

CURRICULUM VITAE  
The Johns Hopkins University School of Medicine

23 July 2023

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Amir Manbachi, Ph.D.

## DEMOGRAPHIC AND PERSONAL INFORMATION

### Current Appointments

- 2019-present Assistant Professor, Department of Neurosurgery, Johns Hopkins University SOM
- 2019-present Assistant Professor, Department of Biomedical Engineering, Johns Hopkins University SOM
- 2021-present Assistant Professor, Department of Electrical and Computer Engineering, Johns Hopkins University
- 2021-present Assistant Professor, Department of Mechanical Engineering, Johns Hopkins University
- 2021-present Assistant Professor, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University SOM
- 2020-present Co-founder and Director, Johns Hopkins HEPIUS Innovation Lab

### Personal Data

Business Address            Johns Hopkins HEPIUS Innovation Lab  
5210 Eastern Ave, Alpha Center, Rm. 115  
Johns Hopkins Bayview Campus  
Baltimore, MD 21224  
Tel: 410-550-5562 (office manager: Geltrouda Demczuk)  
410-550-4265 (laboratory manager: Constantin Smit)  
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E-mail: [Amir.Manbachi@jhu.edu](mailto:Amir.Manbachi@jhu.edu)

### Education and Training

#### Undergraduate

- 2008 Bachelor of Applied Science and Engineering, Engineering Science (Electrical Engineering stream), University of Toronto, Toronto, Canada

#### Doctoral/Graduate

- 2010 Master of Applied Science and Engineering, Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, Canada
- 2015 Doctor of Philosophy, Institute of Biomaterials and Biomedical Engineering (Clinical Engineering stream), University of Toronto, Toronto, Canada

#### Postdoctoral

- 2015-2016 Postdoctoral Fellow, Harvard-MIT Division of Health Sciences and Technology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA
- 2020 Johns Hopkins Office of Faculty Development (OFD)'s Junior Faculty Leadership Program (JFLP)

### Professional Experience

- 1998-2011 Co-founder and Musician, Chakavak Ensemble, Toronto, Canada
- 2006 Summer Research Assistant, Institute for Biomaterials and Biomedical Engineering, University of Toronto, Toronto, Canada
- 2007 Summer Research Assistant, Harvard Medical School, Boston, MA
- 2007-2008 Undergraduate Researcher, Institute for Biomaterials and Biomedical Engineering, University of Toronto, Toronto, Canada
- 2012 Research and Development Intern, Stryker Navigation, Freiburg, Baden-Württemberg, Germany
- 2013-2015 CEO and Founder, Spinesonics Medical Inc., Toronto, Canada
- 2016-2017 Research Associate, Department of Biomedical Engineering, Johns Hopkins University School of Medicine
- 2016-2017 Director of Innovations, Carnegie Center for Surgical Innovations, Johns Hopkins University
- 2017-2018 Lecturer, Department of Biomedical Engineering, Johns Hopkins University
- 2018-2019 Assistant Research Professor, Department of Biomedical Engineering, Johns Hopkins University

## PUBLICATIONS

### Original Research [OR]

1. Chung BG, **Manbachi A**, Khademhosseini A. A microfluidic device with groove patterns for studying cellular behavior. *J Vis Exp.* 2007;7:270. Role: data acquisition; led experimental setup
2. Chung BG, **Manbachi A**, Saadi W, Lin F, Jeon NL, Khademhosseini A. A gradient-generating microfluidic device for cell biology. *J Vis Exp.* 2007;7:271. Role: data acquisition; led experimental setup
3. **Manbachi A**, Shrivastava S, Cioffi M, Chung BG, Moretti M, Demirci U, Yliperttula M, Khademhosseini A. Microcirculation within grooved substrates regulates cell positioning and cell docking inside microfluidic channels. *Lab Chip.* 2008;8(5):747-54.
4. Cioffi M, Moretti M, **Manbachi A**, Chung BG, Khademhosseini A, Dubini G. A computational and experimental study inside microfluidic systems: the role of shear stress and flow recirculation in cell docking. *Biomed Microdevices.* 2010;12(4):619-26. Role: data acquisition; led experimental setup
5. **Manbachi A**, Hoi Y, Wasserman BA, Lakatta EG, Steinman DA. On the shape of the common carotid artery, with implications for blood velocity profiles. *Physiol Meas.* 2011;32(12):1885-97.
6. **Manbachi A**, Cobbold RSC. Development and application of piezoelectric materials for ultrasound generation and detection. *Ultrasound.* 2011;19(4):187-196.
7. Lashkari B, **Manbachi A**, Mandelis A, Cobbold RSC. Slow and fast ultrasonic wave separation improvement in human trabecular bones using Golay code modulation. *JASA.* 2012;132(3):EL222-8. Role: data acquisition; modeling; writing of manuscript
8. Gdyczynski C§, **Manbachi A**§, Hashemi M, Lashkari B, Cobbold RSC. On estimating the directionality distribution in pedicle trabecular bone from micro-CT images. *Physiol Meas.* 2014;35(12):2415-2428. §Authors contributed equally.
9. **Manbachi A**, Ginsberg HJ, Cobbold RSC. Guided pedicle screw insertion: techniques and training. *Spine J.* 2014;14(1):165-79.
10. Zhang YS§, Davoudi F§, Walch P§, **Manbachi A**§, Luo X, Dell'Erba V, Miri AK, Albadawi H, Arneri A, Dokmerci MR, Khademhosseini A, Oklu R. Bioprinted thrombosis-on-a-chip. *Lab Chip.* 2016;16:4097-4105. §Authors contributed equally.
11. Naseer, S§, **Manbachi A**§, Samandari M§, Walch P, Gao Y, Zhang YS, Davoudi F, Wang W, Cooper J, Khademhosseini, A, Shin SR. Surface acoustic waves induced micropatterning of cells in gelatin methacryloyl (GelMA) hydrogels. *Biofabrication.* 2017;9(1):015020. §Authors contributed equally.
12. Goerres J, Uneri A, Jacobson M, Ramsay B, De Silva T, Ketcha M, Han R, **Manbachi A**, Vogt S, Kleinszig G, Wolinsky JP, Osgood G, Siewerdsen JH. Planning, guidance, and quality assurance of pelvic screw placement using deformable image registration. *Phys Med Biol.* 2017;62(23):9018. Role: study design; edited manuscript
13. Brown A, Uneri A, De Silva T, **Manbachi A**, Siewerdsen JH. Design and validation of an open-source library of dynamic reference frames for research and education in optical tracking. *J Med Imag.* 2018;5(2):021215. Role: Mentored author underlined above
14. De Silva T, Punnoose J, Uneri A, Mahesh M, Goerres J, Jacobson MW, Ketcha MD, **Manbachi A**, Vogt S, Kleinszig G, Khanna A, Wolinsky JP, Siewerdsen JH, Osgood G. Virtual fluoroscopy for intraoperative C-arm positioning and radiation dose reduction. *J Med Imag.* 2018;5(1):015005. Role: study design; data acquisition
15. Jacobson MW, Ketcha MD, Ouadah S, Martin A, Uneri A, Goerres J, De Silva T, Reangamornrat S, Han R, **Manbachi A**, Stayman JW, Vogt S, Kleinszig G, Siewerdsen JH. A line fiducial method for geometric calibration of cone-beam CT systems with diverse scan trajectories. *Phys Med Biol.* 2018;63(2):025030. Role: study design; edited manuscript
16. Miri AK, Nieto D, Iglesias L, Goodarzi Hosseinabadi H, Maharjan S, Ruiz-Esparza GU, Khoshakhlagh P, **Manbachi A**, Dokmeci MR, Chen S, Shin SR, Zhang YS, Khademhosseini A. Microfluidics-enabled multimaterial maskless stereolithographic bioprinting. *Adv Mater.* 2018;30(27):e1800242. Role: study design, supported data acquisition and edited manuscript
17. **Manbachi A**, De Silva T, Uneri A, Jacobson M, Goerres J, Ketcha M, Han R, Aygun N, Thompson D, Ye X, Vogt S, Kleinszig G, Molina C, Garzon-Muvdi T, Raber MR, Groves M, Wolinsky JP, Siewerdsen JH. Clinical translation of the LevelCheck algorithm for automatic localization of target vertebrae in spine surgery. *Ann Biomed Eng.* 2018;46:1548. Role: data acquisition; wrote manuscript
18. Belzberg M, Chavez F, Xiong KT, Morrison K, Gamo NJ, Restaino S, Iyer R, Groves M, Thakor N, Brem H, Cohen AR, **Manbachi A**. Minimally invasive intraventricular ultrasound: design and instrumentation towards a miniaturized ultrasound-guided focused ultrasound probe, *Proc. SPIE 10951, Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling*, 109512Y (8 March 2019). Role: obtained funding for the project; study design; mentored the first author on all aspects of the study; co-wrote the manuscript

