Himanshu Shekhar, Ph.D.

Assistant Professor of Electrical Engineering, IIT Gandhinagar

CONTACT DETAILS: AB 6/327A, Electrical Engineering Discipline, Indian Institute of Technology Gandhinagar, Palaj, Gandhinagar, India – 382355
Medical Ultrasound Engineering (MUSE) Lab site:https://labs.iitgn.ac.in/muselaboratory/

AREAS OF INTEREST: Image-guided therapeutics, ultrasound-mediated therapeutic-delivery, microbubble contrast agents, minimally invasive imaging, molecular imaging, biomedical devices, ultrasonic metrology

EDUCATION

Institution	Degree	Date	Field of study
University of Rochester	Ph.D.	May 2014	Electrical Engineering
University of Rochester	M.S.	October 2010	Electrical Engineering
Manipal Institute of Technology	B.E.	June 2008	Electronics and Communication Engineering

EMPLOYMENT

- *Assistant Professor*, Discipline of Electrical Engineering, Indian Institute of Technology Gandhinagar (April 2019 – present)
  I co-lead the Medical Ultrasound Engineering (MUSE) Lab along with teaching undergraduate and postgraduate students.
- *Postdoctoral Fellow*, Department of Internal Medicine, University of Cincinnati
  Mentor: Prof. Christy Holland (July 2014 – March 2019). Worked on ultrasound-enhanced thrombolysis and bioactive gas delivery for vascular applications.
- *Graduate Research Assistant*, Department of Electrical and Computer Engineering, University of Rochester
  Advisor: Prof. Marvin Doyley (June 2009 – May 2014). Worked on ultrasound contrast agents for subharmonic and ultraharmonic vascular imaging.
  Ph.D. thesis available online at: http://hdl.handle.net/1802/28788
- *Research Intern*, Corporate Research and Technology, Hilti AG, Liechtenstein, (Jan – June 2008).
  Undergraduate internship completed in the European electronics industry – developed signal processing algorithms for automating a mechatronic system.
- *Visiting (Summer) Undergraduate Researcher*, Indian Institute of Technology Bombay, India (2005 – 2007).
  Characterized the nonlinear optical properties of a novel material and worked on high-resolution retinal imaging with adaptive optics.

HONORS

Fellowships/scholarships/awards

- *Har Govind Khorana Innnovative Young Biotechnologist Award*, Department of Biotechnology, Government of India.

- *Expertscape Expert Rating* for being among 1% of global experts in Contrast Media over the past decade (2022).
- *Star Ambassador Award*, IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society (2020).
  The award provides travel funding and networking opportunities.
- *Excellence in Research Fellowship*, Indian Institute of Technology Gandhinagar (2019 – 2022)
  Fellowship awarded to faculty members of IIT Gandhinagar based on potential for excelling in research.
- *F.V. Hunt Postdoctoral Research Fellowship in Acoustics** (2015 – 2016)
  Received fellowship instituted by the Acoustical Society of America for advancing research in acoustics. It a supported research on ultrasound-enhanced treatment of vascular disease.
- *Howard Hughes Medical Institute Med-into-Grad Fellowship (2013 – 2014)*
  Received fellowship focused on training for a research career. Received research funds, completed courses in cardiovascular biology and a clinical observership.
- *SPIE Student Scholarship (2012)*
  Scholarship awarded by SPIE based on the potential for long-range contribution to optics, photonics, or related fields.
- *Research Experience Award, Youth Scientist Encouragement Fellowship (2005 – 07)*
  Recipient of undergraduate research opportunity funded by Kishore Vaigyanik Protsahan Yojna of the Department of Science and Technology, Government of India.

Presentation awards

- *Second place: Best Oral Presentation*, 6th Dutch Conference on Biomedical Engineering (2017, second author of paper, awarded to mentee: Kirby Lattwein).
- *Third place: Best Student Paper Award in Biomedical Acoustics*, 171st Meeting of the Acoustical Society of America, Salt Lake City (2016, second author of paper, awarded to mentee: Shenwen Huang).
- *Best Student Paper Award in Biomedical Acoustics*, 167th Meeting of the Acoustical Society of America, Providence (2014).
- *Best Poster Award*, University of Rochester Graduate Research Symposium (2013).
- *Second place: Outstanding Speaker Competition*, SPIE Student Summer Colloquium Series, University of Rochester (2013).
- *Second place: Best Student Paper Award in Biomedical Acoustics*, 161st Meeting of the Acoustical Society of America, Seattle (2011).
- *Best Student Paper Award: Advanced Electronics and Instrumentation*, Fourth National Control Instrumentation Systems Conference, Karnataka, India (2007).

