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Education

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|--------------------|------------|---|
| 2008 – 2012 | PhD | University of Texas at Austin, Austin TX
Mechanical Engineering |
| 2002 – 2004 | MS | Georgia Institute of Technology, Atlanta GA
Aerospace Engineering |
| 1995 – 2002 | BS | Yonsei University, Seoul Korea
Mechanical Engineering |

Academic Positions

- | | |
|-----------------------|---|
| 2018 – present | Assistant Professor
University of Notre Dame
Department of Aerospace and Mechanical Engineering
Bioengineering Graduate Program |
| 2013 – 2018 | Research Associate / Postdoctoral Fellow
University of Southern California
Department of Biomedical Engineering |

Awards and Honors

- | | |
|-----------|---|
| 2018 | Biomedical Engineering Society – Cellular and Molecular Bioengineering Post-doctoral Shooting Start Award |
| 2017 | Postdoc Scholar Travel Award – University of Southern California |
| 2017 | NIH K99/R00 Pathway to Independence Award |
| 2011-2012 | Warren and Alice Meyer Scholarship in Engineering – University of Texas, Austin |

Peer-Reviewed Publications

*corresponding author

1. Kim, M. G., **Yoon, S.***, Chiu, C. T., Shung, K. K., (2018). Investigation of optimized treatment conditions for acoustic-transfection technique for intracellular delivery of macromolecules. *Ultrasound in Medicine and Biology*, 44, 622-634.
2. Pan, Y., **Yoon, S.**, Sun, J., Huang, Z., Lee, C., Allen, M., Wu, Y., Chang, Y-J., Sadelain, M., Shung, K. K., Chien, S., Wang, Y., (2018). Mechanogenetics for the remote and non-invasive control of cancer immunotherapy. *Proceedings of the National Academy of Sciences*, 115, 992-997.
3. Kim, M. G., Park, J., Lim, H. G., **Yoon, S.**, Lee, C., Chang, J. H., Shung, K. K., (2017). Label-free analysis of the characteristics of a single cell trapped by acoustic tweezers. *Scientific Reports*, 7, 14092.
4. **Yoon, S.**, Wang, P., Peng, Q., Wang, Y., Shung, K. K., (2017). Acoustic-transfection for genomic manipulation of single-cells using high frequency ultrasound. *Scientific Reports*, 7, 5275.
5. **Yoon, S.**, Kim, M. G., Chiu, C. T., Hwang, J. Y., Kim, H. H., Wang, Y., Shung, K. K., (2016). Direct and sustained intracellular delivery of exogenous molecules using acoustic-transfection with high frequency ultrasound. *Scientific Reports*, 6, 20477.
6. Kim, M. G., **Yoon, S.***, Kim, H. H., Shung, K. K., (2016). Impedance matching network for high frequency ultrasonic transducer for cellular applications. *Ultrasonics*, 65, 258-267.

7. Hwang, J. Y., Yoon, C. W., Lim, H. G., Park, J., **Yoon, S.**, Lee, J., Shung, K.K., (2015). Acoustic tweezers for studying intracellular calcium signaling in SKBR-3 human breast cancer cells. *Ultrasonics*, 63, 94-101.
8. **Yoon, S.**, Kim, M. G., Williams, J. A., Yoon, C., Kang, B. J., Cabrera-Munoz, N., Shung, K. K., Kim, H. H., (2015). Dual element needle transducer for intravascular ultrasound imaging. *Journal of Medical Imaging*, 2(2), 027001.
9. **Yoon, S.**, Williams, J. A., Kang, B. J., Yoon, C., Cabrera-Munoz, N., Jeong, J. S., Lee, S. G., Shung, K. K., Kim, H. H., (2015). Angled- focused 45 MHz PMN-PT single element transducer for intravascular ultrasound imaging. *Sensors and Actuators A: Physics*, 228(1), 16-22.
10. Hwang, J. Y., Lim, H. G., Yoon, C. W., Lam K. H., **Yoon, S.**, Lee, C., Chiu, C. T., Kang, B. J., Kim, H. H., Shung, K.K., (2014). Non-contact high-frequency ultrasound microbeam stimulation for studying mechanotransduction in human umbilical vein endothelial cells. *Ultrasound in Medicine and Biology*, 40(9), 2172-2182.
11. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2013). Spatial variations of viscoelastic properties of porcine vitreous humors. *IEEE Trans Ultrason Ferroelectr Freq Contr*, 60(11), 2453-2460.
12. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2013). The mechanical properties of *ex vivo* bovine and porcine crystalline lenses: age-related changes and location-dependent variations. *Ultrasound in Medicine and Biology*, 39(6), 1120-1127.
13. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2012). A high pulse repetition frequency ultrasound system for the *ex vivo* measurement of mechanical properties of crystalline lenses with laser-induced microbubbles interrogated by acoustic radiation force. *Physics in Medicine and Biology*, 57(15), 4871-4884.
14. Aglyamov, S., Karpiouk, A., Mehrmohammadi, M., **Yoon, S.**, Kim, S., Ilinskii, Y., Zabolotskaya, E., Emelianov, S., (2012). Elasticity imaging and sensing using targeted motion: from macro to nano. *Curr Med Imaging Rev*, 8(1), 3-15.
15. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2011). Estimation of mechanical properties of a viscoelastic medium using a laser-induced microbubble interrogated by an acoustic radiation force. *Journal of the Acoustical Society of America*, 130(4), 2241-2248.

