

ROHITH KRISHNA REDDY

Assistant Professor and CPRIT Scholar in Cancer Research

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EDUCATION

Ph.D. in Bioengineering

University of Illinois at Urbana Champaign (UIUC), 2013

Advisor: Dr. Rohit Bhargava

Dissertation: Mid-infrared Spectroscopic Imaging and Tomography

Minor in Computational Science and Engineering (CSE)

Bachelor's (B.Tech.) in Electrical Engineering and

Master's (M.Tech.) in Communication and Signal Processing (Dual Degree)

Indian Institute of Technology (IIT) Madras, India, 2006

Advisor: Dr. K.M.M.Prabhu

POST-DOCTORAL TRAINING

Harvard University

Advisor: Dr. Guillermo J. (Gary) Tearney

Harvard Medical School, Massachusetts General Hospital

Nov 2013 – Dec 2017

University of Illinois at Urbana Champaign,

Beckman Institute for Advanced Science and Technology

Advisor: Dr. Rohit Bhargava

June 2013 - Oct 2013

AWARDS AND DISTINCTIONS

- 2016** **Innovation award** given by **FACSS** for the most innovative and **outstanding new research advancement** from among all the scientific work presented at the **SciX 2016** conference. This award recognizes my post-doctoral work on a swallowable capsule endoscopy for Barrett's esophagus diagnosis based on Optical Coherence Tomography.
- 2015** An award from **Massachusetts General Hospital** given to two post-docs each year to present their research at a conference. This award is presented by the Massachusetts General Post-doc Association.
- 2014** **William F. Meggers award** for 2014. This is **the best paper award** in the spectroscopy community. It is awarded annually by the Society of Applied Spectroscopy (**SAS**).
- 2012** **Tomas Hirschfeld Award** for 2012, an **international award** given to a student in recognition of **outstanding research** by the Federation of Analytical Chemistry and Spectroscopy Societies (**FACSS**).
- 2012** **Innovation award** given by **FACSS** for the most innovative and **outstanding new research advancement** presented at the **SciX 2012** conference. This conference Science Exchange (SciX) was held in Kansas City, MO, Sept. 30th to Oct 5th, 2012.
- 2011** **William G. Fateley Student Award** for 2011, an **international award** given to **the exceptional student** in the field of spectroscopy. This is given to one student each year.
- 2011** **Society of Applied Spectroscopy Student Award** for 2011, a **national award** for **outstanding research** in light-matter interaction and image formation in mid-infrared.
- 2011** **Coblentz Student Award** for 2011, an **international award** recognizing contribution to the field of vibrational spectroscopy.

- 2011 **Among the 40 US students selected** to attend the NSF-NSC Summer Institute on Biosensing-Bioactuation (BSBA) 2011 held at National Taiwan University, Taiwan. This program was sponsored jointly by National Science Foundation (NSF) of USA and National Science Council (NSC) of Taiwan.
- 2011 **Best Student Poster Award** at Federation of Analytical Chemistry and Spectroscopy Societies (FACSS '11) annual conference, Reno NV, USA.
- 2010 Bioengineering@Illinois **Graduate Student Award (2010)** for an outstanding poster among more than 80 submissions spanning all bioengineering related research at Urbana-Champaign.
- 2009 **Among the 50 students selected** from all over the world to attend the NanoBiophotonics Summer School 2009 sponsored by National Science Foundation (NSF) and Network for Computational Nanotechnology (NCN)
- 2009 **Best Student Poster Award** at Federation of Analytical Chemistry and Spectroscopy Societies (FACSS '09) annual conference, Louisville KY, USA.
- 2009 Department of Bioengineering **Graduate Student Achievement Award** for distinction in research among all graduate students in Bioengineering at Urbana-Champaign.
- 2007 **Best Student Poster Award** at Federation of Analytical Chemistry and Spectroscopy Societies (FACSS '07) annual conference, Memphis TN, USA.
- 2007 Co-author of the **Bronze Medal winning paper** at Genetic and Evolutionary Computation Conference (GECCO) 2007, London, UK.
- 2001 **33rd Rank (99.98 Percentile)** in IIT Joint Entrance Exam-2001 (Round 1) and **148th Rank (99.9 Percentile)** in IIT Joint Entrance Exam-2001 (Round 2). The IITs are among the most prestigious educational institutions in India.
- 2000 **1st Rank** in the state and **13th Rank** All India in National Science Olympiad, 2000-01 conducted by Science Olympiad Foundation, New Delhi. **22nd Rank** All India in the final round of the same.
- 2000 **Among the top 200 students** in the nation in the **Indian Chemistry Olympiad (IChO)**, June 2000.

PUBLICATIONS

Patents

1. R. Bhargava, F.N. Pounder, **R.K. Reddy**, "Automated Detection of Breast Cancer Lesions in Tissue", U.S. Patent US20120052063A1, 2012.
2. G.J. Tearney, **R.K. Reddy**, "Apparatus and method for controlling propagation and/or transmission of electromagnetic radiation in flexible waveguide(s)", US10228556B2, 2019.
3. G.J. Tearney, **R.K. Reddy**, "Optical imaging device powered by light", filed April 2015.
4. G.J. Ughi, K.Singh, A.M. Fard, **R.K. Reddy**, G.J. Tearney, "Anatomically correct 3D reconstruction of luminal objects", filed July 2015.
5. G.J. Tearney, **R.K. Reddy**, M.J. Gora, K.K. Chu, M. Beatty, J. Dong, E. Beaulieu-Ouellet, "Systems and methods for an actively controlled optical imaging device." US11147503B2, 2021.