19. Belzberg M, Shalom NB, Yuhanna E, **Manbachi A**, Tekes A, Huang J, Brem H, Gordon CR. Sonolucent cranial implants: cadaveric study and clinical findings supporting diagnostic and therapeutic transcranioplasty ultrasound. *J Craniofac Surg*. 2019 Jul;30(5):1456-1461. Role: study design; mentored the first author on the ultrasound aspects of the study; edited the manuscript
20. Belzberg M, Ben-Shalom N, Lu A, Yuhanna E, **Manbachi A**, Tekes A, Huang J, Brem H, Gordon CR. Transcranioplasty ultrasound (TCU) through a sonolucent cranial implant made of poly-methyl methacrylate (PMMA): phantom study comparing ultrasound, CT and MRI. *J Craniofac Surg* 2019. 2019 Oct;30(7):e626-e629. Role: study design; mentored the first author on the ultrasound aspects of the study; edited the manuscript.
21. Berges AJ, Callanan M, Zawicki V, Shi R, Athey T, Ayyappan V, Metzger S, Farrell A, **Manbachi A**, Harvey S, Durr NJ. A novel intermediate attachment to reduce contamination in reusable core needle biopsy devices. *ASME. J. Med. Devices*. 2020;1:MED-19-1131. Role: instructor of the engineering capstone design course; mentored the student team over two years and guided them through the process of data acquisition and writing
22. Hu K, Lapinski MM, Mischler G, Allen RH, **Manbachi A**, Seay RC. Improved treatment of postpartum hemorrhage: design, development, and bench-top validation of a reusable intrauterine tamponade device for low-resource settings. *ASME. J. Med. Devices*. March 2020;14(1):014503. Role: instructor of the engineering capstone design course; mentored the students over two years and guided them through the process of data acquisition and writing. Acted as the senior engineering author; last author is a clinician.
23. Perdomo-Pantoja A, Chara A, Kalb S, Casaos J, Ahmed AK, Pennington Z, Cottrill E, Shah S, Jiang B, **Manbachi A**, Zygorakis C, Witham TF, Theodore N. The effect of renin-angiotensin system blockers on spinal cord dysfunction and imaging features of spinal cord compression in patients with symptomatic cervical spondylosis. *Spine Journal*. 2020 Apr;20(4):519-529. Role: provided support for image analysis and statistical studies
24. Jiang B, Pennington Z, Zhu A, Matsoukas S, Ahmed A, Ehresman J, Mahapatra S, Cottrill E, Sheppell H, **Manbachi A**, Crawford N, Theodore N. Three-dimensional assessment of robot-assisted pedicle screw placement accuracy and instrumentation reliability based on a preplanned trajectory. *J Neurosurg Spine*. 2020;1-10. Role: mentored authors underlined above on their engineering contribution to the 3D accuracy analysis
25. Luciano MG, Dombrowski SM, El-Khoury S, Yang J, Thyagaraj S, Qvarlander S, Khalid S, Suk I, **Manbachi A\***, Loth F\*. Epidural oscillating cardiac-gated intracranial implant modulates cerebral blood flow. *Neurosurgery*. 2020;87(6):1299-310.\*Contributed equally as senior authors. Role: contributed to data analysis and wrote the entire manuscript
26. Yan J, Chaurasia A, Takasuka H, Jithendra A, State C, McCarren K, Li R, Bender E, Hill M, Benassi T, Oni J, **Manbachi A**. Infrared image-guidance for intraoperative assessment of limb length discrepancy during total hip arthroplasty procedures. *Proc. SPIE 11315, Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling*, 113150D (16 March 2020). Role: provided weekly mentorship to a group of 8 engineering students on their capstone design project. Co-advised the team alongside Dr. Julius Oni, the clinical senior author (orthopedic surgery, JHH)
27. Kenet A, Mahadevan E, Elangovan S, Yan J, Siddiq K, Liu S, Ladwa A, Narayanan R, Dakkak J, Benassi T, Ng K, **Manbachi A**. Flexible piezoelectric sensor for real-time image-guided colonoscopies: a solution to endoscopic looping challenges in clinic. *Proc. SPIE 11315, Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling*, 1131520 (16 March 2020). Role: Provided weekly mentorship to a group of 8 engineering students on their capstone design project. Co-advised the team alongside Dr. Kenneth Ng, the clinical senior author (pediatrics endoscopy, JHH)
28. **Manbachi A**, Kambhampati S, Ainechi AM, Mahapatra S, Belzberg M, Ying G, Chai R, Zhang YS, Gorelick N, Pennington Z, Westbroek E, Jiang B, Hwang B, Benassi T, Coles G, Tyler B, Suk I, Yazdi Y, Theodore N. Intraoperative ultrasound to monitor spinal cord blood flow after spinal cord injury. *Proc. SPIE 11317, Medical Imaging 2020: Biomedical Applications in Molecular, Structural, and Functional Imaging*, 113170B (28 February 2020). Role: Wrote the entire manuscript, provided routine mentorship to authors underlined above. Co-advised the team alongside Dr. Nicholas Theodore, the clinical senior author (neurosurgery spine division, JHH)
29. Bechtold R, Tselepidakis N, Garlow B, Glaister S, Zhu W, Liu R, Szwec A, Tandon A, Buono Z, Pitingolo J, Madalo C, Ferrara I, Shale C, Benassi T, Belzberg M, Gorelick N, Hwang B, Molina CA, Coles G, Tyler B, Suk I, Huang J, Brem H, **Manbachi A**. Minimizing cotton retention in neurosurgical procedures: which imaging modality can help? *Proc. SPIE 11317, Medical Imaging 2020: Biomedical Applications in Molecular, Structural, and Functional Imaging*, 1131704 (28 February 2020). Role: Provided weekly mentorship to a group of 12 engineering students on their capstone design project. Co-advised the team alongside Dr. Judy Huang and Dr. Henry Brem (Neurosurgery, JHH)
30. Belzberg M, Mahapatra S, Chavez F, Morrison K, Xiong KT, Gamo NJ, Restaino S, Iyer R, Groves M, Thakor N, Theodore N, Luciano MG, Brem H, Cohen AR, **Manbachi A**. Toward minimally invasive therapeutic ultrasound: ultrasound-guided ablation in neuro-oncology. *bioRxiv* 2020.04.25.061788. Role: Ideation, study

design, experimental verification and manuscript writeup. Provided routine mentorship to authors underlined above.