Invited Presentations

1. "Acoustic-transfection: the next generation intracellular delivery platform." Department of Mechanical Engineering, Virginia Tech, February 2018.
2. "Acoustic-transfection: the next generation intracellular delivery platform." Department of Aerospace and Mechanical Engineering, University of Notre Dame, February 2018.
3. "Acoustic-transfection: the next generation intracellular delivery platform." Department of Engineering Science and Mechanics, Pennsylvania State University, February 2018.
4. "hPiezo1 needs stronger force for mechanical activation than mPiezo1." 2018 Cellular and Molecular Bioengineering Conference, Key Largo, Florida, January 2018.
5. "Acoustic-transfection: the next generation intracellular delivery platform." Department of Biomedical Engineering, Stevens Institute of Technology, November 2017.
6. "The new intracellular delivery platform using high frequency ultrasound." 2017 International Congress on Ultrasonics, Honolulu, Hawaii, December 2017.
7. "Development of intracellular delivery technique using high frequency ultrasound." Seminars in Biomedical Engineering, Department of Biomedical Engineering, University of Southern California, January 25, 2016.
8. "Intracellular delivery of macromolecules using acoustic-transfection with high frequency ultrasound." Grand Rounds of Department of Radiology, Keck School of Medicine, University of Southern California, September 17, 2015.

9. "Acoustic radiation force on gas bubbles and soft elastic scatterers in tissue." The 166th Meeting of the Acoustical Society of America, San Francisco, California, December 2013.

Conference Meeting Presentations

1. **Yoon, S.**, (2018). Mechanical activation of hPiezo1 and mPiezo1 using high frequency ultrasound. 8th World Congress of Biomechanics, Dublin, Ireland, July 2018.
2. **Yoon, S.**, Wang, P., Peng, Q., Wang, Y., Shung, K.K., (2017). Acoustic-transfection for gene editing using high frequency ultrasound. 2017 IEEE Ultrasonics Symposium, Washington, D.C., September 2017.
3. **Yoon, S.**, Kim, M. G., Wang, Y., Shung, K. K., (2016). Acoustic-transfection to modulate cell functions. 2016 IEEE Ultrasonics Symposium, Tours, France, September 2016.
4. **Yoon, S.**, Kim, M. G., Wang, Y., Shung, K. K., (2016). Acoustic-transfection technique for gene and protein delivery. 13th Annual Ultrasonic Transducer Engineering Conference, Torrance, CA, May 16, 2016.
5. **Yoon, S.**, Wang, Y., Shung, K. K., (2016). Optimization of input parameters of acoustic-transfection for the intracellular delivery of macromolecules using FRET-based biosensors. SPIE photonics west symposium, San Francisco, CA, February 2016.
6. **Yoon, S.**, Kim, M. G., Wang, Y., Shung, K. K., (2015). Programmable delivery of macromolecules using high frequency ultrasound. 2015 IEEE Ultrasonics Symposium, Taipei, Taiwan, October 2015.
7. **Yoon, S.**, Kim, M. G., Kang, B. J., Yoon, C., Cabrera-Munoz, N., Williams, J. A., Shung, K. K., Kim, H. H., (2014). Dual element needle transducer for intravascular ultrasound imaging. 2014 IEEE Ultrasonics Symposium, Chicago, IL, September 2014.
8. Kim, H. H., **Yoon, S.**, Cabrera-Munoz, N., Williams, J. A., Kang, B. J., Yoon, C., Shung, K. K., (2014). Angled and press-focused 40 MHz PMN-PT single element transducers for intravascular ultrasound imaging. 2014 IEEE Ultrasonics Symposium, Chicago, IL, September 2014.
9. **Yoon, S.**, Kim, M. G., Carera-Munoz, N., Kim, H. H., Shung, K. K., (2014). Intracellular delivery of macromolecules using high frequency transducers. 12th Annual Ultrasonic Transducer Engineering Conference, Torrance, CA, May 2014.
10. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2011). Young's modulus estimation of bovine lens ex-vivo using a laser-induced microbubble under impulsive acoustic radiation force. 162nd Meeting of the Acoustical Society of America, San Diego, CA, November 2011.
11. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Kim, S., Emelianov, S., (2010). Measurements of Young's modulus of viscoelastic medium using a laser-induced microbubble under acoustic radiation force. 2010 IEEE Ultrasonics Symposium, San Diego, CA, October 2010.
12. **Yoon, S.**, Aglyamov, S., Karpiouk, A., Emelianov, S., (2009). Estimation of mechanical properties of tissue using laser-induced microbubble interrogated by acoustic radiation force. 158th Meeting of the Acoustical Society of America, San Antonio, TX, October 2009.