Peer Reviewed Journal Publications

1. **R.K. Reddy**, R. Bhargava, "Accurate histopathology from low signal-to-noise ratio spectroscopic imaging data", *Analyst*, **135**, 2818-2825, 2010
2. M.V. Schulmerich, **R.K. Reddy**, A.K. Kodali, L.J. Elgass, K. Tangella and R. Bhargava, "Dark Field Raman Microscopy", *Anal. Chem.*, **82**(14), 6273-6280, 2010
3. R. Kong, **R.K. Reddy**, R. Bhargava "Characterization of Tumor Progression in Engineered Tissue using Infrared Spectroscopic Imaging" *Analyst*, **135**(7), 1569-1578, 2010
4. M.J. Walsh, **R.K. Reddy**, R. Bhargava, "Label-free Biomedical Imaging with Mid- Infrared Spectroscopy", *IEEE Journal of Selected Topics in Quantum Electronics focusing on Biophotonics 2*, **18**(4), 1502-1513, 2012
5. J.T. Kwak, **R.K. Reddy**, S. Sinha, R. Bhargava, "Analysis of Variance components in Spectroscopic Imaging data of Tissue Microarray", *Anal. Chem.*, **84**(12), 1063-1069, 2012
6. **R.K. Reddy**, D. Mayerich, M. Walsh, P. S. Carney, R. Bhargava, "Rigorous Electromagnetic Model of Fourier Transform Infrared (FT-IR) Spectroscopic Imaging Applied to Automated Histology of Prostate Tissue Specimens", World Academy of Science, Engineering and Technology, *International Journal of Medical, Health, Biomedical, Bioengineering and Pharmaceutical Engineering* 6.3, 47-51, 2012
7. M.R. Kole, **R.K. Reddy**, M.V. Schulmerich, M.K. Gelber, R. Bhargava, "Discrete frequency infrared microspectroscopy and imaging with a tunable quantum cascade laser", *Anal. Chem.*, **84**(23), 10366-10372, 2012
8. **R.K. Reddy**, M.J. Walsh, M.V. Schulmerich, P. S. Carney, R. Bhargava, "High-definition Infrared Spectroscopic Imaging", *Appl. Spectrosc.*, **67**(1), 93-105, 2013

9. F.N. Pounder, **R.K. Reddy**, R. Bhargava, "Chemical Imaging for Human-Competitive Histologic Recognition Following Breast Cancer Screening", *Faraday discussions* 187, 43-68, 2016
10. B. Deutsch, **R.K. Reddy**, D. Mayerich, R. Bhargava, P. S. Carney, "Compositional prior information in computed infrared spectroscopic imaging", *Journal of the Optical Society of America A*, **32**(6) 1126-1131, 2015
11. B. Yin, K.K. Chu, C. Liang, K. Singh, **R. Reddy**, G.J. Tearney, "μOCT imaging using depth of focus extension by self-imaging wavefront division in a common-path fiber optic probe," *Opt. Express* **24**, 5555-5564, 2016
12. K. Singh, **R.K. Reddy**, G. Sharma, Y. Verma, J. Gardecki, D. Kang, G.J. Tearney, "In-line optical fiber metallic mirror reflector for monolithic common path optical coherence tomography probes", *Lasers in surgery and medicine* 50(3), 230-235, 2018.
13. S. Pahlow, K. Weber, J. Popp, B. R. Wood, K. Kochan, A. R  ther, D. Perez-Guaita, . . . , **R. Reddy**, et al. "Application of Vibrational Spectroscopy and Imaging to Point-of-Care Medicine: A Review." *Applied spectroscopy* 72, no. 1_suppl (2018): 52.
14. C. Liang, J. Dong, T. Ford, **R. Reddy**, H. Hosseiny, H. Farrokhi, M. Beatty, K. Singh, H. Osman, B. Vuong, G. Baldwin, C. Grant, S. Giddings, M. Gora, M. Rosenberg, N. Nishioka, and G. Tearney, "Optical coherence tomography-guided laser marking with tethered capsule endomicroscopy in unsedated patients," *Biomed. Opt. Express* 10(3), 1207-1222, 2019
15. Z. Qin, et. al. "Spontaneous Formation of 2D/3D Heterostructures on the Edges of 2D Ruddlesden–Popper Hybrid Perovskite Crystals", *Chemistry of Materials*, 2020, 32, 12, 5009–5015
16. R. Mankar, C. Gajjela, F. Foroozandeh, S. Prasad, D. Mayerich, and **R. Reddy**, "Multi-Modal Image Sharpening in Fourier Transform Infrared (FTIR) Microscopy", *Analyst* 146(15), 4822-4834, 2021
17. J. Dong, et al. "Feasibility and Safety of Tethered Capsule Endomicroscopy in Patients With Barrett’s Esophagus in a Multi-Center Study," *Clinical Gastroenterology and Hepatology*, doi: 10.1016/j.cgh.2021.02.008, 2021
18. M. Lotfollahi, T. Nguyen, D. Mayerich, Z. Han, R. Reddy , "Adaptive Compressive Sampling for Mid-infrared Spectroscopic Imaging", 2022 IEEE International Conference on Image Processing (ICIP), Bordeaux, France, 2022, pp. 2336-2340, doi: 10.1109/ICIP46576.2022.9897796.
19. R. Mankar, C. Gajjela, D. Mayerich, and **R. Reddy**, "Polarization sensitive photothermal mid-infrared spectroscopic imaging of human bone marrow tissue", *Applied. Spectroscopy*, 76(4), 508-518, 2022
20. C.C. Gajjela, M. Brun, R. Mankar, N. Kennedy, S. Corvigno, Y. Zhong, J. Liu, A.K. Sood, D. Mayerich, S. Berisha, **R. Reddy**, "Leveraging high-resolution spatial features in mid-infrared spectroscopic imaging to classify tissue subtypes in ovarian cancer", *Analyst*, 148, 2699-2708, 2023.
21. S. Ran, D. Mayerich, **R. Reddy**, "A Theoretical Framework for Chemical Holography", *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 2024.
22. R. Sun, D. Mayerich, and **R. Reddy**, "sCWatter: Open source coupled wave scattering simulation for spectroscopy and microscopy", *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 2024.
23. R. Reihanisarsari, C.C. Gajjela, X. Wu, R. Ishrak, Y. Zhong, D. Mayerich, S. Berisha and **R. Reddy**, "Cervical Cancer Tissue Analysis Using Photothermal Midinfrared Spectroscopic Imaging", *Chemical & Biomedical Imaging*, 2024.
24. X. Wu, R. Ishrak, R. Reihanisarsari, Y. Verma, B. Spring, K. Singh and **R. Reddy**. "High-speed forward-viewing optical coherence tomography probe based on Lissajous sampling and sparse reconstruction", *Optics Letters*, 49(13), pp.3652-3655, 2024.
25. R. Reihanisarsari, C.C. Gajjela, X. Wu, R. Ishrak, S. Corvigno, Y. Zhong, J. Liu, A.K. Sood, D. Mayerich, S. Berisha and **R. Reddy**, "Rapid hyperspectral photothermal mid-infrared spectroscopic imaging from sparse data for gynecologic cancer tissue subtyping". *Analytical Chemistry*, 2024 (In-press).

