


# Scott Schoen Jr

He/Him/His

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## Education

- 2016–2020 **Georgia Institute of Technology Atlanta, GA**  
PhD Mechanical Engineering (Acoustics, Mathematics)  
**Thesis:** *Trans-skull Ultrasound for Imaging and Therapy*  
**Supervisor:** Costas D. Arvanitis
- 2011–2013 **The University of Texas at Austin Austin, TX**  
MSE Mechanical Engineering (Acoustics)  
**Thesis:** *Acoustic Characterization of Encapsulated Microbubbles at Seismic Frequencies*  
**Supervisor:** Mark F. Hamilton
- 2007–2011 **Tufts University Medford, MA**  
BS (magna cum laude) Physics & Music

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## Research Experience

- 2023–pres. **Instructor in Radiology**
- 2021–2023 **Postdoctoral Fellow** *Harvard Medical School & Massachusetts General Hospital Center for Ultrasound Research & Translation*  
Leveraging fundamental acoustics, signal processing, and machine learning techniques to improve diagnostic ultrasound images, with particular emphasis on aberration correction and contrast-enhanced techniques.
- 2016–2021 **Graduate Research Assistant** *Georgia Institute of Technology Ultrasound Biophysics & Bioengineering Lab*  
Developing fast algorithms to account for the acoustic heterogeneity of skull bone, and techniques to improve resolution and exploit nonlinearity.
- 2013–2016 **Research Associate** *Trident Research LLC*  
Member of team responsible for maintenance and refresh of mandatory impact localization system used during US Navy flight test operations.
  - Planned collection of and analyzed acoustic & GPS data to produce final impact scores
  - Created computational models of communications reliability, satellite network availability, and ocean acoustic propagation to aid sensor deployment
  - Served as cybersecurity manager for system IT components
- 2011–2013 **Graduate Research Assistant** *The University of Texas at Austin Applied Research Laboratories*  
Investigating the feasibility of the use of encapsulated microbubbles as low-frequency (sub-resonance) acoustic contrast agents for applications in seismic imaging.
- 2009–2011 **Undergraduate Research Assistant** *Tufts University*  
Investigating the crystallization behavior of polymers in the presence of multiwalled carbon nanotubes.

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## Service

### Journal Referee

*Frontiers in Acoustics* (Review Editor)

*Proceedings of Meetings on Acoustics* (Associate Editor, Biomedical Acoustics)

**AD HOC:** *IEEE Transactions on Medical Imaging*, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, *International Journal of Computer Assisted Radiology and Surgery*, *Journal of the Acoustical Society of America*, *JASA Express Letters*

### Committee Member **RSNA QIBA** [rsna.org](http://rsna.org)

Member of Pulse-Echo Quantitative Ultrasound (PEQUS) committee

### Harvard University Bioengineering [seas.harvard.edu](http://seas.harvard.edu)

Senior Thesis Supervisor for James R. Young (2021–2022)

**Thesis:** SoundAI: Machine Learning-Based Correction of Ultrasound Aberration

### ASA Georgia Tech Student Chapter [gt-asa.org](http://gt-asa.org)

Vice President (2019), President (2018), Treasurer (2017)

### IEEE-UFFC Georgia Tech Student Chapter [ieee-uffc.org](http://ieee-uffc.org)

Treasurer (2019–2020)

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## Professional Affiliations

2012–13  
2016–pres.

**Acoustical Society of America** [acousticalsociety.org](http://acousticalsociety.org)

2018–pres.

**IEEE Ultrasonics Ferroelectrics and Frequency Control Society** [ieee-uffc.org](http://ieee-uffc.org)

2021–pres.

**American Institute of Ultrasound in Medicine** [aium.org](http://aium.org)

2020–2021

**American Association of Physicists in Medicine** [aapm.org](http://aapm.org)

2018–2020

**Biomedical Engineering Society** [bmes.org](http://bmes.org)

2018–2020

**International Society for Therapeutic Ultrasound** [istu.org](http://istu.org)

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## Awards & Achievements

ASA Early Career Travel Award, ASA Sydney (2023)

FV Hunt Postdoctoral Research Fellowship in Acoustics (2022–2023)

Overall Runner-up, ULTRA-SR Challenge at IEEE IUS (2022)

NCAC Travel Award, ASA 179 (2020) & ASA 177 (2019)

