

Ajay Anand, Ph.D.
250 Hutchison Rd (Wegmans Hall), Rochester, NY 14627
Phone: (914)-330-3194
Email: ajay.anand@rochester.edu

TECHNICAL AREAS OF INTEREST/EXPERTISE

- Data Analytics, Machine learning and Deep learning for healthcare
- Biomedical/Ultrasound signal processing, Biomedical instrumentation, Predictive modeling, Time-series analysis

EDUCATION

Jun 2002—June 2005 PhD in Electrical Engineering (*Biomedical Imaging concentration*)
(*Advisor: Prof. Lawrence Crum, Faculty Committee: Prof. Blake Hannaford*)
University of Washington, Seattle, WA
PhD Dissertation: Non-invasive ultrasound thermometry for ablative therapy monitoring

Jun 2000—June 2003 Master of Science in Electrical Engineering, (GPA: 3.73/4.0)
University of Washington, Seattle, WA
Major: Biomedical Signal processing, Image Analytics
Advanced graduate level courses: Medical signal processing, Stochastic Analysis of Time Series, Medical imaging

Aug 1998—June 2000 Master of Science in Biomedical Engineering, (GPA: 3.9/4.0)
(*Advisor: Dr. Khosrow Behbehani*)
University of Texas Southwestern Medical Center, Dallas, TX
Major: Biomedical signal processing, Pattern Recognition using Neural Networks

June 1994—June 1998 Bachelor of Engineering in Electronics Engineering (Grade: Distinction) University of Bombay, India

PROFESSIONAL EXPERIENCE

- **University of Rochester, NY (July 2017 – Present)**
 - Deputy Director, Goergen Institute of Data Science*
 - Associate Professor (Instruction)*
 - Secondary/Affiliate Faculty, Department of Biomedical Engineering*
- Lead and direct the data science capstone course offered to undergraduate and graduate students (DSC 383W/483). Worked with industry collaborators (including Harris, Xerox, Wegmans, Paychex and multiple other area companies) to define the scope and technical content of capstone projects offered to senior undergraduate and graduate students. Successfully doubled project sponsors year over year to more than 75 projects from 45 organizations (since 2016).
- Serving as PI and site director for NSF REU grant. Responsible for management of the entire REU program from call for applications, student selection, schedule and content of

- learning modules, and coordinating speakers for research colloquia
 - Developed new concentration area in data science undergraduate curriculum in the area of biomedical engineering (BME) working jointly with BME faculty
 - Coordinated various program initiatives in collaboration with program education coordinator and affiliated faculty in student advising, identifying adjunct faculty resources for staffing courses, and day-to-day program management of the education activities of the data science institute.
 - Serve as faculty coordinator for Masters in Data Science admissions process for Fall 2018, 2019.
 - Evaluated statistics courses currently offered in the university, and made recommendations for an optimal offering within the data science curriculum
- **State University of New York (MCC, Dept of Electrical Technology) 2015-present**
Adjunct Faculty
- **Carestream Health, Rochester, NY (April 2015 – July 2017)**
Job Title/Responsibilities: Technical Manager (Medical Ultrasound)
 - Principal investigator and lead scientist on industry-academic collaboration initiatives working jointly with academic faculty to launch technical and clinical research projects including University of Rochester. (<http://www.rochester.edu/newscenter/carestream-university-of-rochester-collaborate-on-new-ultrasound-technologies-179532/>)
 - Key member of R&D team providing subject matter expertise and responsible for driving new product development and technology initiatives in quantitative biomedical imaging
 - Developed technology presentations and whitepapers in preparation for product launch of first- ever Carestream ultrasound platform.
 - Developed technology positioning strategy and delivered presentations at marketing roadshows to clinicians and prospective customers in various cities in USA and Europe.
 - Developed product feature specifications for new software releases coordinating between product management, engineering, project management functions internally, and strategic vendors/suppliers.
- **Philips Healthcare Research, Briarcliff Manor, NY**
(Corporate research division of Fortune 100 multinational Philips Electronics, Amsterdam, Netherlands)
Job Titles/Responsibilities:
 - Senior Research Scientist / Technical Project Leader (June 2011-April 2015)*
 - International Sabbatical (June 2011-Dec 2011)*
 - Senior Medical Research Scientist (June 2005-June 2011)*
- **Biomedical graduate researcher at University of Texas and University of Washington**