Peer Reviewed Conference Publications

26. X. Llorca, **R. Reddy**, B. Matesic, R. Bhargava, "Towards Better than Human Capability in Diagnosing Prostate Cancer Using Infrared Spectroscopic Imaging", Genetic and Evolutionary Computation Conference (GECCO '07), London UK, 2007 (An ACM conference)
27. **R.K. Reddy**, B. Davis, P.S. Carney, R. Bhargava, "Modeling Fourier Transform Infrared Spectroscopic Imaging of Prostate and Breast Cancer Tissue Specimens", International Symposium of Biomedical Imaging (ISBI), Chicago IL, 2011 (An IEEE conference)
28. **R. Reddy**, D. Mayerich, M. Walsh, M. Schulmerich, P. S. Carney, R. Bhargava, "Optimizing the Design of FT-IR Spectroscopic Imaging Instruments to Obtain Increased Spatial Resolution of Chemical Species", International Symposium of Biomedical Imaging (ISBI), Barcelona, Spain, 2012 (An IEEE conference)

29. M. Lotfollahi, N. Tran, C. Gajjela, S. Berisha, Z. Han, D. Mayerich, **R. Reddy**, (2022, October). Adaptive Compressive Sampling for Mid-Infrared Spectroscopic Imaging. In 2022 IEEE International Conference on Image Processing (ICIP) (pp. 2336-2340). IEEE.

Book Chapters

30. **R.K. Reddy** and R. Bhargava, "Chemometric methods for biomedical Raman spectroscopy and imaging" Book Ref: M.D. Morris, P. Matousek, "Emerging Raman Applications and Techniques in Biomedical and Pharmaceutical Fields", Springer-Verlag, Berlin Heidelberg, 2010
31. K. Yeh, **R.K. Reddy** and R. Bhargava, "Fourier transform infrared spectroscopic imaging: An emerging label-free approach for molecular imaging" Book Ref: M. Anastasio, P.J. La Riviere, "Emerging Imaging Technologies in Medicine", Taylor & Francis, Philadelphia, USA, 2012

Ph.D Thesis

32. **R.K. Reddy**, "Mid-Infrared Spectroscopic Imaging and Tomography", University of Illinois at Urbana Champaign, 2013.