2<sup>nd</sup> Place, ASA International Student Challenge Problem (2019)

ASA Travel Subsidy, ASA 178 (2019)

Provost's Award, CRIDIC Poster Competition (2019)

Session co-moderator (“Ultrasound Guidance”) and Student Travel Award recipient, ISTU'18 Nashville, TN USA (2018)

Elizabeth & Russell Hallberg Foundation Fellowship in Engineering Acoustics (2011)

Tufts University Dean's List (2007–2011)

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## Languages

English (native), Spanish (proficient)

## Publications

### Journal Articles

1. **Schoen Jr, S. J.**, Arshad, S., Prasov, A., Candel, I., Ottensmeyer, M., Brattain, L., Telfer, B. & Samir, A. E. Microbubble Contrast Agents Improve Detection of Ongoing Hemorrhage. *Under Review* (2024).
2. **Schoen Jr, S. J.** & Samir, A. E. Spectral Aberration Correction with Machine Learning Medium Inference. *In Preparation* (2024).
3. Lerendegui, M., Riemer, K., George, P., Lachlan, A. J. M., Wang, B., Chavignon, A., Ashikuzzaman, M., Couture, O., *et al.* ULTRA-SR: assessment of Ultrasound Localisation and Tracking Algorithms for Super Resolution Imaging. *Under Review* (2023).
4. Ozturk, A., Pierce, T. T., Li, Q., Baikpour, M., Rosado-Mendez, I., Wang, M. H., **Schoen Jr, S. J.**, Gu Yuyang and Dayavansha, S. K., *et al.* The Future is Beyond Bright: The Evolving Role of Ultrasound for Liver Disease. *Radiology* (2023).
5. **Schoen Jr, S. J.**, Kumar, V., Gu, Y., Dayavansha, S. K., Tadross, R., Thomenius, K., Washburn, M. & Samir, A. E. Efficient Aberration Correction via Optimal Bulk Speed of Sound Compensation. *Under Review* (2023).
6. Zhang, L., Marcus, C., Mejorado, D., **Schoen Jr, S. J.**, Pierce, T. T., Kumar, V., Fernandez, S. V., Hunt, D., *et al.* Conformable Phased Array Ultrasound Patch for Bladder Volume Monitoring. *Nature Electronics (In Press)* (2023).
7. Wang, X., Bamber, J. C., Esquivel-Sirvent, R., Ormachea, J., Sidhu, P. S., Thomenius, K. E., **Schoen Jr, S.**, Rosenzeig, S., *et al.* Ultrasonic Sound Speed Estimation for Liver Fat Quantification: A Review by the AIUM-RSNA QIBA Pulse-Echo Quantitative Ultrasound Initiative. *Ultrasound in Medicine and Biology* **49**, 2327–2335 (Nov. 2023).
8. Gu, Y., Kumar, V., Dayavansha, S. K., **Schoen Jr, S. J.**, Tadross, R., Thomenius, K., Washburn, M. & Samir, A. E. Propagation-invariant acoustic beams for adaptable shear wave imaging. *Science Advances* **9** (Nov. 2023).
9. Song, Z., Wang, S., Li, Q., Ozturk, A., Mittal, V., **Schoen Jr, S. J.**, Ramaswamy, S., Pierce, T. T., *et al.* Memory-efficient low-compute segmentation algorithms for edge ultrasound devices: continuous bladder monitoring. *Scientific Reports* **13** (Sept. 2023).
10. **Schoen Jr, S. J.**, Kilnic, M. S., Lee, H., Guo, Y., Degertekin, F. L., Woodworth, G. F. & Arvanitis, C. D. Towards controlled drug delivery in brain tumors with microbubble-enhanced focused ultrasound. *Advanced Drug Delivery Reviews* **180** (2022).
11. **Schoen Jr, S. J.**, Dash, P. P. & Arvanitis, C. D. Experimental Demonstration of Trans-skull Volumetric Passive Acoustic Mapping with the Heterogeneous Angular Spectrum Approach. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* **69**, 534–542 (2022).
12. Lee, H., Guo, Y., Ross, J. L., **Schoen Jr, S. J.**, Degertekin, F. L. & Arvanitis, C. D. Spatially targeted brain cancer immunotherapy with closed loop controlled focused ultrasound and immune checkpoint blockade. *Science Advances* **8** (2022).
13. **Schoen Jr, S. J.**, Zhao, Z., Huang, C., Chen, S. & Arvanitis, C. D. Morphological Reconstruction Improves Microvessel Mapping and Characterization in Super-Resolution Ultrasound. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* **68**, 2141–2149 (2021).
14. **Schoen Jr, S. J.** & Arvanitis, C. D. Acoustic source localization with the angular spectrum approach in continuously stratified media. *The Journal of the Acoustical Society of America* **148**, EL333–EL339 (2020).
15. **Schoen Jr, S. J.** & Arvanitis, C. D. Heterogeneous Angular Spectrum Method for Trans-skull Imaging and Focusing. *IEEE Transactions on Medical Imaging* **39**, 1605–1614 (2020).