Travel awards and conference/workshop attendance scholarships

- *Young Investigator Travel Award, Acoustical Society of America, 2017.*
- *Early Career Travel Subsidy,* Acoustical Society of America, 2017.
- *Conference Travel Award*, Graduate Student Association, 2011, 2012, 2013, 2014.
- *Student Conference Travel Award,* Dean of Graduate Studies, 2013, 2014.
- *Student Conference Travel Subsidy,* Acoustical Society of America, 2012, 2013, 2014.
- *Student Travel Grant*, Conference on Ultrasonic Biomedical Microscanning, 2012.

RESEARCH FUNDING

- Collaborative Research Grant, Marico Ltd., India (2022, Budget: $10,000)
- Har Govind Khorana Innovative Young Biotechnologist Research Award (PI), Department of Biotechnology, Govt. of India. (2020-23, Budget: $80,000)
- Start-Up Research Grant (PI) by Science and Engineering Research Board, Govt. of India (2020 – 2022, Budget: $41,000)
- Internal Research Grant (PI) from IITGN (2019 – 2022, Budget: $68,000)
- Major Equipment Purchase Grant (Co-PI) from IITGN (2020, Budget: $1,50,000)
- Major Equipment Purchase Grant (PI) from IITGN (2020, Budget: $58,000)
- Biomedical Technology Development Grant (co-PI), Department of Biotechnology, Govt. of India, 2020-2022, Budget: $55,000)
- Accelerate Science Program Grant (PI), Science and Engineering Research Board, Government of India, and Gujarat State Biotechnology Mission, Government of Gujarat (2020, Budget: $9,000)

PUBLICATIONS

In peer-reviewed journals:

1. C. K. Jha, K. Jajoria, A. L. Chakraborty, **H. Shekhar**, "A Fiber Bragg Grating-based Sensor for Passive Cavitation Detection at MHz frequencies", *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67, 1682-1690 (2022).
2. EL Wallach, **H. Shekhar**, F. Flores-Guzman, S.L. Hernandez, K.B. Bader, Histotripsy bubble cloud contrast with chirp-coded excitation in pre-clinical models, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* 69, 787-794, (2022).
3. K. Bansal, C. K. Jha, D. J. Bhatia, and **H. Shekhar**, "Ultrasound-enabled therapeutic delivery and regenerative medicine: physical and biological perspectives", *ACS Biomaterials Science and Engineering 7*, 4371-4387 (2021).
4. J. Roy, Vijayalakshmi, I. Gupta, **H. Shekhar**, Antimicrobial Sonodynamic Therapy: Current Status and Future Perspectives. *ACS Biomaterials Science and Engineering 7*, 5326-5338 (2021).
5. K. Bader, E. Wallach, **H. Shekhar**, F. Flores-Guzman, H. Halpern, S. Hernandez, "Estimating the mechanical energy of histotripsy bubble clouds with high frame rate imaging," *Physics in Medicine and Biology* 66, 165004 (2021).
6. U. M. Pal, A. Nayak, T. Medisetti, G. Gogoi, **H. Shekhar**, M.S.N. Prasad, J. S. Vaidya, H. J. Pandya. Hybrid Spectral-IRDx: Near-IR and Ultrasound Attenuation System for Differentiating Breast Cancer from Normal Tissue. *IEEE Transactions on Biomedical Circuits and Systems* 68, 3554-3563 (1/05/2021).
7. G. Singh, A. Paul, **H. Shekhar**, A. Paul. Pulsed ultrasound-assisted thermo-therapy for subsurface tumor ablation: a numerical investigation, *Journal of Thermal Science and Engineering Applications* 13, 041007-1 (2020).
8. M. Lafond**, H. Shekhar**, W. Panmanee, S. Collins, A. Palaniappan, C. T. McDaniel, D. J. Hassett, and C. K. Holland. Bactericidal activity of lipid-shelled nitric oxide-loaded microbubbles, *Frontiers in Pharmacology – Translational Pharmacology, special issue on Bubbles, Droplets and Micelles for Acoustically-Mediated Drug/Gene Delivery* 10, 1540 (2020).

