IAS, India.
- 2008 Kishore Vaigyanik Protsahan Yojana (KVPY) scholarship by Department of Science and Technology (DST), India.

## PATENTS

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1. Zheng, Y. B., **Rajeeva, B. B.** "Optical Printing Systems and Methods" Provisional Patent Application, 62/635,768 (2018).
2. Zheng, Y. B., **Rajeeva, B. B.** "One-Shot Synthesis and Printing of Immiscible Nanoparticle Alloys" (2018).

## BOOK CHAPTERS

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1. X. Peng\*, **B. B. Rajeeva\***, M. Wang, N. Bhatt, D. Penley, and Y. B. Zheng. *Plasmo-fluidics in Biology and Healthcare*. in Nanotechnology in Biology and Medicine, edited by Dr. Tuan Vo-Dinh (CRC Press/Taylor & Francis Group, LLC, 2018, submitted)
2. X. Peng, **B. B. Rajeeva**, D. Teal, and Y. B. Zheng. *Plasmo-fluidics for Biosensing and Medical Diagnostics*. in Nanotechnology Characterization Tools for Biosensing & Medical Diagnosis, Edited by Dr. Kumar Challa (Springer, 2018, Chapter 5: 217-251)
3. **B. B. Rajeeva**, Y. B. Zheng. *Molecular Plasmonics: From Molecular-Scale Measurements and Control to Applications*. in Nanotechnology: Delivering the Promise, Edited by Drs. H. N. Cheng, Larry Doemeny, and Diane Grob Schmidt (American Chemical Society, 2016)

## JOURNAL PUBLICATIONS AND MEDIA SPOTLIGHTS (reverse chronological order)

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1. Y. Liu\*, L. Lin\*, **B. B. Rajeeva\***, J. W. Jarrett, X. Li, X. Peng, P. Kollipara, K. Yao, D. Akinwande, A. K. Dunn, and Y. B. Zheng. *Nanoradiator-Mediated Deterministic Opto-Thermoelectric Manipulation*. ACS Nano (2018) <https://pubs.acs.org/doi/10.1021/acsnano.8b05824>. (\*equal contribution)