16. Patel, A., **Schoen Jr, S. J.** & Arvanitis, C. D. Closed Loop Spatial and Temporal Control of Cavitation Activity with Passive Acoustic Mapping. *IEEE Transactions on Biomedical Engineering* **66**, 2022–2031. ISSN: 0018-9294 (July 2019).

### Invited Talks

1. **Schoen Jr, S. J.** *Diagnostic Ultrasound in the Liver: Challenges and Opportunities in Joint GT-ASA and IEEE IUS Student Chapter Seminar* (Oct. 2023).
2. **Schoen Jr, S. J.** *Ultrasound through the Skull: Seeing and Treating Noninvasively in Acoustics Seminar* (Virtual, Nov. 2021).
3. **Schoen Jr, S. J.** *Towards Efficient Methods for Transcranial Ultrasound Monitoring & Control in 2020 Joint AAPM | Comp Meeting* (Virtual, July 2020).

### Theses

1. **Schoen Jr, S. J.** *Trans-skull Ultrasound for Imaging and Therapy* PhD Dissertation (Georgia Institute of Technology, Dec. 2020).
2. **Schoen Jr, S. J.** *Acoustic characterization of encapsulated microbubbles at seismic frequencies* MS Thesis (The University of Texas at Austin, Dec. 2013).

### Patent

1. Arvanitis, C. D., Patel, A., **Schoen Jr, S. J.** & Zhao, Z. *Systems and Methods for Ultrasound Imaging and Focusing* US Patent Pending PCT/US2019/060217. Nov. 2019.

### Conference Presentations

1. **Schoen Jr, S. J.**, Tehrani, A. K. Z. & Samir, A. E. *Deep Learning–Based Microbubble Localization towards Improved Super-resolution Ultrasound* in *Journal of the Acoustical Society of America* (Sydney, Australia, Dec. 2023).
2. Pierce, T. T., Ottensmeyer, M., Som, A., Brattain, L., Weblin, J. S., Sutphin, P. D., **Schoen Jr, S. J.**, Johnson, M. R., et al. *Individualized Ultrasound-Guided Intervention Phantom Development, Fabrication, and Proof of Concept* in *IEEE Engineering in Medicine and Biology Conference* (Sydney, Australia, July 2023).
3. Telfer, B., **Schoen Jr, S.**, Candel, I., Arshad, S., Ottensmeyer, M., Brattain, L. & Samir, A. E. *Contrast-Enhanced Ultrasound To Detect Active Bleeding* in *IEEE Engineering in Medicine and Biology Society* (Sydney, NSW Australia, July 2023).
4. **Schoen Jr, S. J.**, Jakovljevic, M. & Samir, A. E. *Plane Wave Imaging in Arbitrary Media via Efficient Phase Compensation* in *International Symposium on Ultrasound Imaging and Tissue Characterization* (Arlington, VA, June 2023).
5. **Schoen Jr, S. J.** & Samir, A. E. *Fast Spectral Approach for Delay Correction in Heterogeneous Media* in *Journal of the Acoustical Society of America* (Chicago, IL, May 2023).
6. Lee, H., Guo, Y., Ross, J. L., **Schoen Jr, S. J.**, Degertekin, F. L. & Arvanitis, C. D. *Spatially targeted immunotherapy in glioma with closed-loop microbubble enhanced focused ultrasound control* in *International Society for Therapeutic Ultrasound* (Lyon, France, Apr. 2023).
7. **Schoen Jr, S. J.**, Kumar, V., Brattain, L., Telfer, B. & Samir, A. E. *Contrast-enhanced ultrasound to detect active bleeding* in *Journal of the Acoustical Society of America* (Nashville, TN, Dec. 2022).
8. **Schoen Jr, S. J.**, Kumar, V., Gu, Y., Dayavansha, S. K., Tadross, R., Thomenius, K., Washburn, M. & Samir, A. E. *Optimal Abdominal Imaging with Bulk Speed of Sound Beamforming* in *2022 IEEE International Ultrasonics Symposium* (Venice, Italy, Oct. 2022).
9. **Schoen Jr, S. J.**, Samir, A. E. & Kumar, V. *MR for ULTRA-SR: Improved Localization with Morphological Image Processing* in *2022 IEEE International Ultrasonics Symposium* (Venice, Italy, Oct. 2022).