PRESENTATIONS

Invited Talks

1. **R.Reddy**, "Identifying Amyloid Conformations in Alzheimer's Disease Through Mid-infrared Spectroscopy and Optical Imaging of Protein Secondary Structures", Houston Methodist Nantz National Alzheimer Center, May 2, 2023
2. C. Gajjela, R. Ishrak, X. Wu, R. Reihani, S. Afrose, D. Mayerich, **R. Reddy**, "Tissue Segmentation using Optical Photothermal Mid-infrared Spectroscopic Imaging and Machine Learning", Pittsburg Conference (Pittcon), March 19, 2023
3. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, R. Reihani, S. Afrose, D. Mayerich, **R. Reddy**, "Cancer diagnosis using photothermal mid-infrared spectroscopic imaging", U Manitoba seminar, March 31, 2022
4. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, S. Afrose, Camille Artur, D. Mayerich, **R. Reddy**, "Advances in diagnostics with mid-IR Photothermal Spectroscopic imaging", IS&T conference 2022, Jan 2022
5. S. Ran, C. Gajjala, L. Zhang, D. Mayerich, **R. Reddy**, "Biomedical Applications of Mid-Infrared Spectroscopy", NIST, Boulder Colorado, May 15, 2019
6. **R. Reddy**, "New Optical Technologies for Medical Imaging", UC Davis Biophotonics Seminar, Feb 13th, 2019
7. C Gajjela, R. Mankar, L. Zhang, S.Ran, **R.K. Reddy**, "Mid-infrared Spectroscopic Imaging for understanding ovarian cancer", MD Anderson Cancer Center, Houston, TX, Sept 2019.
8. C Gajjela, R. Mankar, L. Zhang, S.Ran, **R.K. Reddy**, "Spectroscopic imaging for ovarian cancer diagnosis", Science Exchange (SciX) Conference, Palm Springs, CA, Oct 2019
9. L. Zhang, C Gajjela, R. Mankar, S.Ran, **R.K. Reddy**, "Spectroscopic imaging for ovarian cancer diagnosis", Eastern Analytical Symposium, Princeton, NJ, Nov 2019
10. S.Ran, C Gajjela, L. Zhang, **R.K. Reddy**, "Biomedical Applications of Mid-Infrared Spectroscopy", National Institute of Standards and Technology (NIST) Seminar, Colorado, May 2019
11. R. Mankar, C Gajjela, L. Zhang, S.Ran, **R.K. Reddy**, "High-resolution spectroscopic imaging for understanding myelofibrosis", Science Exchange (SciX) Conference, Palm Springs, CA, Oct 2019
12. C Gajjela, L. Zhang, S.Ran, **R.K. Reddy**, "New Optical Technologies for Medical Imaging", Biophotonics Seminar, Univ. of California, Davis, Feb 2019
13. C Gajjela, L. Zhang, S.Ran, **R.K. Reddy**, "Spectroscopic Imaging for Digital Pathology", Univ. of California Davis Medical School, Feb 2019
14. C Gajjela, L. Zhang, S.Ran, **R.K. Reddy**, "Biomedical Applications of Infrared Imaging", National Institute of Health (NIH)-National Library of Medicine (NLM) Data Science Summer Program, Rice Univ., Houston, June 2019
15. S. Ran, D. Mayerich, **R.K. Reddy**, "Biomedical Applications of Infrared Spectroscopy", Science Exchange (SciX) Conference, Oct 23, 2018
16. **R.K. Reddy**, S.Ran, "Mid-infrared Spectroscopic Imaging and its Biomedical Applications", Eastern Analytical Symposium, Nov 12, 2018
17. **R.K. Reddy**, "Biomedical Applications of Infrared Spectroscopy", Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Atlanta, GA, Oct 2018.
18. **R.K. Reddy**, "Mid-infrared Spectroscopic Imaging and its Biomedical Applications", Eastern Analytical Symposium, Princeton, NJ, Nov 2018

19. **R.K. Reddy**, D. Mayerich, M.J. Walsh, P.S.Carney, R. Bhargava, “Design of high resolution FT-IR spectroscopic imaging instruments for improved breast cancer detection”, SPIE Photonics West, San Francisco, CA, Feb. 10th, 2015
20. **R.K. Reddy**, “Building mid-infrared spectroscopic imaging instruments for improved breast cancer detection”, Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, Feb. 3rd, 2015
21. **R.K. Reddy**, D. Mayerich, M.J. Walsh, P.S.Carney, R.Bhargava, “High Resolution FT-IR Imaging for Improved Breast Cancer Detection”, Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Oct. 1st, 2014
22. **R.K. Reddy**, K.K. Chu, T.N.Ford, K. Singh, R.W. Carruth, D. Hyun, H. Ma, D. Mojahed, C. Unglert, G.J. Tearney, “Seeing the unseen in human tissue”, Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Oct. 1st, 2014
23. **R.K. Reddy**, P.S.Carney, R.Bhargava, “Mid-infrared Spectroscopic Imaging and Tomography”, Massachusetts General Hospital, July 9th, 2013
24. **R.K. Reddy**, R.Bhargava, “Instrumentation for Infrared Spectroscopic Imaging”, Lam Research, Fremont, California, October 23rd, 2012
25. **R.K. Reddy**, Thomas van Dijk, R.Bhargava, “Vibrational Spectroscopy”, Roger Adams Laboratory, University of Illinois at Urbana Champaign, Jan 31st, 2012
26. **R.K. Reddy**, D. Mayerich, M.J. Walsh, M.V. Schulmerich, P.S.Carney, R.Bhargava, “Fourier Transform Infrared (FT-IR) Spectroscopic Imaging of Human Tissue Specimens”, Beckman Graduate Seminar, Beckman Institute for Advanced Science and Technology, Urbana IL, Nov 2nd, 2010