AWARDS AND HONORS

- Nominated to Founding committee of NorthEast Big Data Hub Student Corps, August 2020
- University of Rochester Gwennies Award for fostering student, alumni, and employer engagement, April 2019
- University of Rochester Hajim School Sykes Teaching Innovation Award/Grant for sophomore course titled “Sensor Data Science”, May 2018

- Inventor of the Year Hall of Fame (for most number of inventions in a calendar year), Philips Research North America, December 2010
- Prize winner at Philips Research North America “Growth Challenge” competition for novel innovation ideas aligned with Philips business decided by peer voting process, December 2009
- Merit Scholarship, University of Washington, May 2001
- President’s award for Academic Excellence, University of Texas, May 2000
- Co-inventor of more than 40 patent filings in the area of point-of-care, diagnostic and therapeutic medical devices
- Best student paper award in ASA conference, Nashville, TN, April 2003 (<http://tcbaasa.org/batc-student-paper-award/>)

CONFERENCE/WORKSHOP/SESSION CHAIR/CO-CHAIR

- Session co-chair, “Image Processing - Machine Learning / Deep Learning Approaches”, for Engineering in Medicine and Biology Conference (EMBC), Berlin, Germany, July 2019.

SELECT PROFESSIONAL SERVICE/ACTIVITIES

- Invited panelist for International Data Science for Schools Project (IDSSP), June 2019.
- Invited to review faculty proposals for University of Rochester URA-University Research Awards representing Data Science, May 2019.
- Reviewer for University of Rochester Medical Center SMD SAC Incubator Funding representing biomedical data science, May 2019.
- Invited panelist for NSF REU-grant review session, October 2018.
- Invited speaker on “Undergraduate Curriculum and Experiential Learning Opportunities in Data Science” at Data Science Leadership Summit, October 2018.
- Industry representative on RSNA-sponsored Committee for Quantitative Bio-marker Alliance for Ultrasound Shear-Wave Imaging, 2016
- Peer-reviewer for international ultrasound imaging journals including Ultrasound Medicine in Biology (2005-2010), and IEEE UFFC (2011-)

INVITED TALKS AND COLLOQUIA

1. Invited Speaker- Lightning Talk: “State of the Data Science Institute at UofR”, Data Science Leadership Summit, Santa Fe, NM, Nov 2019.
2. Invited Speaker for presentation on “Artificial Intelligence Applications in Medical Ultrasound”, at Center for Musculoskeletal Research, University of Rochester Medical Center, February 2019.
3. Invited Speaker for presentation on “Artificial Intelligence Applications in Medical Ultrasound”, at Rochester Center for Biomedical Ultrasound conference, November 2018.
4. Invited speaker for presentation on “Low-cost Automated Ultrasound Device for High-risk Pregnancy Monitoring” at American Institute for Ultrasound in Medicine Conference, April 2014.
5. Invited speaker at Texas A&M Biomedical Engineering department to present on “Point-of-Care Ultrasound Technologies for the Emerging World”, March, 2015