9. K. R. Lattwein, **H. Shekhar**, J. J. P. Kouizer, W. J. B. van Wamel, C. K. Holland, and K. Kooiman, “Sonobactericide: An emerging treatment strategy for bacterial infections,” (review paper), *Ultrasound in Medicine and Biology* 46, 193 – 215 (2020).
10. **H. Shekhar**, R. Kleven, T. Peng, A. Palaniappan, K. Karani, S. L. Huang, D. D. McPherson, and C. K. Holland, "In vitro characterization of sonothrombolysis and echocontrast agents to treat ischemic stroke", *Scientific Reports* 9, 9902 (2019).
11. R. Kleven, K. Karani, N. Salido, **H. Shekhar**, K. J. Haworth, T. D. Mast, D. Tadesse, C. K. Holland, “The effect of 220 kHz insonation scheme on rt-PA thrombolytic efficacy in vitro", *Physics in Medicine and Biology* 64,165015 (2019).
12. **H. Shekhar**, A. Palaniappan, T. Peng, M. R. Moody, K. J. Haworth, S. L. Huang, D. D. McPherson, and C. K. Holland, “Characterization and imaging of lipid-shelled microbubbles for ultrasound-triggered delivery of xenon,” *Neurotherapeutics* 16, 878 – 890 (2019).
13. K. R. Lattwein, **H. Shekhar**, W. van Wamel, T. Gonzalez, A. Herr, C. K. Holland, and K. Kooiman, “An in vitro proof-of-principle study of sonobactericide,” *Scientific Reports* 8, 3411 (2018).
14. **H. Shekhar**, N. Smith, J. L. Raymond, and C. K. Holland, “Effect of temperature on the size distribution, shell properties, and stability of Definity®,” *Ultrasound in Medicine and Biology* 44, 434 – 436 (2018).
15. **H. Shekhar**, J. S. Rowan, and Marvin M. Doyley, “Combining subharmonic and ultraharmonic modes for intravascular ultrasound imaging: a preliminary evaluation,” *Ultrasound in Medicine and Biology* 43, 2725 – 2732 (2017).
16. S. Huang, **H. Shekhar**, and C. K. Holland, “Comparative lytic efficacy of rt-PA and ultrasound in porcine versus human clots,” *PLOS One*, e0177786 (2017).
17. **H. Shekhar**, K.B. Bader, S. Huang, T. Peng, S. L. Huang, D. D. McPherson, and C. K. Holland, “In vitro assessment of thrombolytic efficacy of echogenic liposomes that co-encapsulate rt-PA and octafluoropropane gas,” *Physics in Medicine and Biology* 62, 517 – 538 (2017).
18. K. B. Bader, K. J. Haworth, **H. Shekhar**, A. D. Maxwell, T. Peng, D. D. McPherson, and C. K. Holland, “Effect of histotripsy combined with rt-PA *in vitro*," *Physics in Medicine and Biology* 61, 5253 – 5274 (2016).
19. M. A. Kanadadai, P. Mukherjee, **H. Shekhar,** G. J. Shaw, I. Papautsky, and C. K Holland, “Microfluidic manufacture of rt-PA-loaded echogenic liposomes,” *Biomedical Microdevices* 18, 1 – 10 (2016).
20. K. J. Haworth, J. L. Raymond, K. Radhakrishnan, M. R. Moody, S.L. Huang, T. Peng, **H. Shekhar**, M. E. Klegerman, H. Kim, D. D. McPherson, and C. K. Holland, “Trans-stent ultrasound imaging and cavitation detection,” *Ultrasound in Medicine and Biology* 42, 518 – 527 (2016) Erratum to this article was published in vol. 42 pp. 244.
21. S. J. Huntzicker, **H. Shekhar**, and M. M. Doyley, “Contrast-enhanced quantitative intravascular elastography: The impact of microvasculature on stress reconstruction,” *Ultrasound in Medicine and Biology* 42, 1167 – 1181 (2016).
22. **H. Shekhar**, S.J. Huntzicker, I. Awuor, and M. M. Doyley, “Chirp-coded ultraharmonic imaging with a modified clinical intravascular ultrasound system,” *Ultrasonic Imaging* 38, 403 – 419 (2016).
23. **H. Shekhar**, I. Awuor, K. Thomas, J. J. Rychak, and M. M. Doyley, “The delayed onset of nonlinear emissions from phospholipid-encapsulated microbubble contrast agents: implications for imaging and therapy,” *Ultrasound in Medicine and Biology* 40, 727 – 738, (2014).

24. **H. Shekhar**, J. J. Rychak, and M. M. Doyley, "Modifying the size distribution of microbubble contrast agents for high-frequency subharmonic imaging," *Medical Physics* 40, 082903-1 – 82903-10, (2013).
25. **H. Shekhar** and M. M. Doyley, "The response of phospholipid-encapsulated microbubbles to chirp-coded excitation: Implications for high-frequency nonlinear imaging," *Journal of the Acoustical Society of America* 133, 3145 – 3158, (2013).
26. **H. Shekhar** and M. M. Doyley, "Improving the sensitivity of subharmonic imaging at high frequencies with coded excitation: A feasibility study," *Medical Physics* 39, 2049 – 2060 (2012).