2. L. Lin, J. Li, W. Li, M. N. Yogeesh, J. Shi, X. Peng, Y. Liu, **B. B. Rajeeva**, M. F. Becker, Y. Liu, D. Akinwande, and Y. B. Zheng. *Opto-thermoplasmonic Nanolithography for On-Demand Patterning of 2D Materials*. Advanced Functional Materials. (2018) <https://doi.org/10.1002/adfm.201803990>
3. **B. B. Rajeeva**, Z. Wu, A. Briggs, P. Acharya, B. S. Walker, X. Peng, V. Bahadur, S. R. Bank, and Y. B. Zheng. "Point-and-Shoot" Synthesis of Metallic Ring Arrays and Surface-Enhanced Optical Spectroscopy. *Advanced Optical Materials* 6 (2018) 1701213. *Featured as Front Cover Article*.
4. **B. B. Rajeeva**, L. Lin, and Y. B. Zheng. *Design and Applications of Lattice Plasmon Resonances*. *Nano Research* 11 (2018) 4423. *Featured as Front Cover Article*.
5. **B. B. Rajeeva**, M. Alabandi, L. Lin, E. P. Peillo, A. K. Dunn, and Y. B. Zheng. *Patterning and Fluorescence Tuning of Quantum Dots with Haptic-Interfaced Bubble Printing*. *Journal of Materials Chemistry C* 5 (2017) 5693-5699. *Featured as Back Cover* [[2017 HOT Paper](#), [Nanowerk](#)]
6. M. Wang, W. Li, L. Scarabelli, **B. B. Rajeeva**, M. Terrones, L. Liz-Marzán, D. Akinwande, and Y. B. Zheng. *Plasmon-Trion and Plasmon-Exciton Resonance Energy Transfer from a Single Plasmonic Nanoparticle to Monolayer MoS<sub>2</sub>*. *Nanoscale* 9 (2017) 13947-13955. *Featured as Inside Cover Article*.
7. M. Wang, G. Hartmann, Z. Wu, L. Scarabelli, **B. B. Rajeeva**, L. Liz-Marzán, G. S. Hwang, Y. B. Zheng. *Controlling Plasmon-Enhanced Fluorescence via Intersystem Crossing in Photoswitchable Molecules*. *Small* 13 (2017) 1701763. *Featured as Frontispiece*.
8. **B. B. Rajeeva\***, L. Lin\*, E. P. Peillo, X. Peng, M. A. Albandi, W. W. Yu, A. K. Dunn, and Y. B. Zheng. High-Resolution Bubble Printing of Quantum Dots. *ACS Applied Materials & Interfaces* 9 (2017) 16725-16733. Featured by [[Nanowerk](#), [3dprint.com](#), [Nanotechweb](#)]
9. Z. Wu, G. Kelp, M. N. Yogeesh, W. Li, A. Briggs, **B. B. Rajeeva**, D. Akinwande, S. Bank, G. Shvets, Y. B. Zheng. *Dual-Band Moiré Metasurface Patches for Multifunctional Biomedical Applications*. *Nanoscale* 8 (2016) 18461-18468. Featured by [Nanowerk](#).
10. M. Wang, **B. B. Rajeeva**, L. Scarabelli, E. P. Perillo, A. K. Dunn, L. Liz-Marzan, and Y. B. Zheng. *Molecular-Fluorescence Enhancement via Blue-Shifted Plasmon-Induced Resonance Energy Transfer*. *Journal of Physical Chemistry C* 1 (20) (2016) 14820-14827.
11. J. Y. Gan, **B. B. Rajeeva**, Z. L. Wu, D. Penley, C. Liang, Y. X. Tong, and Y. B. Zheng. *Plasmon-Enhanced Nanoporous BiVO<sub>4</sub> Photoanodes for Efficient Photoelectrochemical Water Oxidation*. *Nanotechnology* 27 (2016) 235401.
12. J. Y. Gan, **B. B. Rajeeva**, Z. L. Wu, D. Penley, and Y. B. Zheng. *Hydrogen-Reduced Bismuth Oxyiodide Nanoflake Arrays with Plasmonic Enhancements for Efficient Photoelectrochemical Water Reduction*. *Electrochimica Acta* 2 (19) (2016) 20-27.
13. L. Lin\*, X. Peng\*, Z. Mao, W. Li, M. N. Yogeesh, **B. B. Rajeeva**, E. P. Perillo, A. K. Dunn, D. Akinwande, and Y. B. Zheng. Bubble-Pen Lithography. *Nano Letters* 16 (2016) 701-708. *Highlighted on Front Cover* [[Discovery Channel Canada](#), [IEEE Spectrum](#), [Statesman](#), [EurakAlert](#), [Photonics.com](#), [AzoNano](#), [Chemistry Views](#), [Engadget](#), [Geek.com](#), [Digital Journal](#), [New Electronics](#), [Phys.org](#), [OSA-OPN](#), [Laser Focus World](#), [Controlled Environments Magazine](#), [Semiconductor Engineering](#), [UT News](#), [Nanowerk](#), [Nanotechweb](#), [Nanotec](#), [OpenNano](#), [Gentaur](#), [Cool Physics](#)]
14. J. Lee, **B. B. Rajeeva**, T. Yuan, Z. H. Guo, M. Al-Hashimi, Y. B. Zheng, and L. Fang. *Thermodynamic Synthesis Of Solution Processable Ladder Polymers*. *Chemical Science* 7 (2016) 881-889. *Featured as Front Cover*
15. **B. B. Rajeeva**, D. Hernandez, M. Wang, E. Perillo, L. Lin, L. Scarabelli, B. Pingali, L. Liz-Marzan, A. Dunn, J. Shear, and Y. B. Zheng. Regioselective Localization and Tracking of Biomolecules on Single Gold Nanoparticles. *Advanced Science* 2 (2015) 1500232. *Featured as Frontispieces* [[Advanced Science News](#), [Materials Views China](#)]
16. K. Chen, **B. B. Rajeeva**, Z. L. Wu, M. Rukavina, T. D. Dao, S. Ishii, M. Aono, T. Nagao, and Y. B. Zheng. *Moiré Nanosphere Lithography*. *ACS Nano* 9 (2015) 6031-6040. *Featured in the book "Nanotechnology: The Future is Tiny" by Michael Berger (2016)* [[Nanowerk Spotlight article](#), [UT Austin Mech Eng](#)]
17. J. Y. Gan, X. Lu, **B. B. Rajeeva**, R. Menz, Y. Tong, and Y. B. Zheng. *Efficient Photoelectrochemical Water Oxidation over Hydrogen-Reduced Nanoporous BiVO<sub>4</sub> with Ni-Bi Electrocatalyst*. *ChemElectroChem* 2 (2015) 1385-1395.