SELECTED RESEARCH PROJECTS AND OUTCOMES

- **US DoD DARPA project on Autonomous Bleed Detection and Localization (DBAC project):**
 - Led a cross-site team (including University of Washington) to develop novel ultrasound bleed detection and localization algorithms based on 3D-spatial acoustic data for use in battlefield trauma.
 - Developed machine classification algorithms to discriminate bleeds from normal physiological blood flow using spectral signatures from backscattered ultrasound. The information was used to localize the bleeds for subsequent therapy using higher intensity ultrasound.
 - Technology developed was successfully demonstrated at an independent blind test at Stanford University designed by the United States DoD DARPA (funding agency for the project).
- **Development of a predictive image-based model to monitor RF Ablation therapies for treating liver tumors:**
 - Implemented a predictive model based on ultrasound image data to estimate the size of the ablated treatment zone.
 - Developed multi-physics simulation models to simulate energy deposition due to RF and ultrasonic energy sources, and heat transfer in heterogeneous media. Implemented an iterative model-based parameter estimation technique by coupling experimental data with multi-physics simulations implemented in MATLAB and COMSOL.
 - Developed acoustic signal processing (time-frequency analysis, matched filter, block matching/cross-correlation analysis) and data analysis techniques to perform noninvasive temperature measurements *in situ* using acoustic backscatter by tracking changes in echo arrival times.
 - Designed and implemented a real-time signal processing technique to measure mechanical properties (stiffness) of heterogeneous media by tracking shear-wave propagation arrival times using ultrasound data.
- **Automated sleep apnea detection using ECG-derived respiration signals**
 - Developed a novel machine learning algorithm (employing shallow neural networks) to detect apneic episodes during polysomnography tests based on analysis and classification of ECG-derived respiration signals. The clinical motivation was to replace expensive overnight polysomnography tests with commonly measured ECG signals.
 - The algorithms were successfully evaluated on data collected during overnight polysomnography tests and compared with the ground truth measurements. An overall accuracy of ~85% was achieved.
- **Operational analytics on system log files acquired from clinical ultrasound scanners**
 - Implemented a Tableau-based data analytics tool to import log files for exploratory and predictive analysis
 - Developed algorithms using MATLAB data analytics toolbox to extract quantitative metrics for clinically relevant parameters such as mean exam time, case mix, transducer selection, and use of advanced features.
 - The algorithms were implemented to develop real-time dashboards to provide operational

data to hospital administrative staff for optimization and efficiency tracking.

PATENTS ISSUED AND PENDING

1. US10856839, “*Scanning to identify and delimit stationary fluid pools*”,12/8/2020
2. US10849679, “*Heat sink parameter determination apparatus*”,12/1/2020
3. US10813624, “*Ultrasound display method*”,10/27/2020
4. US10786223, “*Method and apparatus for automated ultrasonic doppler angle and flow velocity estimation*”,9/29/2020
5. US10702248, “*Ultrasound acquisition feedback guidance to a target view*”,7/7/2020
6. US10660615, “*Patient-specific ultrasound thermal strain-to-temperature calibration*”,5/26/2020
7. US10359323B2, “*Temperature distribution determining apparatus*”,7/23/2019
8. US10304226, “*Ultrasound Focal Zone System And Method*”,5/28/2019
9. US10231694, “*Automatic Blood Vessel Identification By Name*”,3/19/2019
10. US20190000415, “*Ultrasound System And Method For Acquisition Parameter Determination*”,1/3/2019
11. WO2017109080A1, “*Multi-Site Continuous Ultrasonic Flow Measurement For Blood Flow Management*”,12/27/2018
12. US20180271577A1, “*System And Method For Adaptive Ablation And Therapy Based On Elastography Monitoring*”,9/27/2018
13. US10076310, “*Method And Device For Detecting Occlusion/Reopening Of An Artery And System For Measuring Systolic Blood Pressure*”,9/18/2018
14. US20180206820, “*Ultrasound Apparatus And Method*”,7/26/2018
15. US10004479B2, “*Temperature distribution determining apparatus*”,6/26/2018
16. US20180168552, “*Calibration Of Ultrasonic Elasticity-Based Lesion-Border Mapping*”,6/21/2018
17. US20180049720, “*Ultrasound Beamforming System And Method*”,2/22/2018
18. US20180042578, “*Automated Ultrasound Image Measurement System And Method*”,2/15/2018
19. US20170372019, “*Ultrasound System And Method*”,12/28/2017
20. US20170360407, “*Patient- Specific Ultrasound Thermal Strain-To-Temperature Calibration*”,12/21/2017
21. US20170347993, “*System And Method For Ultrasound Customization*”,12/7/2017
22. US20170347992, “*Automated Region Of Interest Placement*”,12/7/2017
23. US20170007175A1, “*A normalized-displacement-difference-based approach for thermal lesion size control*”,6/1/2017
24. US20170119352, “*Ultrasound Display Method*”,5/4/2017
25. BR112014006480A2, “*Ultrasound Device And Computer Readable Medium For An Ultrasound Imaging Device*”,3/28/2017
26. US20170079625, “*Motion Gated-Ultrasound Thermometry Using Adaptive Frame Selection*”,3/23/2017
27. US20170071468, “*Motion Tracking Method For Sonographer*”,3/16/2017
28. US9579078B2, “*Excitation schemes for low-cost transducer arrays*”,2/28/2017
29. US20160345839, “*Temperature Distribution Determination Apparatus*”,12/1/2016