31. Belzberg M, Mahapatra S, Perdomo-Pantoja A, Chavez Francisco, Morrison K, Xiong KT, Gamo NJ, Restaino S, Thakor N, Yazdi Y, Iyer R, Tyler B, Theodore N, Luciano MG, Brem H, Groves M, Cohen AR, **Manbachi A**. Minimally invasive therapeutic ultrasound: ultrasound-guided ultrasound ablation in neuro-oncology. *Ultrasonics*. 2020;108(12):106210. Role: Ideation, study design, experimental verification, and manuscript writeup. Provided routine mentorship to authors underlined above.
32. Kim JH, Um R, Liu J, Patel J, Curry EJ, Aghabaglou F, Mahapatra S, Ainechi A, Tsehay Y, Ehresman J, Hwang B, Tyler B, Iyer R, Theodore N, **Manbachi A**. Development of a Smart Hospital Assistant: integrating artificial intelligence and a voice-user interface for improved surgical outcomes. *Proc. SPIE 11601, Medical Imaging 2021: Imaging Informatics for Healthcare, Research, and Applications, 116010U* (15 February 2021). Role: Ideation, study design, experimental verification, and manuscript writeup. Provided routine mentorship to authors underlined above.
33. Mahapatra S, Balamurugan M, Chung K, Kuppoor V, Curry EJ, Aghabaglou F, Kaovasia TP, Acord M, Ainechi A, Kim JH, Tsehay Y, Ghinda CD, Son JK, Pustavoitau A, Tyler B, Theodore N, Brem H, Huang J, **Manbachi A**. Automatic detection of cotton balls during brain surgery: where deep learning meets ultrasound imaging to tackle foreign objects. *Proc. SPIE 11602, Medical Imaging 2021: Ultrasonic Imaging and Tomography, 116021C* (15 February 2021). Role: Ideation, study design, experimental verification, and manuscript writeup. Provided routine mentorship to authors underlined above.
34. Aghabaglou F, Ainechi A, Abramson H, Curry EJ, Kaovasia TP, Kamal S, Acord M, Mahapatra S, Pustavoitau A, Smith B, Azadi J, Son JK, Suk I, Theodore N, Tyler BM, **Manbachi A**. Ultrasound monitoring of microcirculation: an original study from the laboratory bench to the clinic. *Microcirculation* (New York, NY: 1994) 2022 May 24:e12770. <https://doi.org/10.1111/micc.12770> Role: Ideation, study design, experimental verification, and manuscript writeup. Provided routine mentorship to authors underlined above.  
Note: The publisher (Wiley) featured our study using their short 1-min video abstract and cover image.
35. Abramson HG, Curry EJ, Mess G, Thombre R, Kempski-Leadingham KM, Mistry S, Somanathan S, Roy L, Abu-Bonsrah N, Coles G, Doloff JC, Brem H, Theodore N, Huang J and **Manbachi A** (2022) Automatic detection of foreign body objects in neurosurgery using a deep learning approach on intraoperative ultrasound images: From animal models to first in-human testing. *Front. Surg.* 9:1040066. doi: 10.3389/fsurg.2022.1040066 Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
36. Tsehay Y, Zeng Y, Weber-Levine C, Awosika T, Kerensky M, Hersh AM, Ou Z, Jiang K, Bhimreddy M, Bauer SJ, Theodore JN, Quiroz VM, Suk I, Alomari S, Sun J, Tong S, Thakor NJ, Doloff JC, Theodore N, **Manbachi A**. (2023) Low-Intensity Pulsed Ultrasound Neuromodulation of a Rodent's Spinal Cord Suppresses Motor Evoked Potentials, *IEEE Transactions on Biomedical Engineering*, doi: 10.1109/TBME.2022.3233345. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects  
Note: The publisher featured this study on the cover of their journal.
37. Thombre R, Mess G, Kempski Leadingham KM, Kapoor S, Hersh A, Acord M, Kaovasia T, Theodore N, Tyler B and **Manbachi A** (2023) Towards standardization of the parameters for opening the blood–brain barrier with focused ultrasound to treat glioblastoma multiforme: A systematic review of the devices, animal models, and therapeutic compounds used in rodent tumor models. *Front. Oncol.* 12:1072780. doi: 10.3389/fonc.2022.1072780 Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
38. Mess G, Anderson T, Kapoor S, Thombre R, Liang R, Derin E, Kempski Leadingham KM, Yadav SK, Tyler B and **Manbachi A**. (2023) Sonodynamic Therapy for the Treatment of Glioblastoma Multiforme in a Mouse Model using a Portable Benchtop Focused Ultrasound System. *J. Vis. Exp.* (192), e65114, doi:10.3791/65114. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
39. Bhimreddy M, Routkevitch D, Hersh A, Mohammadabadi A, Menta AK, Jiang K, Weber-Levine C, Davidar D, Punnoose J, Kempski Leadingham KM, Doloff JC, Tyler B, Theodore N and **Manbachi A**. (2023) Disruption of the Blood-Spinal Cord Barrier using Low-Intensity Focused Ultrasound in a Rat Model. *J. Vis. Exp.* (193), e65113, doi:10.3791/65113. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
40. Liang R, Mess G, Punnoose J, Kempski Leadingham KM, Smit C, Thakor NV, Habela CW, Tyler B, Salimpour Y, and **Manbachi A**. (2023) Focused Ultrasound Neuromodulation of Human In Vitro Neural Cultures in Multi-well Microelectrode Arrays. Accepted in *J. Vis. Exp.* Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects.