18. **B. B. Rajeeva**, R. Menz, and Y. B. Zheng. *Towards Rational Design of Multifunctional Theranostic Nanoparticles: What Barriers do We Need to Overcome?* *Nanomedicine* 9 (2014) 1767-1770.
19. T. Chen, **B. B. Rajeeva**, J. Wolff, A. Schmalen, F. Finger. *Dual hot-wire arrangement for the deposition of silicon and silicon carbide thin films.* *Thin Solid Films* 575 (2015) 25-29.

## **REFEREED CONFERENCE PROCEEDINGS**

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1. **B. B. Rajeeva**, Z. Wu, A. Briggs, S. R. Bank, X. Peng, Y. Zheng ““Point-and-shoot” strategies for metallic ring printing and dual-mode spectroscopy” SPIE Nanoscience + Engineering 2018. San Diego, CA, Aug 19-23, 2018. (Poster)
2. **B. B. Rajeeva**, Z. Wu, A. Briggs, P. V. Acharya, V. Bahadur, S. R. Bank, Y. Zheng, " In-situ “Point-and-Shoot” Fabrication of Metallic Rings for Mid-IR/Visible Sensing" Conference on Lasers and Electro-Optics (CLEO) 2018, San Jose, CA, May 13-18, 2018. (Oral)
3. **B. B. Rajeeva**, Z. Wu, A. Briggs, P. V. Acharya, V. Bahadur, S. R. Bank, Y. B. Zheng, "“Point-and-Shoot” Printing of Metallic Rings for Dual-Mode Spectroscopy", Material Research Society (MRS) Spring Meeting & Exhibit, Phoenix, AZ, April 2-6, 2018. (Poster)
4. Y. Liu, L. Lin, **B. B. Rajeeva** and Y. Zheng, " Thermophoretic manipulation of colloidal particles on single plasmonic nanoantenna", Material Research Society (MRS) Spring Meeting & Exhibit, Phoenix, AZ, April 2-6, 2018. (Poster).
5. **B. B. Rajeeva**, L. Lin, E. P. Perillo, X. Peng, A. K. Dunn, and Y. B. Zheng, “High-Resolution Bubble Printing of Quantum Dots on Plasmonic Substrates” Material Research Society (MRS) Fall Meeting, Boston, MA, November 27-December 2, 2016. (Oral)
6. L. Lin, X. Peng, Z. Mao, W. Li, M. N. Yogeesh, **B. B. Rajeeva**, E. P. Perillo, A. K. Dunn, D. Akinwande, and Y. B. Zheng, “Laser-Directed ‘Bubble-Pen’ for Nanoparticle Patterning,” Conference on Lasers and Electro-Optics (CLEO), San Jose, CA, June 5-10, 2016. (Oral)
7. **B. B. Rajeeva**, L. Lin, E. P. Perillo, X. Peng, A. K. Dunn, and Y. B. Zheng, “Two-Dimensional Free- Form Fabrication and Lifetime-Tuning of Quantum Dots,” Conference on Lasers and Electro- Optics, San Jose, CA, June 5-10, 2016. (Oral)
8. **B. B. Rajeeva**, M. Wang, L. Lin and Y. B. Zheng, “Protein Hydrogel Immobilization via Multiphoton Plasmonic Lithography,” *Frontiers in Optics (FIO)* , San Jose, CA, October 18-22, 2015. (Poster)
9. L. Lin, M. S. Wang, **B. B. Rajeeva**, and Y. B. Zheng, “Plasmonic Nanosensors: Improving Spectral and Spatial Resolution,” ASME 2015 4th Global Conference on Nanoengineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015. (Poster)
10. M. S. Wang, **B. B. Rajeeva**, and Y. B. Zheng, “Rational Design and Control of Functional Molecules on Single Metal Nanoparticles”, the 249th ACS National Meeting, Denver, CO, March 22-26, 2015. (Oral)
11. M. S. Wang, **B. B. Rajeeva**, and Y. B. Zheng, “Exploring Photoswitchable Plasmon-Molecule Interactions at the Single-Molecule and Single-Nanoparticle Levels,” APS March Meeting, San Antonio, March 2-6, 2015. (Oral)

## **OUTREACH AND NON ACADEMIC INVOLVEMENT**

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- Participant, Austin I-Corps Regional Program, Summer 2016 to explore technology commercialization.
- Volunteer, Explore UT, The University of Texas at Austin, 2015 and 2016.
- Member, The University of Texas at Austin Table Tennis team.
- Guest service volunteer, *Formula 1* 2016 and 2017, Circuit of the Americas, USA.