Conference Presentations

27. C. Gajjela, R. Ishrak, X. Wu, R. Reihani, S. Afrose, D. Mayerich, **R. Reddy**, “Biomedical Applications of Photothermal Mid-infrared Spectroscopic Imaging”, Gordon Chemical Imaging Conference, Aug 4, 2023
28. Gajjela, R. Ishrak, X. Wu, R. Reihani, S. Afrose, D. Mayerich, **R. Reddy**, “Biomedical diagnostics and clinical applications of photothermal mid-infrared spectroscopic imaging”, SPIE Photonics West, 2023, Jan 31, 2023
29. C. Gajjela, R. Mankar, S. Afrose, R. Ishrak, X. Wu, D. Mayerich, **R. Reddy**, “Analysis of bone disorders and gynecologic cancers using photothermal spectroscopic imaging” Gordon Optics and Photonics in Medicine and Biology, 2022, July 10 2022
30. R. Sun, **R. Reddy**, D. Mayerich, “Characterization and optimization of coupled-wave simulations for complex heterogeneous samples”, SPIE Photonics West 2022, Jan 24, 2022
31. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, S. Afrose, Camille Artur, D. Mayerich, **R. Reddy**, “Advances in diagnostics with mid-IR Photothermal Spectroscopic imaging”, IS&T conference 2022
32. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, S. Afrose, D. Mayerich, **R. Reddy**, “Photothermal spectroscopic imaging for analysis and diagnosis of cancers”, International Conference on Clinical Spectroscopy (SPEC 2022)
33. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, R. Reihani, S. Afrose, D. Mayerich, **R. Reddy**, “Tissue Subtype Identification using Photothermal Mid-infrared Spectroscopic Imaging”, SciX Conference 2022
34. C. Gajjela, R. Mankar, R. Ishrak, X. Wu, D. Mayerich, **R. Reddy**, “Mid-Infrared Biomarkers of Lupus Nephritis Using Optical Photothermal imaging”, SciX Conference 2022, Oct 3, 2022
35. R. Mankar, C. Gajjela, R. Ishrak, X. Wu, D. Mayerich, **R. Reddy**, “High-speed photothermal mid-infrared spectroscopic imaging through optimization of sampling parameters”, SciX Conference 2022, Oct 3, 2022
36. C. Gajjela, R. Mankar, D. Mayerich, **R. Reddy**, “Photothermal spectroscopic imaging for ovarian and bone disorders”, SPIE Photonics West 2022, Jan 24, 2022
37. C. Gajjela, R. Mankar, S. Afrose, R. Ishrak, X. Wu, D. Mayerich, **R. Reddy**, “Disease Diagnosis using Mid-infrared Spectroscopic Imaging” Southeastern Regional Meeting American Chemical Society (SERMACS) 2021
38. C. Gajjela, R. Mankar, S. Afrose, R. Ishrak, X. Wu, D. Mayerich, **R. Reddy**, “Photothermal Mid-infrared Spectroscopic Imaging for Disease Diagnosis”, SciX 2021
39. C. Gajjela, R. Mankar, D. Mayerich, R. Reddy, “Classification of cell types within ovarian tissue using optical-photothermal imaging”, SciX 2021
40. R.Mankar, C. Gajjela, Carlos E. Bueso-Ramos, C.C. Yin, and **R. Reddy**, “Polarization sensitive photothermal mid-infrared spectroscopic imaging of human bone marrow tissue”, SciX 2021
41. C. Gajjela, R. Mankar, D. Mayerich, **R. Reddy**, “High-resolution mid-infrared spectroscopic imaging for studying gynecologic cancers”, Pacificchem Conference (online)
42. R.Mankar, C. Gajjela, Carlos E. Bueso-Ramos, C.C. Yin, and R. Reddy, “Comprehensive Evaluation of Myelofibrosis in Bone Marrow Using Infrared Imaging”, ARC conference