## Review Articles [RA]

1. Yliperttula M, Chung BG, Navaladi A, **Manbachi A**, Urtti A. High-throughput screening of cell responses to biomaterials. *Eur J Pharm Sci.* 2008;35(3):151-60. Role: literature review; wrote manuscript
2. Zorlutuna P, Annabi N, Camci-Unal G, Nikkhah M, Cha JM, Nichol JW, **Manbachi A**, Bae H, Chen S, Khademhosseini A. Microfabricated biomaterials for engineering 3D tissues. *Advanced Materials.* 2012;24(14):1782-1804. Role: literature review; wrote manuscript
3. Yetisen AK, Qu H, **Manbachi A**, Butt H, Dokmeci MR, Hinestroza JP, Skorobogatiy M, Khademhosseini A, Yun SH. Nanotechnology in textiles. *ACS Nano.* 2016;10(3):3042-68. Role: Led two sections of article, including literature review and data acquisition; wrote manuscript
4. Ribas J, Sadeghi H, **Manbachi A**, Leijten J, Brinegar K, Zhang YS, Khademhosseini A. Cardiovascular organ-chip platforms for drug development. *Applied In-vitro Toxicology.* 2016;2(2):82-96. Role: Led two sections of article, including literature review, data acquisition, and writing of manuscript
5. **Manbachi A**, Kreamer-Tonin K, Walch P, Gamo NJ, Khoshakhlagh P, Zhang YS, Montague C, Acharya S, Logsdon EA, Allen RA, Durr NJ, Luciano MG, Theodore N, Brem H, Yazdi Y. Starting a medical technology venture as a young academic innovator or student entrepreneur. *Ann Biomed Eng.* 2018;46(1):1-13.
6. Hwang BY, Mampre D, Ahmed AK, Suk I, Anderson WS, **Manbachi A**, Theodore N. Ultrasound in traumatic spinal cord injury: a wide-open field. *Neurosurgery.* 2021;89(3):372-82. Role: Provided routine mentorship to author underlined above, and provided access and training to ultrasound related aspects
7. Tsehay Y, Weber-Levine C, Kim T, Chara A, Alomari S, Awosika T, Liu A, Ehresman J, Lehner K, Hwang B, Hersh AM, Suk I, Curry E, Aghabaglou F, Zeng Y, **Manbachi A**, Theodore N. Advances in monitoring for acute spinal cord injury: a narrative review of current literature. *Spine J.* 2022 Mar 26:S1529-9430(22)00139-5. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
8. Weber-Levine C, Hersh AM, Jiang K, Routkevitch D, Tsehay Y, Perdomo-Pantoja A, Judy BF, Kerensky M, Liu A, Adams M, Izzi J, Doloff JC, **Manbachi A**, and Theodore N. Porcine Model of Spinal Cord Injury: A Systematic Review. *Neurotrauma Reports.* Sep 2022.352-368. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
9. Hersh AM, Weber-Levine C, Jiang K, Young L, Kerensky M, Routkevitch D, Tsehay Y, Perdomo-Pantoja A, Judy BF, Lubelski D, Theodore N, and **Manbachi A**. Applications of elastography in operative neurosurgery: A systematic review. *J Clin Neurosci.* 2022 Aug 4;104:18-28. doi: 10.1016/j.jocn.2022.07.019. Epub ahead of print. PMID: 35933785. Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound and elastography related aspects
10. Hersh AM, Bhimreddy M, Weber-Levine C, Jiang K, Alomari S, Theodore N, **Manbachi A**, and Tyler BM. Applications of Focused Ultrasound for the Treatment of Glioblastoma: *A New Frontier.* *Cancers.* 2022; 14(19):4920. <https://doi.org/10.3390/cancers14194920> Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects
11. Thombre R, Mess G, Kempski Leadingham KM, Kapoor S, Hersh AM, Accord M, Kaovasia T, Theodore N, Tyler B, and **Manbachi A** (2023) Towards Standardization of the Parameters for Opening the Blood-Brain Barrier with Focused Ultrasound to Treat Glioblastoma Multiforme: A Systematic Review on the Devices, Animal Models, and Therapeutic Compounds used in Rodent Tumor Models. *Front. Oncol.* 12:1072780 doi: 10.3389/fonc.2022.1072780 Role: Provided routine mentorship to authors underlined above, and provided access and training to ultrasound related aspects

## Books, Textbooks [BK]

1. **Manbachi A**. Towards ultrasound-guided spinal fusion surgery. Springer Theses. 2016; <http://www.springer.com/us/book/9783319298313>.
2. **Manbachi A**, Suk I. Ultrasound for clinical innovation: beginner's guide to fundamental physics & medical ultrasound applications. 2021. eBook. <https://www.amazon.com/Ultrasound-Clinical-Innovation-Fundamental-Applications-ebook/dp/B0971WQY69>
3. **Manbachi A**. handbook for clinical ultrasound: beginner's guide to fundamental physics & medical ultrasound applications. 2021. Audio book. <https://www.amazon.com/Handbook-Clinical-Ultrasound-Fundamental-Applications/dp/B0983Z8JPX>
4. Kim JJH, Um R, Iyer RR, Theodore N, **Manbachi A**. Design and development of smart surgical assistant technologies: a case study for translational sciences. 2022. CRC Press. ISBN: 9781032168722. Note: An invited book, by Carolina Antunes, Physics Editor of CRC Press – Routledge – Taylor & Francis. <https://doi.org/10.1201/9781003253341>
5. **Manbachi A**, Kempfski Leadingham K, Curry EJ. The Abundant Promise of Ultrasound in Neurosurgery: A Broad Overview and Thoughts on Ethical Paths to Realizing Its Benefits. United States, SPIE Press, 2022. ISBN:

Published Curricula [PC], Learner Assessment Tools, Educational Evaluations, Assessment / Evaluation Instruments [PC]

1. Logsdon EA, Allen RA, Bigelow E, **Manbachi A**, Durr NJ. Curriculum to advance capstone design projects beyond the one year. Biomedical Engineering Society Annual meeting, Oct 2017.  
Role: taught the course while gathering data for future faculty discussions.
2. **Manbachi A**, Logsdon EA, Yazdi Y, Durr NJ. curricular advancement of biomedical engineering undergraduate design projects beyond 1 year: a pilot study. *Ann Biomed Eng.* 2019;s10439-019-02434-7  
Role: co-designed the curriculum for the reported course, taught the students, data analysis and independent manuscript writing.

Media Releases or Interviews [MR]

- 4/2012 Director's Notes, IBBME departmental Newsletter, Apr 11, 2012.
- 6/2012 "[Internship Guides IBBME Student in Translating Ideas Into Innovation.](#)"
- 8/2012 "Navigating the Curves: Student internship translates ideas into innovation." Article published by *UofT News*.
- 2/2013 Summer placement at Stryker featured in [Grad School News's February newsletter.](#)
- 3/2013 "Alumni Translating Ideas Into Innovation." [Division of Engineering Science News.](#)
- 3/2013 "Student-led company spins towards commercialization." [Departmental Front page.](#)
- 4/2013 Review article in *The Spine Journal* was featured on [Neurosurgery Blog.](#)
- 5/2013 Ontario Centres of Excellence Discovery 2013 Video Contest Winners announcement:  
<http://www.ocediscovery.com/competitions/video-competition>
- 5/2013 Named on Ontario Centres of Excellence Webpage News Release:  
<http://www.oce-ontario.org/news-events/media/news-releases/2013/05/28/oce-obi-fellowships>
- 6/2013 Brain researchers to become "neuroentrepreneurs": <http://lnkd.in/UjzUSS>
- 6/2013 Featured on School of Graduate Studies Newsletter: <http://lnkd.in/jPy8r>
- 6/2013 A Discovery of Talent and Drive, [https://twitter.com/IBBME\\_UofT](https://twitter.com/IBBME_UofT)'s article about #OCEDiscovery & the success of IBBME's ambassadors: <http://lnkd.in/4SCw>
- 9/2013 Article about Ontario's economy and job growth, mentioning Amir Manbachi of Spinesonics Medical in CTV news
- 12/2013 Article about project in Skulematters Alumni Magazine 2013 by University of Toronto
- 3/2014 "Anatomy of a spin-off company" in IBBME's annual 2013 report
- 11/2014 Spinesonics Medical Inc. featured in Global News
- 11/2014 Spinesonics Medical Inc. takes top prize in IBBME's inaugural 2-minute video contest
- 2/2015 Featured on [NeuSTEP conference](#)'s promotional package as invited speaker:  
<http://youtu.be/KBUWze9xZl0>
- 3/2015 NSERC *Science, Action!* National video competition winner: [http://www.nserc-crsng.gc.ca/scienceaction/index\\_eng.asp](http://www.nserc-crsng.gc.ca/scienceaction/index_eng.asp)
- 4/2015 3 minute thesis competition, University of Toronto finalist:  
<http://www.sgs.utoronto.ca/currentstudents/Pages/3MT.aspx>
- 5/2015 University of Toronto's 2015 "Inventor of the Year" award:  
<http://news.engineering.utoronto.ca/three-u-of-t-engineers-named-inventors-of-the-year/>
- 5/2016 Johns Hopkins BME twitter account: <https://twitter.com/JHUBME/status/743828332421197824>  
Welcome @JHUBME new faculty Amir Manbachi @AManbachi.
- 1/2017 Johns Hopkins Hub News center: <http://hub.jhu.edu/2017/01/12/gap-year-mse-program-device-design-for-med-students/>
- 10/2017 JHU BME website's Featured Highlights: "Undergrads kick off the semester with Design Sprint challenge": <https://www.bme.jhu.edu/news-events/news/undergrads-kick-off-semester-design-sprint-challenge/>
- 11/2017 JHU BME twitter account: "BME's Amir Manbachi spoke at the Grand Rounds this morning and discussed the collaboration between Neurosurgery and @jhu\_cbid"  
<https://twitter.com/JHUBME/status/926545804369842177>
- 12/2017 JHU BME's twitter account: <https://twitter.com/JHUBME/status/944221177119199232> "Students in the @JohnsHopkins #BME Design Team course wrapped up the semester with a little Jeopardy. Jan, 2018
- 1/2018 JHU BME's twitter account: "Check out the January 2018 issue of *Annals of Biomedical Engineering*. The cover image was taken from a paper written by Amir Manbachi, lecturer for @JohnsHopkins