30. US20160346031, "*Heat Sink Parameter Determination Apparatus*",12/1/2016
31. BR112013014560A2, "*Monitoring For Postpartum Hemorrhage*",9/20/2016
32. US20160242838, "*Temperature Monitoring Apparatus And Method For Monitoring A Temperature Within A Tissue*",8/25/2016
33. US20160151038A1, "*A Method For Aligning Spatially Different Subvolumes Of Vascular Ultrasound Data*",8/25/2016
34. US9420988, "*Systems And Methods For Tracking And Guiding High Intensity Focused Ultrasound Beams*",8/23/2016
35. US9399148, "*MR Imaging Guided Theraphy*",7/26/2016
36. US20160157826, "*Non-Imaging Two Dimensional Array Probe And System For Automated Screening Of Carotid Stenosis*",6/9/2016
37. US20160157814, "*Non-Imaging Two Dimensional Array Probe And System For Classifying Carotid Stenosis*",6/9/2016
38. US9351708, "*Automated Doppler Velocimetry Using A Low-Cost Transducer*",5/31/2016
39. US20160143627, "*Ultrasound Acquisition Feedback Guidance To A Target View*",5/26/2016
40. US20140350405, "*System And Method For Identifying High Risk Pregnancies*",11/27/2014
41. US8867811B2, "*MR imaging guided therapy*",10/21/2014
42. US20140228688, "*Method And Apparatus For Automated Ultrasonic Doppler Angle And Flow Velocity Estimation*",8/14/2014
43. US20130096597, "*Real-Time Monitoring And Control Of HIFU Therapy In Multiple Dimensions*",4/18/2013
44. WO2013014647A1, "*Ultrasound Probe, Method And Device For Acquiring A Blood Flow Signal Of An Artery And System For Measuring Systolic Blood Pressure*",1/31/2013
45. US 8328721, "*Determination Of Optical Absorption Coefficients*",9/5/2012
46. US8016757B2, "*Non-invasive temperature estimation technique for HIFU therapy monitoring using backscattered ultrasound*",9/13/2011
47. US20110208055, "*Method And System For Ultrasound Therapy*",8/25/2011

TEACHING / ACADEMIC ADVISING / MENTORSHIP EXPERIENCE

- Courses Taught:
 - Data Science Capstone (Lead Instructor and Course director): *Fall 2017, Spring 2018, Fall 2018, Spring 2019, Fall 2019, Spring 2020, Fall 2020, Spring 2021*
 - Time series Analysis and Forecasting for Data Science (Developed the course and offered for the first time): *Fall 2019, Fall 2020*
 - Introduction to Data Science: *Summer 2020*
 - Data Mining: *Spring 2018, Fall 2018* (Taught select lectures/assigned modules)
 - Introduction to Ultrasound Imaging (Invited lecture series at Carestream Health): *Summer 2016* (Content of the course focused on providing a system level introduction to ultrasound imaging)
- Conducted multiple independent study projects with graduate students in data science and TEAM (Simon/Hajim) program- one leading to NSF ICORPS grant for studying "Passenger Traffic Analytics for Regional Airports"
- Faculty advisor for average of 15 students in graduate and undergraduate program in

data science each semester

- Wrote recommendation letters for average 8 students per year in 2018, 2019 for admission to national graduate programs in computer science, business analytics, and data science
- Advised 5 graduate students during their industry internship at Philips Research
- Co-authored multiple publications with undergraduate students at University of Washington