43. C. Gajjela, R. Mankar, D. Mayerich, **R. Reddy**, “Mid-infrared spectroscopic imaging for diagnosis of ovarian cancer” Eastern Analytical Symposium, Princeton NJ (Online) Nov 17, 2021
44. C. Gajjela, L. Zhang, S. Ran, D. Mayerich, **R. Reddy**, “Mid-infrared Optical Photothermal Imaging for Cancer Diagnosis”, SPIE Photonics West, Feb 5, 2020
45. C. Gajjela, R. Mankar, D. Mayerich, **R. Reddy**, “New techniques for tissue subtype identification with mid-infrared spectroscopic imaging”, SciX 2020, Sparks, NV, (Online) Oct 14 2020
46. C. Gajjela, R. Mankar, D. Mayerich, **R. Reddy**, “Classification of cell types within ovarian tissue using optical-photothermal imaging”, SciX 2020, Sparks, NV, (Online) Oct 14 2020
47. **R. Reddy**, “Spectroscopic Imaging for Digital Histopathology”, UC Davis Medical School Seminar, Feb 11th, 2019
48. **R. Reddy**, “Biomedical Applications of infrared imaging”, NIH NLM data science summer program, Houston, June 5th, 2019
49. Shihao Ran, David Mayerich, **Rohith Reddy**, “Mid-infrared hyperspectral holographic imaging for digital histopathology”, SPIE Photonics West, Feb 6, 2019
50. Chalapathi Gajjala, Licheng Zhang, David Mayerich, **Rohith Reddy**, “High-resolution spectroscopic imaging for understanding myelofibrosis”, Science Exchange (SciX), Oct 15, 2019
51. Chalapathi Gajjala, Licheng Zhang, David Mayerich, **Rohith Reddy**, “Biomedical Applications of Photothermal Spectroscopic Imaging”, Science Exchange (SciX), Palm Springs, CA, Oct 15, 2019
52. Shihao Ran, Chalapathi Gajjala, Licheng Zhang, David Mayerich, **Rohith Reddy**, “Application of Mid-Infrared Spectroscopic Imaging to Cancer Diagnosis”, ICAVS New Zealand, June 12, 2019
53. Rupali Mankar, Chalapathi Gajjala, Licheng Zhang, David Mayerich, Carlos E. Bueso-Ramos, **Rohith Reddy**, “Vibrational spectroscopic imaging for diagnosis of bone disorders”, Princeton, NJ, Nov 2019
54. **R. Reddy**, J. Dong, C. Liang, T. Ford, M. Beatty, K. Singh, H. Osman, B. Vuong, C. Grant, M. Gora, M. Rosenberg, N. Nishioka, and G. Tearney, “Barrett’s esophagus screening using motor capsule endomicroscopy”, Gordon Lasers in Medicine and Biology, July 10, 2018
55. **R. Reddy**, J. Dong, C. Liang, T. Ford, M. Beatty, K. Singh, H. Osman, B. Vuong, C. Grant, M. Gora, M. Rosenberg, N. Nishioka, and G. Tearney, “Esophageal cancer screening using motor capsule endomicroscopy”, SPIE Translational Biophotonics, May 15, 2018.
56. **R. Reddy**, J. Dong, C. Liang, T. Ford, M. Beatty, K. Singh, H. Osman, B. Vuong, C. Grant, M. Gora, M. Rosenberg, N. Nishioka, and G. Tearney, “OCT based motor capsules for Barrett’s esophagus screening”, SPIE Photonics West, Jan 28, 2018.
57. Liang, Chia-Pin, Jing Dong, Timothy N. Ford, **R. Reddy**, Seyed Hamid Hosseiny Darbrazi, Hamid Farrokhi, Matthew Beatty et al. "Optical coherence tomography-guided laser marking with tethered capsule endomicroscopy (Conference Presentation)." In Endoscopic Microscopy XIII, vol. 10470, p. 104700X. International Society for Optics and Photonics, 2018.
58. C Gajjela, R. Mankar, L. Zhang, S.Ran, **R. Reddy**, “Mid-infrared Optical Photothermal Imaging for Cancer Diagnosis”, SPIE Photonics West, San Francisco, Feb 2020
59. **R.K. Reddy**, J. Dong, M.J. Gora, M. Beatty, W. Trasischker, K. Singh, R. Carruth, A. Soomro, C.N. Grant, M. Rosenberg, G.J. Tearney, “An Inexpensive Medical Device for Barrett’s esophagus Screening”, SPIE Photonics West, San Francisco, CA, Jan 30th, 2017.
60. **Rohith Reddy**, Michalina Gora, Jing Dong, Timothy Ford, Matthew Beatty, Wolfgang Trasischker, Kanwarpal Singh, Kengyeh Chu, Amna Soomro, Catriona Grant, Mireille Rosenberg, Guillermo (Gary) Tearney, Inexpensive Tethered Capsule Endomicroscopy for Barrett’s Esophagus Screening using a Micro-motor based Capsule, Gordon Lasers in Medicine & Biology Conference, Mount Snow, VT, July 2016.
61. **R.K. Reddy**, J. Dong, M.J. Gora, M. Beatty, W. Trasischker, K. Singh, R. Carruth, A. Soomro, C.N. Grant, M. Rosenberg, G.J. Tearney, “An Inexpensive Medical Device for Barrett’s esophagus Screening”, Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Minneapolis, MN, Sept. 23rd, 2016
62. **R.K. Reddy**, M.J. Gora, R. Carruth, T.N. Ford, J. Dong, G.J. Tearney, “Tethered Capsule Endomicroscopy for Barrett’s Esophagus Screening”, Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Providence, RI, Oct. 1st, 2015
63. **R.K. Reddy**, K.K. Chu, T.N. Ford, K. Singh, R.W. Carruth, D. Hyun, H. Ma, D. Mojahed, C. Unglert, G.J. Tearney, “Functional micron-resolution imaging with micro-optical coherence tomography”, Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Oct. 2nd, 2014
64. **R.K. Reddy**, D. Mayerich, M.J. Walsh, M.V. Schulmerich, R. Bhargava, “Improved Breast Cancer Detection from High-Resolution Fourier Transform Infrared (FTIR) Spectroscopic Imaging”, Science Exchange (SciX) conference

organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Milwaukee, WI, Oct. 3rd, 2013