- BME!": <https://twitter.com/JHUBME/status/952245108971368448>
- 1/2018 Baltimore Business Journal: "Hopkins-born venture aims to use ultrasound technology to treat brain tumors": <https://www.bizjournals.com/baltimore/news/2018/01/31/hopkins-venture-using-ultrasound-to-treat-tumors.html>
- 1/2018 JHU BME Departmental Highlights: "BME Launches One-Week Intersession Workshop": <https://www.bme.jhu.edu/news-events/news/bme-launches-one-week-intersession-workshop/>
- 5/2018 MEDICINE'S PROBLEM-SOLVERS: Johns Hopkins' biomedical engineering program empowers undergrads to develop real-world solutions for improving patient care: <https://hub.jhu.edu/2018/05/23/undergrad-engineers-solve-medical-problems/>
- 6/2018 BME faculty, staff, and students honored at Convocation Ceremony <https://www.bme.jhu.edu/news-events/news/bme-faculty-staff-and-students-honored-at-convocation-ceremony/>
- 9/2018 Biomedical engineering undergraduates win 2018 DEBUT Design Challenge <https://www.bme.jhu.edu/news-events/news/biomedical-engineering-undergraduates-win-2018-debut-design-challenge/>
- 10/2018 Johns Hopkins Faculty and Student Researchers Present at 2018 Biomedical Engineering Society Meeting <https://www.hopkinsmedicine.org/news/newsroom/news-releases/johns-hopkins-faculty-and-student-researchers-present-at-2018-biomedical-engineering-society-meeting>
- 11/2018 Undergraduate team developed Radiex device to hold back cortical tissue during brain surgery. <https://www.bme.jhu.edu/news-events/news/undergraduate-team-developed-radiex-device-to-hold-back-cortical-tissue-during-brain-surgery/>
- 11/2018 Johns Hopkins undergraduates place second in Collegiate Inventors Competition: Team CortiTech developed device to prevent injuries during brain surgery. <https://hub.jhu.edu/2018/11/20/radiex-collegiate-inventors-competition-silver-award/>
- 12/2018 Our therapeutic ultrasound research was featured by the Johns Hopkins Medicine Fundamentals (visual storytelling campaign for science stories) as one of the Top 9 Science Images Of 2018. <https://www.hopkinsmedicine.org/news/newsroom/news-releases/johns-hopkins-fundamentals-top-9-science-images-of-2018>
- 2/2019 Hopkins Medicine News Article featuring our recent clinical translation publication in the Annals of Biomedical Engineering Journal: <https://www.hopkinsmedicine.org/news/newsroom/news-releases/new-computer-program-reduces-spine-surgery-errors-linked-to-wrong-level-labeling>
- 10/2020 \$13.48M Awarded to Johns Hopkins Scientists to Develop Implantable Ultrasound Devices for Patients with Spinal Cord Injury: <https://www.hopkinsmedicine.org/news/newsroom/news-releases/1348m-awarded-to-johns-hopkins-scientists-to-develop-implantable-ultrasound-devices-for-patients-with-spinal-cord-injury>
- 11/2020 Cross-disciplinary team will design, develop devices to better treat spinal cord injuries: <https://hub.jhu.edu/2020/11/11/darpa-funds-spinal-cord-injury-project/>
- 11/2020 Our paper was selected by the Editor-in-Chief for the Editor's choice featuring researches with applaudable merits: <https://www.journals.elsevier.com/ultrasonics/editors-choice/editors-choice-highlighted-articles>
- 1/2021 Developing implantable and wearable technology for spinal cord injury: <https://www.hopkinsmedicine.org/news/articles/developing-implantable-and-wearable-technology-for-spinal-cord-injury>
- 1/2021 Amir Manbachi. Interview by Kimberly A. Skarupski, Jan 29, 2021. Faculty Factory [Audio podcast]. Retrieved from <https://facultyfactory.org/podcast/#episode106>.
- 2/2021 Backs to the future, by Jim Duffy: <https://www.hopkinsmedicine.org/news/articles/backs-to-the-future>
- 6/2021 Back(s) to Life, by Jim Duffy: <https://engineering.jhu.edu/magazine/2021/06/backs-to-life/#.YqIPQy-B3AJ>
- 9/2021 Hopkins Medicine webcast on HEPIUS lab's grand opening: <https://webcast.jhu.edu/Mediasite/Play/41697d47f16543e988809fd0ace9c84d1d?catalog=9685625030204c8bac877040cab36a8421&playFrom=661&autoStart=true>
- 9/2021 Johns Hopkins and Collaborators Create Medical Device Design and Innovation Laboratories: <https://www.fusfoundation.org/news/johns-hopkins-and-collaborators-create-medical-device-design-and-innovation-laboratories>
- 9/2021 Lab website built and published online: [HopkinsMedicine.org/Neuro/HEPIUS](https://www.hopkinsmedicine.org/Neuro/HEPIUS)
- 6/2022 1-min video demo to feature our 2022 book by the CRC Press: "Smart, Voice-assisted Operating Rooms" <https://youtu.be/Y3D0oZCLp8k> (27 June 2022)
- 6/2022 Video Abstract created and uploaded by the Wiley (the publisher) Editing Services to feature our 2022 publication in the Microcirculation journal: <https://doi.org/10.1111/micc.12770> (2 July 2022)

- 11/2022 Introducing the BBJ's 2022 class of 40 Under 40 honorees  
<https://www.bizjournals.com/baltimore/news/2022/09/19/baltimore-business-journal-40-under-40-2022.html>
- 2/2023 “*Johns Hopkins lab aiming to improve spinal cord injury care hits FDA milestone*”. Featured on Baltimore Business Journal’s MarylandINNO stories.  
<https://www.bizjournals.com/baltimore/inno/stories/news/2023/02/06/johns-hopkins-hepius-lab-fda-approval.html> (6 Feb 2023)
- 2/2023 “*Focused Ultrasound for Motor Neuron Modulation of the Spinal Cord*” Featured on Focused Ultrasound Foundation’s Newsletter <https://www.fusfoundation.org/posts/focused-ultrasound-for-motor-neuron-modulation-of-the-spinal-cord/> (23 Feb 2023)

## FUNDING

### EXTRAMURAL Funding

#### Extramural Research Funding

##### Current

2020-2025 Holistic Electrical, Ultrasonic and Physiological Interventions Unburdening those with Spinal Cord Injury (HEPIUS)  
 Defense Advanced Research Projects Agency. (DARPA), Award Contract #: N660012024075  
 \$13,488,956  
 PI: Nicholas Theodore  
 Role: Co-PI, 90% effort