In review:

1. S. R. Bisht, R. Bhardwaj, C. K. Jha, D. Ghosh, **H. Shekhar**, "Pulsing and detection strategies for contrast-enhanced ultrasound: A review (under revision, submitted to Ultrasonic Imaging 17/3/22).

Edited conference proceedings (presenter underlined)

1. K. Jajoria, C. K. Jha, A. L. Chakraborty, **H. Shekhar, "**Detection of Ultrasound up to 10 MHz frequency using an FBG sensor", *IEEE Workshop on Recent Advances in Photonics*, Mumbai, India (2022).
2. E. Wallach, **H. Shekhar**, and K. B. Bader, Assessment of Chirp-Coded Excitation to Monitor Histotripsy Bubble Clouds. *IEEE Ultrasonics Symposium Proceedings* (held online, 2020).
3. C. K. Holland, **H. Shekhar**, and M. Lafond, "Lipid-shelled microbubbles for ultrasound-triggered release of bioactive gases to treat stroke and cardiovascular disease", Invited presentation, *IEEE Ultrasonics Symposium Proceedings* (2019). Venue: Glasgow, UK.
4. **H. Shekhar**, J. Rowan, I. Awuor and M. M. Doyley, "Nonlinear intravascular ultrasound contrast imaging with a commercial catheter," *Proceedings of Meetings on Acoustics*, 21, 020003 (2014). Venue: Providence, RI, USA.
5. **H. Shekhar**, J. J. Rychak and M. M. Doyley, "Temporal evolution of subharmonic emissions from a lipid-encapsulated contrast agent," *Proceedings of Meetings on Acoustics*, 19, pp. 075019 (2013). Venue: Montreal, QC, Canada.
6. **H. Shekhar** and M. M. Doyley, "Nonlinear response of lipid-shelled microbubbles to coded excitation: implications for noninvasive atherosclerosis imaging," *Proceedings of SPIE* 8675, Medical Imaging 2013, 867510. Venue: Orlando, FL, USA.
7. **H. Shekhar** and M. M. Doyley, "High-frequency subharmonic emission with chirp-coded excitation: implications for imaging," *Proceedings of SPIE* 8320, 83200V (2012). Venue: San Diego, CA, USA.

In review:

V. Trivedi, E. Wallach, K.B. Bader, and **H. Shekhar***, "Contrast-Enhanced Imaging of Histotripsy Bubble Clouds using Chirp Coded Excitation and Volterra Filtering", IEEE Ultrasonics Symposium, Venice, Italy, 2022.

Conference abstracts:

From IIT Gandhinagar (mentees underlined)

1. **V. Trivedi**, E. Wallach, K. Bader, and **H. Shekhar**, Histotripsy Bubble Cloud Contrast using Chirp-Coded Excitation and Volterra Filtering, International Symposium on Therapeutic Ultrasound, Toronto, 2022

2. **K. Jajoria**, **C. K. Jha, A. L. Chakraborty**, **H. Shekhar,** Passive Cavitation Detection using a Fiber Bragg grating sensor, International Symposium on Therapeutic Ultrasound, Toronto, 2022 (accepted)

3. **V. Patel, M. Das**, V. Pandey, D. Bhatia, I. Gupta, and **H. Shekhar**, "Sonodynamic response of a water-soluble porphyrin derivative to ultrasound exposure at 1 MHz", International Symposium on Therapeutic Ultrasound, Toronto, 2022 (accepted).

4. **A. Kaushik, Pratibha, A. Khan, S. V. Dalvi**, and **H. Shekhar**, Stable cavitation behavior of size-isolated protein-shelled microbubbles and SonoVue, International Symposium on Therapeutic Ultrasound, Toronto, 2022 (accepted).
5. Vagisha, K. B. Bader, **H. Shekhar**, "Self-demodulation revisited: Effect of nonlinear propagation on stable cavitation from ultrasound contrast agents" *180th Meeting of the Acoustical Society of America – Acoustics in Focus* (Virtual, 2021).
6. B. Suresh, A. Khan, D. Shah, S. V. Dalvi, **H. Shekhar**, "Acoustic characterization and stability assessment of size-isolated protein-shelled microbubbles", *180th Meeting of the Acoustical Society of America – Acoustics in Focus* (Virtual, 2021).
7. C. K. Jha, K. Jajoria, A. L. Chakraborty, **H. Shekhar**, "A fiber Bragg grating-based optical probe to detect MHz-frequency ultrasound", *180th Meeting of the Acoustical Society of America – Acoustics in Focus* (2021).
8. E. Wallach, **H. Shekhar**, K. Bader, "Assessment of Histotripsy Bubble Cloud Echogenicity with Chirp-Coded Excitation", *180th Meeting of the Acoustical Society of America – Acoustics in Focus* (2021).
9. **H. Shekhar**, "Ultrasound for brain therapy: Recent developments, opportunities, and challenges", *International Conference on Neurological Disorders and Therapeutics, Ahmedabad*, India (2019, invited talk).