TEACHING SERVICE/OUTREACH ACTIVITIES

- Developed a new Advanced Certificate Program in Data Science. Worked with faculty in Computer Science and Statistics department to define the curriculum and coordinated with senior university administrators to secure New York state approval.
- Developed and implemented a new week-long “Introduction to Data Science” course for high-school students admitted via the Hajim Engineering Pre-College program - Summer 2018, 2019 (<http://www.sas.rochester.edu/dsc/news/2018/2018-07-30-high-school-students.html>)
- Served as curriculum committee member on the International Data Science for Schools Project (IDSSP) aimed at building curriculum frameworks comprising computer science and statistics faculty worldwide. Authored modules on unsupervised learning, and image data representations.

SELECT JOURNAL PUBLICATIONS AND CONFERENCE PROCEEDINGS

1. Erika Ramsdale, Eric Snyder, Eva Culakova, Huiwen Xu, Adam Dziorny, Shuhan Yang, Martin Zand, **A. Anand**, “*An introduction to machine learning for clinicians: How can machine learning augment knowledge in geriatric oncology?*”, Journal of Geriatric Oncology (In Press), March, 2021
2. Aaron B. Wagner, Elaine L. Hill, Sean E. Ryan, Ziteng Sun, Grace Deng, Sourbh Bhadane, Victor Hernandez Martinez, Peter Wu, Dongmei Li, **A. Anand**, Jayadev Acharya, David S. Matteson, “*Social distancing merely stabilized COVID-19 in the United States*”, 2020, Stat, Volume 9, Issue 1.
3. N. Patil, **A. Anand**, “*Automated Ultrasound Doppler Angle Estimation Using Deep Learning*”, IEEE Engineering in Medicine and Biology Conference (EMBC), Berlin, Germany, July 2019.
4. S. S. George, J. Mitrovic, **A. Anand** and Z. Ignjatovic, “*Low-complexity compressive beamforming for portable ultrasound imaging*,” 2017 IEEE International Ultrasonics Symposium (IUS), Washington, DC, 2017, pp. 1-4.
5. **A. Anand**, “*Touch Prime: Advanced ultrasound imaging with an extraordinary user experience*”, Technical Whitepaper, July 2015
6. W. Shi, A. Anand, S. Sethuraman, S. W. Huang, H. Xie, H. Agarwal, P. Yan, J. Azevedo, J. Kruecker, G. Ng, V. Shamdasani, W. Pritchard, J. Karanian, B. Wood, “*Monitoring of*