##### Pending

2023-2027 Implantable Ultrasound Transducer for Remote Spinal Cord Injury Monitoring  
 Blueprint NeuroTech Harbor  
 \$2,000,000  
 Role: PI

2023-2027 Smart Cerebrospinal Fluid Management Implant for Spinal Cord Injury Patients  
 Blueprint NeuroTech Harbor  
 \$50,000  
 PI: Nicholas Theodore  
 Role: co-I

2023-2027 Monitoring GBM through Implantable Ultrasound Transducer  
 Blueprint NeuroTech Harbor  
 \$50,000  
 PI: Corbin Clawson (Longevity Neuro Solutions, LLC)  
 Role: Sub-contractor

##### Previous

2013 Development of a navigation device which allows the visualization of screw positioning during spinal fusion surgeries: early stage design and prototyping  
 Ontario Centres of Excellence, Market Readiness Grant  
 \$50,000  
 PI: Richard S.C. Cobbold, PhD  
 Role: Co-PI

2013 Development of a navigation device which allows the visualization of screw positioning during spinal fusion surgeries: job creation and IP protection  
 The Ontario Brain Institute Entrepreneurs Program  
 \$50,000



	Role: PI
2013	Development of a navigation device which allows the visualization of screw positioning during spinal fusion surgeries: hardware prototyping and software development FedDev (Federal Development) Canada \$15,000 Role: PI
2013	Ultrasound-guided spine surgery Medical Sciences Proof-of-Principle (MScPoP) Program, OCE-supported MScPoP Fund \$20,000 PI: Richard S.C. Cobbold, PhD Role: Co-PI
2014	Development of a navigation device which allows the visualization of screw positioning during spinal fusion surgeries: job creation MScPoP Program, OCE-supported MScPoP Fund \$6,800 Role: PI
2014	Device that allows the visualization of screw positioning during insertion into the spine Natural Sciences and Engineering Research Council of Canada, NSERC Idea to Innovation Grant, Commercialization Program \$120,000 PI: Richard S.C. Cobbold, PhD Role: Co-PI
2014	Ultrasound reinventing the future of spine surgeries Investing in Commercialization Partnership, FedDev Ontario \$500,000 PI: Richard S.C. Cobbold, PhD Role: Co-PI
2017-2018	Minimally invasive theranostic device for brain neuro-oncology 127660 TEDCO, Maryland Innovation Initiative Grant \$165,000 Role: PI, 0% effort
2019	Minimally Invasive Ultrasound approaches for brain oncology 1853459 NSF, National Science Foundation \$50,000 PI: Amir Manbachi, PhD Role: PI, 0% effort
2020-2021	Minimally Invasive, High-Intensity Focused Ultrasound Device for Ablation of Brain Tumors Small Business Technology Transfer Program Phase I (STTR) National Science Foundation (NSF), Award Number 1938939 \$224,997 PI: Nao J Gamo (NeuroSonics Medical, Inc) Role: Co-PI, 2.5% effort

## **INTRAMURAL Funding**

### Intramural Research Funding

#### Current

2022-2023      Wearable Ultrasound Transducer for Continuous Monitoring of Venous Blood Flow: Prediction and

	<p>Early Detection of Deep Vein Thrombosis          Johns Hopkins University Discovery Award (17% success rate)          \$100,000          PI: Aliaksei Pustavoitau          Role: Co-PI, 2.5% effort</p>
2023-2024	<p>A Center of Excellence for Wearable and Implantable Ultrasound Sensors: Towards Building a Fabrication Shop for a Variety of Applications in Engineering, Medicine, and Music          Johns Hopkins University Catalyst Award          \$75,000          Role: PI</p>
Pending	None
Previous 2013	<p>Development of a navigation device which allows the visualization of screw positioning during spinal fusion surgeries: hardware prototyping and software development          University of Toronto Internal Fund, Connaught Innovation Award          \$35,000          PI: Richard S.C. Cobbold, PhD          Role: Co-PI</p>
2016-2017	<p>Minimally invasive theranostic device for brain neuro-oncology          110934          Johns Hopkins-Coulter Translational Partnership Program Seed Funding          \$48,000          Role: PI, 10% effort</p>
2018	<p>Minimally invasive focused ultrasound for ablative neuro-oncology          Johns Hopkins University Cohen Translational Engineering Fund          \$40,000          Role: PI, 0% effort</p>
2020-2022	<p>Toward clinical translation of an implantable sensor for monitoring of spinal cord injury patients          KL2 Clinical Research Scholar program career development award          Johns Hopkins Institute for Clinical and Translational Research          National Center for Advancing Translational Sciences (NCATS)          National Institute of Health (NIH)          \$235,000          Role: PI, 90% effort</p>

## EDUCATIONAL ACTIVITIES

### Educational Focus

I am inspired by role models who have taught me to shape the future of medicine by nurturing bright minds and allowing them to grow by working on meaningful real-world problems. Teaching problem-solving and engineering design has been one of my passions since my PhD studies. I also enjoy teaching the subjects of medical imaging, human factors, and patient safety standards.

### Teaching

#### Classroom instruction

JHMI/Regional

2017-present	Course Instructor, undergraduate, Undergraduate Capstone Design (EN.580.411-2), Department of Biomedical Engineering, Johns Hopkins University
2017-present	Course Coordinator, undergraduate, Advanced Design Team (EN.580.497-8), Department of Biomedical Engineering, Johns Hopkins University
2017-present	Course Coordinator, undergraduate, Independent Design (EN.580.580-1), Department of Biomedical Engineering, Johns Hopkins University

2017-present Course Coordinator, undergraduate, Research Credits (EN.580.597), Department of Biomedical Engineering, Johns Hopkins University

#### International

2011-2014 Teaching Assistant, undergraduate, Medical Imaging (BME595), University of Toronto  
2012-2013 Course Guest Instructor, undergraduate, Biomaterial and Medical Device Product Development (BME460), University of Toronto  
2013 Instructor Replacement, undergraduate, Medical Imaging (BME595), University of Toronto  
2013 Course Guest Instructor, undergraduate, Biomaterial Processing and Properties (MSE440), University of Toronto

#### Workshops / seminars

2018 Co-organizer, undergraduate / graduate, Launch Your Venture, Department of Biomedical Engineering, Johns Hopkins University