65. **R.K. Reddy**, D. Mayerich, M.J. Walsh, M.V. Schulmerich, R. Bhargava, "Classification of Prostate and Breast Tissue Data from High-Resolution Fourier Transform Infrared (FTIR) Spectroscopic Imaging", Science Exchange (SciX) conference organized by Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Kansas City, MO, Oct. 1st, 2012
66. **R.K. Reddy**, M.J. Walsh, M. Schulmerich, P.S. Carney, R. Bhargava "High resolution FT-IR spectroscopic imaging instruments for cancer detection", (Poster) Univ. of Illinois at Urbana Champaign Community at Illinois Symposium, Chicago, April 5th, 2012
67. **R.K. Reddy**, D. Mayerich, M. Walsh, P. S. Carney, R. Bhargava, "Rigorous Electromagnetic Model of Fourier Transform Infrared (FT-IR) Spectroscopic Imaging Applied to Automated Histology of Prostate Tissue Specimens", International Conference on Optics, Lasers and Spectroscopy (ICOLS), Madrid, Spain, March 28th, 2012
68. **R.K. Reddy**, M.J. Walsh, M. Schulmerich, P.S. Carney, R. Bhargava "Design of high resolution FT-IR spectroscopic imaging instruments for cancer detection", (Poster) Univ. of Illinois at Chicago Cancer Center Research Forum, Chicago, March 6th, 2012
69. **R. Reddy**, D. Mayerich, M. Walsh, M. Schulmerich, P.S. Carney, R. Bhargava, "High Definition Fourier Transform Infrared (FT-IR) Spectroscopic Imaging" Midwest ACS meeting, Oct. 19th, 2011
70. **R.K. Reddy**, P.S. Carney, R. Bhargava, "Overcoming Spectral Distortions in Fourier Transform Infrared (FT-IR) Spectroscopic Imaging", Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Oct. 2nd, 2011
71. R. Bhargava, T. van Dijk, **R.K. Reddy**, P.S. Carney "Theory of resolution and image quality in mid-IR imaging", FACSS '11, Reno, October 3rd, 2011.
72. **R.K. Reddy**, R. Bhargava, "High-Definition FT-IR Spectroscopic Imaging", Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Oct. 4th, 2011
73. **R.K. Reddy**, M.J. Walsh, M. Schulmerich, P.S. Carney, R. Bhargava "High Definition Fourier Transform Infrared (FT-IR) Spectroscopic Imaging", (Poster) FACSS '011, Reno, NV, Oct. 4th, 2011
74. **R.K. Reddy**, R. Bhargava, "Fourier-Transform Infrared Spectroscopic Imaging for Histopathology", (Poster) BioSensing and BioActuation Summer Institute 2011, National Taiwan University, Taiwan, July 22nd, 2011
75. **R.K. Reddy**, B.J. Davis, P.S. Carney, R. Bhargava "Modeling Fourier transform infrared spectroscopic imaging of Prostate and breast cancer tissue specimens" IEEE International Symposium on Biomedical Imaging (ISBI), Chicago, March 30th, 2011
76. **R.K. Reddy**, B.J. Davis, P.S. Carney, R. Bhargava, "Enhanced Models for Fourier Transform Infrared (FT-IR) Spectroscopic Imaging of Human Tissue Specimens", Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Rayleigh, NC, Oct. 4th, 2010
77. **R.K. Reddy**, F.N. Pounder, R. Bhargava, "Modeling, Data Visualization and Histopathology using Fourier Transform Infrared (FT-IR) Spectroscopic Imaging of Human Tissue Specimens" (Poster), Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Louisville, KY, Oct. 19th, 2009
78. **R.K. Reddy**, R. Bhargava, "Modeling, Data Visualization and Histopathology using Fourier Transform Infrared (FT-IR) Spectroscopic Imaging of Human Tissue Specimens", Biomedical Engineering Society Conference (BMES), Pittsburgh, PA, Oct. 8th, 2009
79. **R.K. Reddy**, R. Bhargava, "Fourier-Transform Infrared Spectroscopic Imaging", (Poster) NanoBiophotonics Summer School 2009, Urbana IL, June 4th, 2009
80. **R.K. Reddy**, R. Bhargava, "Advances in Automated Histopathology using Fourier Transform Infrared (FT-IR) Spectroscopic Imaging" (Poster) Univ. of Michigan at Ann Arbor, Midwestern Biomedical Engineering Conference, April 3rd, 2009
81. **R.K. Reddy**, R. Bhargava, "Robustness of Tissue Classification using FT-IR Imaging", Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Sept. 30th, 2008
82. R. Bhargava, F.N. Pounder, **R.K. Reddy**, X. Llorca, "Enhancing the tissue segmentation capability of fast infrared spectroscopic imaging via chemometric methods," Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, NV, Sept. 30th, 2008
83. **R.K. Reddy**, R. Bhargava, "Advances in Automated Histopathology using Fourier Transform Infrared (FT-IR) Spectroscopic Imaging", (Poster) Biomedical Engineering Society Conference (BMES), St. Louis, MO, Oct 3rd, 2008
84. **R. Reddy**, R. Bhargava, "Computational Methods for Enhancing Infrared Spectroscopic Imaging", Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Memphis TN, Oct 14th, 2007

Conference Papers (Other)