Conference Abstracts / Posters

1. **Yoon, S.**, (2017). Poster presentation in Meet the Faculty Candidate Forum at 2017 BMES Annual meeting, Phoenix, AZ, October 2017.
2. **Yoon, S.**, Wang, P., Wang, Y., Shung, K. K., (2017). Acoustic-transfection using High Frequency Ultrasound for Cell Manipulation. 2017 BMES Annual meeting, Phoenix, AZ, October 2017.
3. **Yoon, S.**, Wang, P., Peng, Q., Wang, Y., Shung, K. K., (2017). Acoustic-transfection using High Frequency Ultrasound for Genomic Manipulation of Single Cells. Moving Targets 2017, The American Association of Pharmaceutical Scientists, Los Angeles, CA, August 2017.
4. **Yoon, S.**, Wang, P., Peng, Q., Wang, Y., Shung, K. K., (2017). Single-cell level targeting and simultaneous intracellular delivery of macromolecules using super high frequency ultrasound. Abstract

of the 2017 Cellular and Molecular Bioengineering Conference (CMBE), Big Island, Hawaii, January 2017.

5. Kim, M. G., **Yoon, S.**, Shung, K. K., (2015). Mechanism of intracellular delivery of exogenous molecules using high frequency ultrasound. Abstract of the 2015 BMES Annual meeting, Tempa, FL, October 2015.
6. **Yoon, S.**, Kim, M. G., Carera-Munoz, N., Kim, H. H., Shung, K. K., (2014). Intracellular delivery of macromolecules using ultrahigh frequency ultrasound. Abstract of the 2014 BMES Annual meeting, San Antonio, TX, October 2014.
7. Pourebrahimi, B., **Yoon, S.**, Dopsa, D., Kolios, M., (2013). Improving the quality of photoacoustic images using short-lag spatial coherence imaging technique. Proceedings of the 2013 SPIE photonics west symposium, San Francisco, CA.
8. Aglyamov, S., **Yoon, S.**, Karpiouk, A., Manapuram, R.K., Larin, K.V., Emelianov, S., (2011). Noninvasive assessment of mechanical properties of the crystalline lens. Abstract of the 2011 International Tissue Elasticity Conference 2011, Arlington, TX, October 2011.
9. Volovoi, V. V., **Yoon, S.**, Lee, C. Y., Hodges, D.H., (2004). Structural optimization of composite rotor blades. Proceedings of the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Palm Springs, CA, April 2004.

Teaching

Instructor AME 60678: Biomedical Imaging Modalities, University of Notre Dame, Fall 2018
Guest Lecturer BME 535: Ultrasonic Imaging, University of Southern California, Spring 2017
Teaching Assistant ME 324: Dynamics, University of Texas at Austin, TX, Fall 2008 / 2011

Service

Journal reviewer: Nano Letters; IEEE UFFC; IEEE TBME; Medical Physics; Plos One; Scientific Reports; Sensors; IEEE Transactions on Industrial Electronics

Professional Memberships

IEEE Ultrasonics, Ferroelectrics and Frequency Control Society (IEEE UFFC)
Biomedical Engineering Society (BMES)
Acoustical Society of America (ASA)

Other Experience

Engineer, Samsung Electronics, Suwon, Korea, 2005 – 2008
Sergeant, Korean Army, 1997 – 1999