From postdoctoral and doctoral research:

1. C. K. Holland, **H. Shekhar**, M. Lafond, "Lipid shelled microbubbles for ultrasound-triggered release of bioactive gases to treat stroke and cardiovascular disease", *177th Meeting of the Acoustical Society of America*, Louisville, KY, USA (2019, invited talk).
2. M. Lafond, **H.Shekhar**, N. Salido, K. J. Haworth, A. Hannah, Curtis Genstler, and C. K. Holland, "Cavitation nucleated with Definity® infused through an ekosonic catheter", *International Symposium on Therapeutic Ultrasound*, Barcelona, Spain (2019).
3. C. K. Holland, **H. Shekhar**, T. Peng, M R. Moody, K. J. Haworth, S. L. Huang, D. D. McPherson, "Lipid shelled microbubbles for ultrasound-triggered release of Xenon for neuroprotection", *24th European Symposium on Ultrasound Contrast Imaging*, Rotterdam, The Netherlands (2019, invited talk).
4. **H. Shekhar**, P. Arunkumar, C. McDaniel, D. J. Hassett, and C. K. Holland, "Characterization of lipid-encapsulated microbubbles for delivery of nitric oxide," *176th Meeting of Acoustical Society of America*, Victoria, B.C, Canada (2018).
5. **H. Shekhar**, P. Arunkumar, T. Peng, M. R. Moody, K. J. Haworth, S. L. Huang, D. D. McPherson, and C. K. Holland, "Lipid-shelled microbubbles for ultrasound-triggered release of Xenon," *176th Meeting of Acoustical Society of America*, Victoria, B.C, Canada (2018).
6. **H. Shekhar**, R. Kleven, P. Arunkumar, T. Peng, K. B. Karani, S. L. Huang, D. D. McPherson, and C. K. Holland, "Lytic efficacy of 220-kHz sonothrombolysis with rt-PA and echo contrast agents," 18*th International Symposium for Therapeutic Ultrasound*, Nashville, TN, USA (2018).

7. R. Kleven, **H. Shekhar**, K. B. Karani, K. J. Haworth, and C. K. Holland, "Effect of duty cycle on the efficacy of 220 kHz ultrasound-enhanced rt-PA thrombolysis *in vitro,"* 18th *International Symposium for Therapeutic Ultrasound*, Nashville, TN, USA (2018).
8. K. J. Haworth, A. S. Hannah, **H. Shekhar,** P. Arunkumar, S. L. Huang, T. Peng, M. Vranish, D.D. McPherson, C. Gentsler, and C. K. Holland, "Cavitation activity of pioglitazone echogenic liposomes using an Ekosonic® catheter," *18th International Symposium for Therapeutic Ultrasound*, Nashville, TN, USA (2018).
9. C. K. Holland, P. Arunkumar, and **H. Shekhar**, "Lipid-shelled microbubbles for ultrasound-triggered release of Xenon for treating stroke," *20th Meeting of the American Society for Experimental Neurotherapeutics*, Rockville, MD, USA (invited talk, 2018).
10. **H. Shekhar**, J. S. Rowan, and M. M. Doyley, "Combined subharmonic and ultraharmonic intravascular ultrasound imaging," *174th Meeting of Acoustical Society of America*, New Orleans, LA, USA (2017).
11. **H. Shekhar**, and C. K. Holland, "Impact of the F. V. Hunt postdoctoral fellowship on a trainee's research and career advancement," (invited poster), Special session: ASA Hunt Postdoctoral Research Fellows: Through the Years, *174th Meeting of Acoustical Society of America, New Orleans*, LA, USA (2017).
12. K. R. Lattwein, **H. Shekhar**, W. van Wamel, A. Herr, C. K. Holland, and K. Kooiman, "Sonobactericide as an Adjunct Therapy to Treat Infective Endocarditis: an *in vitro* demonstration of an Ultrasound Microbubble and Thrombolytic-Based Treatment," (invited presentation), *32nd Annual advances in contrast ultrasound agents conference*, Chicago, IL, USA (2017).
13. **H. Shekhar**, N. Smith, J. L. Raymond, and C. K. Holland, "Impact of temperature on the size distribution and shell properties of ultrasound contrast agents," *Acoustics 2017*, Boston, MA, USA (2017).
14. K. R. Lattwein, **H. Shekhar**, W. van Wamel, A. Herr, C. K. Holland, and K. Kooiman, "Sonobactericide: an ultrasound-mediated adjunct treatment for bacterial infective endocarditis – *in vitro* proof-of-principle," *Acoustics 2017*, Boston, MA, USA (2017).
15. S. Huang, **H. Shekhar**, and C. K. Holland, "Comparative lytic efficacy of rt-PA and intermittent ultrasound in porcine versus human clots," *Acoustics 2017*, Boston, MA, USA (2017).
16. K. R. Lattwein, **H. Shekhar**, W. J. B. van Wamel, A. B. Herr, C. K. Holland, and K. Kooiman, "I*n vitro* demonstration of sonobactricide: An ultrasound, ultrasound contrast agent, and thrombolytic-based adjunct treatment for infective endocarditis," *6th Dutch Conference on Biomedical Engineering*, Egmond aan Zee, The Netherlands (2017).
17. K. R. Lattwein, **H. Shekhar**, W. J. B. van Wamel, A. B. Herr, C. K. Holland, and K. Kooiman, "Sonobactericide as adjunct therapy to treat infective endocarditis: an in vitro demonstration of an ultrasound, microbubble, and thrombolytic-based treatment*," 22nd European Conference on Ultrasound Contrast Imaging*, Rotterdam, The Netherlands (2017).
18. **H. Shekhar**, S. Huang, T Peng, M. E. Klegerman, S. L. Huang, D. D. Mcpherson, and C. K. Holland, "Thrombolytic efficacy of echogenic liposomes that co-encapsulate rt-PA and octafluoropropane gas," *171st Meeting of Acoustical Society of America*, Salt Lake City, UT, USA (2016).
19. S. Huang, **H. Shekhar**, and C. K. Holland, "Lytic efficacy of tissue plasminogen activator and ultrasound in porcine clots doped with barium sulfate in vitro," *171st Meeting of Acoustical Society of America*, Salt Lake City, UT, USA (2016).