10. Young, J. R., **Schoen Jr, S. J.**, Kumar, V. & Samir, A. E. *SoundAI: Aberration Correction from Learned Sound Speed Maps in 2022 IEEE International Ultrasonics Symposium* (Venice, Italy, Oct. 2022).
11. **Schoen Jr, S.**, Heidari, F., Parameswaran, M., Cheah, E., Ozturk, A., Martin, M., Kumar, V., Pierce, T. T., et al. *Accurate Fibrosis Staging from Unstructured Data with Natural Language Processing in American Institute of Ultrasound in Medicine* (San Diego, CA, Mar. 2022).
12. Dash, P. P., **Schoen Jr, S. J.** & Arvanitis, C. D. *Experimental Demonstration of 3D Transcranial Passive Acoustic Mapping with the Heterogeneous Angular Spectrum Approach in 2021 IEEE International Ultrasonics Symposium* (Xi'an, China, Sept. 2021).
13. Lee, H., Schoen Jr, S., **Guo, Y.**, Kim, C., Degertekin, F. L. & Arvanitis, C. *Acoustic Emission Based Closed-Loop Focused Ultrasound System for Targeted and Controlled BBB-Opening in Rodents in 2021 IEEE International Ultrasonics Symposium* (Xi'an, China, Sept. 2021).
14. Lee, H., **Schoen Jr, S.**, Guo, Y., Kim, C. & Arvanitis, C. *A Closed-loop Focused Ultrasound System for Controlled and Targeted Antibody Delivery in Central Nervous System in American Institute of Ultrasound in Medicine* (Virtual, Apr. 2021).
15. **Schoen, S. J.** & Arvanitis, C. Spatial characterization of high intensity focused ultrasound fields in the brain. *The Journal of the Acoustical Society of America* **148**, 2560–2560. eprint: <https://doi.org/10.1121/1.5147103> (2020).
16. **Schoen Jr, S. J.**, Zhao, Z., Huang, C., Chen, S. & Arvanitis, C. D. *Computationally Efficient Methods for Vascular Characterization with Super-resolution Ultrasound in Biomedical Engineering Society 2020 Annual Meeting* (Virtual, Oct. 2020).
17. Lee, H., **Schoen Jr, S. J.**, Guo, Y., Kim, C. & Arvanitis, C. D. *Autonomous Ultrasound System for Targeted Drug Delivery in Central Nervous System with Sub-millimeter Targeting Accuracy in 2020 IEEE International Ultrasonics Symposium* (Las Vegas, NV USA, Sept. 2020).
18. **Schoen Jr, S. J.**, Zhao, Z., Huang, C., Chen, S. & Arvanitis, C. D. *Super-Resolution Ultrasound with Morphological Image Reconstruction and Local Projection for Microvascular Characterization in 2020 IEEE International Ultrasonics Symposium* (Las Vegas, NV USA, Sept. 2020).
19. **Schoen Jr, S. J.** & Arvanitis, C. Heterogeneous angular spectrum method for trans-skull imaging and focusing. *The Journal of the Acoustical Society of America* **146**, 2813–2813 (2019).
20. **Schoen Jr, S. J.**, Zhao, Z. & Arvanitis, C. D. Efficient sub-diffraction passive cavitation imaging. *The Journal of the Acoustical Society of America* **145** (2019).
21. **Schoen Jr, S. J.**, Zhao, Z., Guo, Y. & Arvanitis, C. D. *Spectrally Resolved Super-Resolution Ultrasound for Microvascular Imaging and Quantification in 2019 IEEE International Ultrasonics Symposium* (Glasgow, Scotland, Oct. 2019).
22. **Schoen Jr, S. J.**, Patel, A. & Arvanitis, C. D. *Real-Time Closed-Loop Spatiotemporal Control of Cavitation Activity with Passive Acoustic Mapping in 2018 IEEE International Ultrasonics Symposium* (Kobe, Japan, Oct. 2018).
23. **Schoen Jr, S. J.**, Zhao, Z. & Arvanitis, C. D. *Super-Resolution Passive Acoustic Imaging of Microbubbles in Biomedical Engineering Society 2018* (Atlanta, GA USA, Oct. 2018).
24. **Schoen Jr, S. J.**, Patel, A. & Arvanitis, C. D. *A Real-Time Passive Acoustic Mapping-Based Cavitation Controller in 18th Meeting of the International Society for Therapeutic Ultrasound* (Nashville, TN USA, May 2018).
25. **Schoen Jr, S. J.** & Arvanitis, C. D. Passive acoustic mapping in aberrating media with the angular spectrum approach. *The Journal of the Acoustical Society of America* **141**, 3459 (2017).
26. **Schoen Jr, S. J.** & Arvanitis, C. D. *Passive Acoustic Mapping with the Angular Spectrum Approach and Methods for Aberration Correction in 2017 Joint IEEE ISAF-IVATMD-PFM Conference* (Atlanta, Georgia, June 2017).