- radiofrequency ablation with shear wave delay mapping*”, Ultrasonics Symposium (IUS), 2015 IEEE International, Taipei, 2015, pp. 1-4.
7. **Anand, A.**, S. Zhou, J. Petruzzello, L. Gupta, R. Sisodia, P. Vajinepalli, G. Ramachandran, and C. Firtion, “*Novel Doppler Ultrasound Device for Pregnancy Monitoring in Low-Resource Settings*”, Invited talk in American Institute of Ultrasound in Medicine. 2014.
 8. Sethuraman, S., **A. Anand**, and J. Li, *Integrated ultrasound thermometry and multiphysics modeling for liver RF ablation monitoring: Ex vivo studies*. Ultrasonics Symposium (IUS), 2014 IEEE International, 2014: p. 1650-1653.
 9. Petruzzello, J., **A. Anand**, S. Zhou, S. Sethuraman, and J. Azevedo, *Two-dimensional real-time ultrasound technique to control lesion size during high intensity focused ultrasound therapy*. The Journal of the Acoustical Society of America, 2011. 129(4): p. 2437-2437.
 10. Kaczkowski, P.J., G. Speyer, A.A. Brayman, L.A. Crum, and **A. Anand**, *Heat diffusion constrained inversion of backscattered ultrasound data to image temperature rise during high intensity focused ultrasound therapy*. The Journal of the Acoustical Society of America, 2011. 129(4): p. 2439-2439.
 11. Zhou, S., J. Petruzzello, **A. Anand**, S. Sethuraman, and J. Azevedo, *Validating Ultrasound-based HIFU Lesion-size Monitoring Technique with MR Thermometry and Histology*. 9TH INTERNATIONAL SYMPOSIUM ON THERAPEUTIC ULTRASOUND: ISTU—2009, 2010. 1215(1): p. 53-56.
 12. **Anand, A.**, J. Petruzzello, S. Zhou, S. Sethuraman, and J. Azevedo, *Two-Dimensional Real-time Ultrasound Technique to Control Lesion Size during HIFU Therapy*. 9th International Symposium on Therapeutic Ultrasound: ISTU—2009, 2010. 1215(1): p. 79-82.
 13. **Anand, A.**, B.I. Raju, S. Sethuraman, and S. Sokka, *Transrectal Array Configurations Optimized For Prostate HIFU Ablation*. 8th International Symposium On Therapeutic Ultrasound, 2009. 1113(1): p. 200-204.
 14. **Anand, A.** and P.J. Kaczkowski, *Noninvasive Determination of in situ Heating Rate Using kHz Acoustic Emissions and Focused Ultrasound*. Ultrasound in medicine & biology, 2009. 35(10): p. 1662-1671.
 15. **Anand, A.** and P.J. Kaczkowski, *Noninvasive measurement of local thermal diffusivity using backscattered ultrasound and focused ultrasound heating*. Ultrasound in medicine & biology, 2008. 34(9): p. 1449-1464.
 16. **Anand, A.**, D. Savery, and C. Hall, *Three-dimensional spatial and temporal temperature imaging in gel phantoms using backscattered ultrasound*. Ultrasonics, Ferroelectrics and Frequency Control, IEEE Transactions on, 2007. 54(1): p. 23-31.
 17. **Anand, A.**, J. Petruzzello, S. Yin, B. Dunmire, J. Kucewicz, and S. Vaezy, *Noninvasive Bleeding Detection and Localization Using Three Dimensional Doppler Ultrasound*. Ultrasonics Symposium, 2007. IEEE, 2007: p. 1297-1300.
 18. Kaczkowski, P., M. Bailey, L. Crum, V. Khokhlova, and **A. Anand**, *Microbubble cavitation, boiling, and nonlinear acoustic propagation in high-intensity focused ultrasound thermal therapy*. The Journal of the Acoustical Society of America, 2006. 119(5): p. 3211-3211.
 19. **Anand, A.**, D. Savéry, and C.S. Hall, *Ultrasonic determination of three-dimensional spatial and temporal thermal distribution for therapy monitoring*. Acoustics, Speech and Signal