20. C. K. Holland, **H. Shekhar**, and K. B. Bader, "Microbubble pumps: Ultrasound theragnostic agents," (invited presentation), *170th Meeting of Acoustical Society of America*, Jacksonville, FL, USA (2015).
21. A21. **H. Shekhar**, I. Awuor, S. Huntzicker and M. M. Doyley, "Ultraharmonic intravascular ultrasound imaging with commercial 40 MHz catheter: a feasibility study," *168th Meeting of Acoustical Society of America*, Indianapolis, Indiana, USA (2014).
22. C. K. Holland, T. D. Mast, K. J. Haworth, K. B. Bader, and **H. Shekhar**, "Biomedical Research at the Image-Guided Ultrasound Therapeutics Laboratories*," 168th Meeting of Acoustical Society of America*, Indianapolis, Indiana, USA (invited talk, 2014).
23. **H. Shekhar**, J. J. Rychak and M. M. Doyley, "The late onset of nonlinear emissions from an ultrasound contrast agent," *166th Meeting of the Acoustical Society of America*, San Francisco, CA, USA (2013).
24. **H. Shekhar** and M. M. Doyley, "Improving subharmonic emission at high-frequencies by modifying the size distribution of microbubble contrast agents," *8th International Conference on Ultrasonic Biomedical Microscanning*, St. Paulin, Canada (2012).
25. **H. Shekhar** and M. M. Doyley, "High-frequency harmonic imaging with coded excitation: Implications for the assessment of coronary atherosclerosis," *164th Meeting of the Acoustical Society of America*, Kansas City, MO, USA (2012).
26. **H. Shekhar** and M. M. Doyley, "A coded excitation technique for the functional imaging of coronary atherosclerosis using ultrasound contrast agents," *161st Meeting of the Acoustical Society of America*, Seattle, WA, USA (2011).
27. M.M. Doyley, **H. Shekhar**, J.S. Allen, J Rychak, "Visualizing the functional properties of life-threatening atherosclerotic plaques using targeted ultrasound contrast agent and intravascular ultrasound," *159th Meeting of the Acoustical Society of America*, Baltimore, MD, USA (2010).

INTELLECTUAL PROPERTY

1. C. K. Holland, **H. Shekhar**, and P. Arunkumar, Gas encapsulated acoustically responsive microbubbles and methods of treating cardiovascular disease (US Patent #104564832019, issued 2019).
2. C. K. Holland, **H. Shekhar**, and P. Arunkumar, Gas encapsulated acoustically responsive microbubbles and methods of treating cardiovascular disease (US Patent # 11,007,284, issued 2021, a second patent on the topic).