27. Copenhaver, B. J., **Schoen Jr, S. J.** & Haberman, M. R. Toward reliable metrics for Sacred Harp singing spaces. *The Journal of the Acoustical Society of America* **134**, 3969–3969 (2013).
28. **Schoen Jr, S. J.**, Ilinskii, Y. A., Zabolotskaya, E. A. & Hamilton, M. F. Low-frequency measurement of encapsulated bubble compressibility. *The Journal of the Acoustical Society of America* **132**, 2039 (2012).
29. Georgiev, G., Cabrera, Y., Wielgus, L., **Schoen Jr, S.**, Ivy, D. & Cebe, P. *Melt-Quench Formed Smectic Phase in iPP/CNT Nanocomposites and its Re-Crystallization* in *Symposium HH/II/JJ: Polymer-Based Materials and Composites – Synthesis, Assembly and Applications* **1312** (2011).
30. Georgiev, G., **Schoen Jr, S.**, Ivy, D., Wielgus, L., Cabrera, Y. & Cebe, P. *Crystallization Kinetics in Isotactic Polypropylene Films with Carbon Nanotubes* in *Symposium HH/II/JJ: Polymer-Based Materials and Composites – Synthesis, Assembly and Applications* **1312** (2011).
31. Georgiev, G., **Schoen Jr, S.**, Cabrera, Y., Wielgus, L. & Cebe, P. *Carbon Nanotubes Speed Crystallization of Polymers* in *Nanotech 2011 Conference and Expo* (June 2011).
32. Georgiev, G., **Schoen Jr, S.**, Ivy, D. & Cebe, P. *Crystallization effects of carbon nanotubes on semicrystalline isotactic polypropylene* in *Bulletin of the American Physical Society* **56** (American Physical Society, Dallas, TX, Mar. 2011).
33. Georgiev, G., **Schoen Jr, S.**, Ivy, D., Wielgus, L., Cabrera, Y. & Cebe, P. *Crystal Nanostructuring in Isotactic Polypropylene-carbon Nanotubes Films* in *Symposium JJ: Nanostructured Polymeric Materials – Synthesis and Assembly* (Dec. 2010).
34. Georgiev, G., **Schoen Jr, S. J.**, Ivy, D., Gombos, E., McIntyre, M. & Cebe, P. *Smectic phase and crystallization of multiwalled carbon nanotubes/isotactic polypropylene formed through melt-quenching* in *Division of Polymeric Materials: Science and Engineering, Sci-Mix* (Boston, MA, Aug. 2010).
35. Georgiev, G., Judith, R., Gombos, E., McIntyre, M., **Schoen Jr, S.**, Cebe, P. & Mattera, M. *Isotactic polypropylene carbon nanotube composites – crystallization and ordering behavior* in *Bulletin of the American Physical Society* **55** (American Physical Society, Portland, OR, Mar. 2010).