#### Mentoring

##### Graduate and Medical student Advisees / Mentees

2013-2014 Catherine Gdyczynski: originally Masters student at University of Toronto, subsequently Technical Development Manager at Spinesonics Medical Inc., currently Application Consultant at BrainLab. Shared publications scholarship: OR8  
2013-2014 Spencer Hu: originally Engineering Science undergraduate student at University of Toronto, while interning at Spinesonics Medical Inc., currently medical student at Schulich School of Medicine & Dentistry, University of Western Ontario  
2013-2014 Farrokh Mansouri: originally Masters student at University of Toronto, currently PhD Candidate at UofT  
2013-2015 Atena Keshavarzian: originally Masters student at University of Toronto, subsequently Technical Development Manager at Spinesonics Medical Inc., currently senior consulting associate at PwC Canada  
2015-2016 Philipp Walch: visiting Masters student from University of Heidelberg at Harvard-MIT Division of Health Sciences and Technology, Brigham and Women's Hospital, currently PhD student Shared publications scholarship: OR10, OR11, RA5  
2015-2016 Ramsabarish Vijayakumar: visiting Masters student from SRM Institute of Science and Technology, India, at Harvard-MIT Division of Health Sciences and Technology, Brigham and Women's Hospital, currently working in industry: ICON plc pharmaceutical  
2016-2017 Esme (Xiaoxuan) Zhang: Biomedical Engineering Masters student, Johns Hopkins University  
2017-2021 Ana M Ainechi: Biomedical Engineering Masters graduate, Johns Hopkins University. Shared publications scholarship: OR28, OR32, OR33, OR34  
2018-2021 Smruti Mahapatra: Chemical Engineering Masters student, Johns Hopkins University. Shared publications scholarship: OR24, OR28, OR30, OR31, OR32, OR33, OR34  
2019-2021 Jeong Hun (Jeff) Kim: Electrical Engineering Masters student, Johns Hopkins University. Shared publications scholarship: OR32, OR33, BK4  
2019-2021 Molly Acord: Biomedical Engineering Masters student, Johns Hopkins University. Shared publications scholarship: OR33, OR34  
2019-2021 Tarana Parvez Kaovasia: Biomedical Engineering Masters student, Johns Hopkins University. Shared publications scholarship: OR33, OR34  
2019-2021 Yinuo (Enoch) Zeng: Biomedical Engineering Masters student, Johns Hopkins University. Shared publications scholarship: RA7  
2020-2021 Yohannes Tsehay, Medical Student Research Year (co-advisor: Nicholas Theodore). Shared publications scholarship: OR32, OR33, RA7  
2021-present Carly Weber-Levine, Medical Student Research Year (co-advisor: Nicholas Theodore). Shared publications scholarship: RA7  
2021-present Andrew Hersh, Medical Student Research Year (co-advisor: Nicholas Theodore). Shared publications scholarship: RA7  
2022-present Arjun Kumar Menta, Medical Student Research Year (co-advisor: Nicholas Theodore); Awarded Paul & Daisy Soros fellowship for New Americans (2023)  
2022-present Meghanna Bhimreddy, Medical Student Research Year (co-advisor: Nicholas Theodore).

- 2022-present Kelly Jiang, Medical Student Research Year (co-advisor: Nicholas Theodore); Awarded Neurosurgical Society of the Virginias' Medical Student Summer Fellowship | *Neurosurgical Society of the Virginias* (2022)
- 2021-2022 Rasika Thombre: Biomedical Engineering Masters student, Johns Hopkins University. Got recruited to Intuitive Surgical following graduation.
- 2021-2023 Griffin Mess: Biomedical Engineering Masters student, Johns Hopkins University. Got recruited to Insightec following graduation.
- 2021-present Denis Routkevitch, Biomedical Engineering MD-PhD candidate at Johns Hopkins University (co-advisor: Nitish Thakor and Nicholas Theodore)
- 2021-present Avisha Kumar, Biomedical Engineering PhD student at Johns Hopkins (co-advisor: Nitish Thakor); Awarded Student Best Paper Award at the Institute of Electrical and Electronics Engineers (IEEE) EMBS Conference on Neural Engineering 2023
- 2021-present Max Kerensky, Biomedical Engineering PhD student at Johns Hopkins (co-advisor: Nitish Thakor) Awarded Graduate Research Fellowship Program scholarship from the National Science Foundation (NSF) in 2023
- 2021-present Haley Abramson, Biomedical Engineering PhD candidate at Johns Hopkins University (co-advisor: Nicholas Theodore); Awarded (1) Graduate Research Fellowship Program scholarship from the National Science Foundation in 2021; Awarded (2) grand prize at the Five Minute Pitch Competition *Design of Medical Devices Conference* (2022) ; Awarded (3) Johns Hopkins Medicine's Young Investigators Award 2023; Shared publications scholarship: OR34

### Undergraduate Advisees / Mentees

- 2007 Margie N. Trevino: originally MIT freshman student in Mechanical Engineering, currently in industry
- 2014-2015 Seray Cicek: undergraduate thesis student at University of Toronto
- 2014-2015 Niousha Aflatouni: originally Biomedical Engineering undergraduate student at Ryerson University, while interning at Spinesonics Medical Inc., currently Masters student at University of Toronto
- 2014-2015 Shervin Barati: Engineering Science undergraduate student at University of Toronto
- 2015 Katlin Kreamer-Tonin: originally Biomedical Engineering undergraduate student at University of Toronto while interning at Spinesonics Medical Inc., currently working at Synaptive Medical, a pioneer in brain navigation systems. Shared publications scholarship: RA5
- 2016-2017 Alisa Brown: Undergraduate Research Assistant in Biomedical Engineering at Johns Hopkins University. Shared publications scholarship: OR13
- 2017-2018 Ana Ainechi, Edward Cai, Himanshu Dashora, Angela Park, Jessica Shen, Siya Zhang, Stephen Kyranakis, Sandeep Khambhampati: Capstone Design Team, "Monitoring spinal cord blood flow post-operatively for spinal cord injury patients," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Nicholas Theodore)
- 2017-2018 Dani Kiyasseh, Michael Morikubo, Rene Lopez, Chukwuebuka (Ned) Achebe, Isabella Martinelli, Daniel Borders, Hana Escovar, Paroma Mukhopadhyay: Capstone Design Team, "Redesigning operating table to accommodate mid-procedure patient repositioning," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Edith Gurewitsch Allen, Dr. Robert Allen)
- 2017-2018 Daphne Schlesinger, Ryan Najmi, Vinay Ayyappan, Dante Navarro, Walter Zhao, Shayan Hemmati, Aneka Kleine, Helen Wiegand: Capstone Design Team, "Ventricular shunt malfunction detection," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Mark Luciano)
- 2017-2018 Pooja Nair, Austin Petronack, Jamie Shade, Kuke Zhu Sophia Chang, Mihika Aedla, Drake Foreman: Capstone Design Team, "Redesigning hearing loss screeners," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Nicholas Reed)
- 2017-2018 Rohith Bhethanabotla, Callie Deng, Jack Ye, Linh Tran, Sun Jay Yoo, Jody Mou, Munachiso Igboko, Kevin Tu: Capstone Design Team, "Developing an atraumatic and dynamic brain retractor for deep-seated brain procedures," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Alan R. Cohen)
- 2017-2018 Saki Fujita, Olivia Musmanno, Sanjay Elangovan, Vorada Sakulsaengrapha, Alan Lai, Lucia Zhang, Aman Patel, Zach Zarubin: Capstone Design Team, "Re-designing suturectomy surgical toolkits used to cut the skull bone while leaving the surrounding tissues safe," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Ed Ahn)
- 2017-2018 Tara Blair, Gabrielle Allred, Shipra Khatri, Anders Gould, Nikhil Murty, Ronak Mahatme, Joshua Liu, Victoria Chen: Capstone Design Team, "Improving fracture management and casting," Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Jason Hammond)