INVITED TALKS

- Ultrasound Technologies for Medical Applications, (Invited by Prof. Libertario Demi), University of Trento, Italy, 2022.
- Recent Trends in Biomedical and Biomechanical Engineering Workshop, National Institute of Technology, Warangal, India (2022)
- International Symposium of Medical Imaging in Clinical Environment, Visvesvaraya National Institute of Technology, Nagpur, India (2021)
- Indian Institute of Technology, Palakkad, IEEE Engineering in Medicine and Biology Society Kerala Chapter (2021)
- Indian Institute of Technology Kharagpur, IEEE Engineering in Medicine and Biology Kharagpur Chapter (2020)
- Department of Biomedical Engineering, Manipal Institute of Technology, 2020

- Department of Applied Mechanics, Indian Institute of Technology Madras, 2018

INDUSTRY COLLABORATION AND CONSULTANCY

- Collaborated with Marico Inc. on drug delivery using lipid carriers and scalp imaging (2021 – present).
- Collaborated with EKOS® Corporation (now part of Boston Scientific, USA) on vascular drug delivery with echogenic liposomes and a catheter-based ultrasound device (2018).
- Consulted for Proctor & Gamble Corporation through the University of Cincinnati Research Institute (Time devoted: 34 hours, Nov. 2015 – Feb. 2016). Characterized the size distribution and acoustic properties of absorbent hydrogel microparticles.
- Collaborated with Targeson Inc. (San Diego, CA, USA) on the acoustic characterization of a commercial ultrasound contrast agent (2013 - 2014)

TEACHING AND MENTORING EXPERIENCE

- **Teaching at IIT Gandhinagar:** ES655 Medical Imaging Systems, ES216 Signals, Systems, and Networks, ES 104 Analog and Digital Electronics, FP 602 Writing Lab**,** EE321 Analog Circuits Lab, FP02 Learning How to Learn
- **Teaching at postdoctoral and doctoral level:** Teaching Assistantship at University of Rochester: Digital Image Processing (ECE 447), Communication Systems (ECE 242), Circuits and Systems (ECE 113) **Guest lectures:** BME 451 Biomedical Ultrasound University of Rochester, BME 6010 Biomedical Ultrasound, University of Cincinnati. BME 7001 Survey of Biomedical Engineering

Current Research Mentorship at Medical Ultrasound Engineering Lab:

- Postdoctoral Fellows: Dr. Chandan Jha, Dr. Anuj Kaushik, Dr. Manita Das
- Doctoral Students: Abhinav Kumar Singh, Vishwas Trivedi, Ruchika Dhawan (Electrical Engineering PhD program)
- Masters Students: Manik (Physics)
- Project Assistants: Jayishnu Roy (Biological Engineering), Pratibha (Physics), Kuldeep Jajoria (Electrical Engg)

Past Mentees:

- Boyapati Suresh (M.Tech, Electrical Engineering), Current Position: Steel Authority of India Limited
- Rohit Pawar (Project Associate), Current Position: M.Tech Student, IIT Guwahati
- Justin Joseph (Postdoctoral fellow), Current Position: Assistant Professor, Department of Biomedical Engineering, Vellore Institute of Technology (Bhopal Campus), Bhopal, India.

ADDITIONAL TRAINING AND CAREER DEVELOPMENT

- *Acoustical Society of America Early-Career Acousticians Retreat*, Salt Lake City, UT (2016)
  Selected to participate in a two-day leadership workshop for early career researchers.
- *Young Investigator's Meeting*, Chicago IL (2016) and Cambridge, MA (2015)
  Selected to attend networking and leadership training conferences for scientists of Indian origin.

- *Acoustical Society of America School*, Providence, RI (2014)
  Received funds by the Acoustical Society of America for attending a 2-day workshop.
- *Workshop on preparing a competitive NIH proposal*, SPIE Medical Imaging (2013)
  Invited by Lee Rosen, Ph.D. National Institute of Health, to review sample R01/R21 grants for a workshop held at SPIE Medical Imaging Symposium, Orlando, FL (2013).
- *Physical Acoustics Summer School*, Oxford, Mississippi, USA (2012)
  Received funds from the National Center for Physical Acoustics to attend a week-long school focused on research in physical acoustics.