- Processing, 2006. ICASSP 2006 Proceedings. 2006 IEEE International Conference on, 2006. 2: p. II-II.
20. **Anand, A.**, D. Savery, and C. Hall, *Ultrasonic Spatial and Temporal Determination of Heat Deposition in Three Dimensions*. Ultrasonics Symposium, 2006. IEEE, 2006: p. 1758-1761.
 21. Kaczkowski, P.J., **A. Anand**, and M.R. Bailey, *Processing ultrasound backscatter to monitor high-intensity focused ultrasound (HIFU) therapy*. The Journal of the Acoustical Society of America, 2005. 118(3): p. 1876-1876.
 22. Kaczkowski, P.J. and **A. Anand**, *Bioheat Transfer Model (BHTE) based temperature estimation technique for high intensity focused ultrasound therapy monitoring*. The Journal of the Acoustical Society of America, 2005. 117(4): p. 2444-2444.
 23. Kaczkowski, P.J. and **A. Anand**, *Monitoring high-intensity focused ultrasound (HIFU) therapy using radio frequency ultrasound backscatter to quantify heating*. The Journal of the Acoustical Society of America, 2005. 118(3): p. 1882-1882.
 24. **Anand, A.** and P. Kaczkowski, *Non-invasive measurement of in situ thermal diffusivity and local heat source using backscattered ultrasound for thermal therapy planning and monitoring*. The Journal of the Acoustical Society of America, 2005. 117(4): p. 2445-2445.
 25. Kaczkowski, P.J. and **A. Anand**, *Temperature rise measured noninvasively during thermal therapy using backscattered ultrasound*. Ultrasonics Symposium, 2004 IEEE, 2004. 1: p. 720- 723.
 26. **Anand, A.** and P.J. Kaczkowski, *A model-based noninvasive temperature estimation technique for monitoring HIFU therapy using backscattered ultrasound*. The Journal of the Acoustical Society of America, 2004. 115(5): p. 2490-2490.
 27. **Anand, A.** and P.J. Kaczkowski, *Monitoring formation of high intensity focused ultrasound (HIFU) induced lesions using backscattered ultrasound*. Acoustics Research Letters Online, 2004. 5(3): p. 88-94.
 28. **Anand, A.**, L. Byrd, and P.J. Kaczkowski, *In situ thermal parameter estimation for HIFU therapy planning and treatment monitoring*. Ultrasonics Symposium, 2004 IEEE, 2004. 1: p. 137-140.
 29. Reed, J., M. Bailey, **A. Anand**, and P. Kaczkowski, *Separating thermal coagulation and cavitation effects in HIFU attenuation measurements*. The Journal of the Acoustical Society of America, 2003. 114(4): p. 2347-2347.
 30. Bailey, M.R., J.A. Reed, **A. Anand**, P.J. Kaczkowski, W. Kreider, S. Vaezy, and M. Nakazawa, *Cavitation detection and suppression in HIFU*. Proceedings of the 3rd International Symposium on Therapeutic Ultrasound, 2003: p. 43-48.
 31. **Anand, A.**, P.J. Kaczkowski, R.E. Daigle, L. Huang, M. Paun, K.W. Beach, and L.A. Crum, *Using the ATL HDI 1000 to collect demodulated RF data for monitoring HIFU lesion formation*. Medical Imaging 2003, 2003: p. 316-326.
 32. **Anand, A.** and P.J. Kaczkowski, *Monitoring evolution of HIFU-induced lesions with backscattered ultrasound*. The Journal of the Acoustical Society of America, 2003. 113(4): p. 2310-2310.
 33. Bailey, M.R., S. Vaezy, J.C. Yuen, **A. Anand**, N.A. Miller, P.J. Kaczkowski, and L.A. Crum, *Bubbles and acoustic image-guided high intensity focused ultrasound*. The Journal

of the Acoustical Society of America, 2001. 110(5): p. 2643-2643.

FUNDING SOURCES AND SUPPORT

2020/04/01-2023/03/31

Renewal of NSF REU Site: Computational Methods for Understanding Music, Media, and Minds, NSF # 1950460 (Funding: \$405,000)

Lead Principal Investigator/ Site Director

2019/09/15-2022/08/31

NSF-TRIPODS Grant for Data Science

(Funding: \$274,767.00)

Senior Personnel

2018/01/01-2020/03/01

NSF REU Site: Computational Methods for Understanding Music, Media, and Minds, NSF # 1659250 (Funding: \$323,950)

Lead Principal Investigator/ Site Director

2015/09/01-2020/03/31

NRT-DESE: Graduate Training in Data-Enabled Research into Human Behavior and its Cognitive and Neural Mechanisms

Funding: \$2,965,341.00

Co-PI

2019/01/01-2019/05/31

NSF I-Corps Site Award: Passenger Traffic Flow Analytics for Regional Airports: Customer Discovery (Funding: \$3000)

Lead Principal Investigator/ Entrepreneurial Lead

2018/08/01-2019/05/31

Sykes Teaching Award for undergraduate course development: *Sensor-based Data Science* (Funding: \$3000)

Lead Instructor

2012/01/01-2016/01/01

Philips Corporate Research Award (total funding >\$2M cumulative)

Principal Investigator and Project Leader

Research Title: Ultrasound-based real time ablation monitoring