85. T.H. Nguyen, **R.K. Reddy**, M. J. Walsh, M. Schulmerich, G. Popescu, M.N. Do, R. Bhargava, “Denoising and deblurring of Fourier-transform infrared spectroscopic imaging”, Society of Photo-Optical Instrumentation Engineers (SPIE) Photonics West, Paper No. 8296-20, 2012
86. R. Bhargava, P.S. Carney, **R.K. Reddy** “Re-imagining FT-IR imaging and applications with new theory and instruments” SciX ‘12, Kansas City, October 2012
87. R. Bhargava, A.K. Kodali, X. Llorca, **R.K. Reddy**, M.J. Walsh, P.S. Carney “Development of highly sensitive and specific vibrational spectroscopic imaging guided by new theory” EAS 2011, Somerset, NJ, November 2011
88. F.N. Pounder, **R.K. Reddy**, M. Walsh and R. Bhargava, “Validating the cancer diagnosis potential of mid-infrared spectroscopic imaging,” Society of Photo-Optical Instrumentation Engineers (SPIE ‘09) Photonics West, Paper No. 7186-14, 2009
89. R. Bhargava, F.N. Pounder, **R.K. Reddy**, “Validating the cancer diagnosis potential of mid-infrared spectroscopic imaging,” Society of Photo-Optical Instrumentation Engineers (SPIE) Photonics West, San Jose, CA, Jan. 27th 2009
90. F.N. Keith, **R.K. Reddy**, and R. Bhargava, “Practical protocols for ultrafast histopathology by Fourier transform infrared imaging,” Society of Photo-Optical Instrumentation Engineers (SPIE) Photonics West, Paper No. 6853A-5, 2008

Master’s Thesis

91. **R.Reddy**, K.M.M.Prabhu, “3D Warped Discrete Cosine Transform and its application in Image Compression”, Indian Institute of Technology Madras, Chennai, India, July 2006.

SERVICE AND LEADERSHIP

- Served on the **Board of the Coblentz Society**, a professional society in the field of vibrational spectroscopy.
- Serving on the **Advisory Board of the journal Applied Spectroscopy**.
- Serving on the **Society for Applied Spectroscopy (SAS) Publication Committee**.
- **Lifetime member of the Coblentz Society, SAS, and Optica**.
- Served as an **editor for the special issue of Applied Spectroscopy** on “Vibrational Spectroscopy for Understanding, Screening and Monitoring Disease State”.
- Serving on the **program committee** for SPIE Photonics West 2022-2023
- **Organized conference sessions**
 - SciX 2024. Session titled “Life Science Applications of Optical Photothermal IR”
 - SciX 2023. Session titled “Applications of Photothermal IR Spectroscopy and Imaging in the Life Sciences”
 - SciX 2022. Session titled “Biomedical applications of Photothermal infrared spectroscopic imaging”
 - SciX 2021. Session titled “Photothermal infrared spectroscopic imaging”
 - SciX 2019. Session titled “Machine and Deep Learning for Biomedical Diagnostics”
 - SPIE Photonics West 2020. Session titled “Transient Absorption and Harmonic Microscopy”
 - SciX 2018. Session Titled “New Chemical Imaging Instrumentation”
 - SciX 2017. Session titled “Endoscopy”
 - SPIE Photonics West 2017. Session titled “Applications of Other Imaging Methods I”
 - SciX 2016. Session titled “Clinical biomedical imaging”
 - SciX 2015. Session titled “Super-resolution microscopy and imaging”
 - SciX 2014. Session titled “Biomedical analyses from nanoscale to macroscale”.
- I have been a **reviewer** for several **journals** including Science Advances, Applied Spectroscopy, Journal of the Optical Society of America, Applied Spectroscopy, Scientific Reports, Biomedical Optics Express, Applied Optics, Cancer research, Journal of Medicinal Chemistry, Analyst, Analytical Chemistry, and Frontiers on Physics Optics and Photonics.
- Member of SPIE, OSA, IEEE, SAS and Coblentz society.
- Harmony Science and Engineering Fair (2019) Poster Competition Judge
- NIH NLM Rice Univ. Poster Competition Judge, Aug 2019

- The MGH Scientific Advisory Committee ([SAC](#)) consisting of representatives from Harvard, MIT, Yale, University of Texas Southwestern Medical Center, University of Maryland School of Medicine **requested my inputs** into the challenges facing the research community at MGH. A video excerpt from my involvement can be found [here](#).
- I am working with a team of faculty and researchers to **create a post-doc office** to improve the quality of life of all post-docs at MGH.
- I have **mentored** several undergraduate students successfully. I have co-authored papers and posters with them. One student (Brian Matesic) is now jointly a graduate student at the Stanford Medical School and Harvard Business School.
- I have served as the co-chair (**co-president**) of the **Massachusetts General Hospital Post-doc Association (MGPA)**
- I have served as the **vice-president (vice-chair)** of the **Massachusetts General Hospital Post-doc Association**.
- I have served on the **board of the Engineering Graduate Student Advisory Committee (EGSAC)** representing the engineering student body and helping shape policy in association with the Dean's office.
- I have served on the **board of Asha for Education, a non-profit** that works towards education of underprivileged children in India.

INDUSTRY EXPERIENCE

- **Procter and Gamble (P&G)**, Miami Valley Research Center, Cincinnati, OH
June 2008 to Aug 2008: Intern
- **Analog Devices Inc.**, Product Development Centre, Bangalore, India
May 2004 to July 2004: Intern

TEACHING EXPERIENCE

Teaching at the University of Houston

- 2018, 2020, 2021, 2022, 2023, 2024: ECE 3337 – Signals and Systems
- Spring 2019: ECE 4335 – Senior Design
- Fall 2019: ECE 5397/6397: Medical Imaging with Lasers