SERVICE AND LEADERSHIP ROLES

Grant Proposal Review:
Gandhian Young Technological Innovation Award, India (2019, 2020)
NIDHI Prayas Technology Business Incubator, IIT Gandhinagar (2020)

- *Referee for peer-reviewed journals*:*

Ultrasonics (2013 - present), IF = 2.337
Ultrasound in Medicine and Biology (2014 - present), IF = 2.645
Journal of Ultrasound in Medicine (2014 - present), IF = 1.530
Ultrasonic Imaging (2014 - present), IF = 2.300
Expert Opinion on Drug Delivery (2016 – present), if = 5.553
Journal of Thrombosis and Thrombolysis (2017 – present), IF = 2.620
Biotechnology and Bioengineering (2017 – present), IF = 3.952
Journal of Medical Imaging (2017 – present), IF = 1.740
IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control (2017 – present), IF = 2.704
Journal of the Acoustical Society of America (2017 – present), IF = 1.605
Translational Stroke Research (2018 – present), IF= 8.266.
Life Sciences (2019 – present), IF = 3.448
Advanced Biosystems (2019 – present), IF = 3.591
IEEE Transactions on Biomedical Engineering (2020 – present), IF = 4.424
RSC Advances (2020 – present), IF = 3.070
Journal of Visualized Experiments (2020 – present) , IF = 1.325
Journal of Biophotonics (2021 – present), IF = 3.207
Medical Physics, (2021 – present), IF = 4.071
Micro and Nano Letters (2022 – present), IF =1.102
Bioprinting (2022 – present), Citescore = 6.9
IEEE International Symposium on Biomedical Imaging 2022

* Verified record on publons.com: https://publons.com/author/1304755/himanshu-shekhar#profile

- *Coordinator*, Career Development Services, IIT Gandhinagar. My role is to promote higher education and career outcomes for postgraduate students and postdoctoral fellows.

- *Coordinator*, Faculty Search Committee, Biological, Chemical, and Computer Science and Engineering, IIT Gandhinagar.

- *Member*, Foundation Program Team – 2019, IIT Gandhinagar. Coordinated a 5-week foundation program for first-year BTech students.

- *Member*, Mentorship Committee, IEEE Ultrasonics, Ferroelectrics, and Frequency Control (UFFC) Society. One of four members of the Committee chaired by Dr. Jessica Liu Strohmann, Associate Editor-in-Chief, IEEE Transactions on UFFC. Paired over 180 individuals for the mentorship program (2021 – present). Served as a mentor to 2 postdoctoral fellows from US universities through this program.

- Session Chair (virtually), Education Session 2 (focused on ultrasound therapy), International Symposium on Therapeutic Ultrasound, Toronto, 2022.

- *Session Chair*, "Therapeutic Ultrasound", Acoustics in Focus, 180th Acoustical Society of America Meeting, 2021 (held virtually).

- *Member*, *Ad hoc* Committee ASA Foundation fundraising campaign, Acoustical Society of America (2016 – 2019)

Serving on a 6-member committee chaired by the ASA president tasked to establish an Early Career Awards Fund.

- *Member, Ad hoc* Committee for Live-Streaming, Acoustical Society of America (2016 – 2019)

Coordinated ASA's initiative of live-streaming research talks delivered at its biannual international conferences online to a worldwide audience starting 2016.

- *Moderator,* live-streaming of the following sessions at the Spring Meeting of the Acoustical Society of America meeting, at Salt Lake City, UT, (2016), Acoustics 2017 at Boston, MA, (2017), and Fall meeting at New Orleans, LA (2017): Session numbers 3aBA,3pBA, 3pBAa, 4aBA, 4aBAa, 4aBA Judge, Best Student Paper in Biomedical Acoustics, Acoustical Society of America Meeting, Salt Lake City, UT, USA (2016) and at Acoustics 2017, Boston, MA, USA (2017).

- *Invited Member*, Biomedical Acoustics Technical Committee, Acoustical Society of America (Term: 2016 – 2023)

This committee is responsible for arranging technical sessions on Biomedical Acoustics, and for promoting new developments in research and education.

- Member, Technical Program Committee, IEEE Ultrasonics Symposium, Group 1 – Medical Ultrasonics (2022-2025).

- Chair, Student and Young Professional Activities, IEEE International Symposium on Biomedical Imaging, Kolkata 2022. This conference is a flagship event of IEEE Engineering in Medicine and Biology Society and IEEE Signal Processing Society and was held for the first time in India.

- *Chairman,* IAESTE India MIT, Manipal, KA, India (2007-08)

Chaired the co-operating body of the International Association for the Exchange of Students for Technical Experience (IAESTE), the world's largest student exchange organization. Managed a budget of $50,000 for exchanging 140 students from 44 countries, generated internships, and led the Indian delegation to the 60th IAESTE General Conference in Jordan (2008). Also served as head of VISA Processing Head (2006) for facilitating VISAs for over 50 exchange students.

PROFESSIONAL MEMBERSHIPS

- IEEE, IEEE Ultrasonics Society
- Acoustical Society of America
- International Society of Therapeutic Ultrasound