- 2017-2018 Victor Dadfar, Victoria Fang, Zhou (Jo) Li, Daniel Huang, Hadley VanRenterghem, Deborah Weidman, Angela Lu, SeYeon Cindy Choi: Capstone Design Team, “Chronic and portable delivery of neuro-oncology medications via a customized clear cranial implant,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Chad Gordon, Dr. Jon Weingart, Dr. Judy Huang)
- 2017 Jung Min Lee, Burton Ye, Brett Wolfinger, Gabriel Fernandes, Elizabeth Wu: Advanced Design Team Instrumentation Course, “Point-of-care monitoring of tacrolimus levels,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Douglas Mogul)
- 2017-2018 Megan Callanan, Valerie Zawicki, Sophia Triantis, Laura Hinson, Madeline Lee: Advanced Design Team Instrumentation Course, “Reusable core needle biopsy device for breast biopsies in low-resourced settings,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Susan Harvey)
- 2017-2018 Gavin Mischler, Katherine Hu, Maya Lapinsky, Joshua Punnoose. Extracurricular continuing Design Team, “Postpartum Hemorrhage Management in low-resource settings,” Dept. of Biomedical Engineering, Johns Hopkins University. (co-supervised by: Dr. Rachel Seay)
- 2017-2018 Aine O’Sullivan, Olivia Musmanno, Varun Kedia. Design Team continuing into second year for Research Credit, “a non-invasive, easy to use, accurate and reliable biopsy device for bile duct cancer diagnosis,” Dept. of Biomedical Engineering, Johns Hopkins University. (co-supervised by: Dr. Clifford Weiss)
- 2017-2018 Olivia Choi: Independent Design Course, “Designing effective polymeric nano-particles for siRNA delivery to treat glioblastoma,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Jordan Green)
- 2017-2018 Vignesh Sadras: Independent Design Course, “Developing computational models to study the mechanisms of delayed afterdepolarization in familial hypertrophic cardiomyopathy,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Raimond Winslow)
- 2017-2018 Jin Young (Daniel) Sohn: Independent Design Course, “Developing a computational model of DNA flexibility for studying nucleosome positioning,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Taekjip Ha)
- 2017-2018 Richard Um: Independent Design Course, “Designing the next generation of operating room patient beds,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Rajiv Iyer)
- 2017 Aseem Jain: Independent Design Course, “Novel management method for refractory ascites,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Ashish Nimgaonkar)
- 2017 Hanbiehn (Han) Kim: Independent Design Course, “Normal and pathological vertebral column simulation using 3D printing technology,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Mari Groves)
- 2017 Min Geol (Kevin) Joo: Independent Design Course, “Distributed, secure platform for exchanging health data and supporting research,” Biomedical Engineering, Johns Hopkins University.
- 2017 Olivia Puleo: Independent Design Course, “Microsurgical needle driver for a steady-hand robot,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Russell H. Taylor)
- 2018 Sarah Sukardi: Independent Design Course, “A quantification software for spinal oncology,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Daniel Sciubba)
- 2018 Jacob Wei: Independent Design Course, “System and methods for quantification of spinopelvic parameters,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Daniel Sciubba)
- 2018 Tony Wang: Independent Design Course, “Visualizing a novel correlated LDA model for evaluating patients’ responses to immunotherapies,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Jennifer Elisseeff)
- 2018 Ivan Liao: Independent Design Course, “Promoting mental health through an innovative digital app,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Nitish Thakor)
- 2018 Paul Kim: Independent Design Course, “When to start lifting heavier? Exercise feedback through EMG,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Nitish Thakor)
- 2018 Hyung Kyu (Mario) Choi: Independent Design Course, “Piezoelectric and Electrostatic Energy Harvesting Device,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. James West)
- 2018-2019 Akash Chaurasia, Katie McCarren, Robert Li, Claire State, Jerry Yan, Evan Bender, Aditi Jithendra, Hannah Takasuka: Capstone Design Team, “Reducing Limb Length Discrepancy in Total Hip Arthroplasty Procedures,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Julius Oni). Shared publications scholarship: OR26

- 2018-2019 Celine Arpornsuksant, Isaree Pitaktong, Maxwell Xu, Varun Kedia, Damali Egyen-Davis, Colin Lee, Lily Zhu, Yunonne Bai: Capstone Design Team, “Redesigning Dry Powder Inhalers,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Carlton Lee, and Dr. Mandeep Jassal)
- 2018-2019 Parth Vora, Alan Lai, Justin Wang, Maya Lapinski, Miguel Inerni: Capstone Design Team, “Reinventing Blood Potassium Level Sensing Home kit,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Mohamed G Atta)
- 2018-2019 Sanjay Elangovan, Amrita Ladwa, Simon Liu, Kamran Siddiq, Justin Yan, Adam Kenet, Eashwar Mahadevan, Roshini Narayanan: Capstone Design Team, “Endosight: Minimizing Endoscopic Looping during Gastrointestinal Tract Examinations” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Kenneth Ng). Shared publications scholarship: OR27
- 2018-2019 Zachary Buono, Benjamin Garlow, Niki Tselepidakis, Raphael Bechtold, Cristina Madalo, Sean Glaister, Jimmy Pitingolo, Bella Ferrara: Capstone Design Team, “Reducing the rate of unintentional cotton balls left inside brain surgery patients” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Henry Brem and Dr. Judy Huang). Shared publications scholarship: OR29
- 2019 Nicholas Sass: Independent Design Course, “Redesigning Scrambler Therapy for Treating Pheripheral Neuropathic Pain,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Allan Belzberg and Dr. Michael Caterina)
- 2019 Chenyi (Lisa) Zhu: Independent Design Course, “Redesigning Scrambler Therapy for Treating Pheripheral Neuropathic Pain--Continuation,” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Allan Belzberg and Dr. Michael Caterina)
- 2019 Jihoon Jang: Independent Design Course, “Design of an apparatus suitable for the collection of bimanual reaching data from patients with neurological disorders” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Reza Shadmehr)
- 2019 Shanelle Mendes: Independent Design Course, “designing, synthesizing, and testing new polymers for non-viral gene delivery.” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Jordan Green)
- 2019 Marion Pang Wan Rion: Independent Design Course, “Synergistic effects of combinatorial functional surface functionalization on PEI-PEG DNA nanoparticles.” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Mao Hai Quan)
- 2019 Sandeep Kambhampati: Independent Design Course, “Quantification of Tissue Perfusion from Power Doppler Ultrasound.” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Nicholas Theodore). Shared publications scholarship: OR28
- 2019 Grace Kuroki: Independent Design Course, “Redesigning the orthopedic boot” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Jason Hammond and Jane Webster)
- 2019 Raphael Bechtold, Benjamin Garlow, Renee Liu, Alexandra Szewc, Arushi Tandon, William Zhu: Advanced Design Team, “CottInSight: Minimizing Unintended Cotton Retention in Neurosurgical Procedures” Biomedical Engineering, Johns Hopkins University (co-supervised by: Dr. Henry Brem and Dr. Judy Huang). Shared publications scholarship: OR29

#### Pre- and Post-doctoral Advisees / Mentees

- 2015-2016 Farideh Davoudi, MD: post-doctoral fellow at Harvard Medical School. Shared publications scholarship: OR10, OR11
- 2016-2019 Micah Belzberg, MD: post-doctoral fellow, now at Hopkins Medicine Dermatology residency PGY1. Shared publications scholarship: OR18, OR19, OR20, OR28, OR29, OR30, OR31
- 2021-2022 Eli J. Curry, PhD: post-doctoral training under my direct supervision. Shared publications scholarship: OR32, OR33, OR34, RA7
- 2021-2023 Fariba Aghabaglou, PhD: post-doctoral training under my direct supervision. Shared publications scholarship: OR32, OR33, OR34, RA7
- 2021-present Kelley Kempski, Biomedical Engineering Research Scientist at Johns Hopkins University
- 2021-2022 Ali Mohammadabadi, PhD: post-doctoral training under my direct supervision
- 2022-present Joshua Punnoose, PhD: post-doctoral training under my direct supervision

#### Others (staff)

- 2021-2022 Richard Mejia, staff engineering / fabrication shop lab manager
- 2021- Geltrouda Demczuk, office manager / administrative lead
- 2022 Constantin Smith, staff engineering / fabrication shop lab manager

#### Thesis Committees

2021	Haley Abramson, Hopkins BME Doctoral Board Exam
2021	Serene Kamal, Hopkins ECE qualifying exam
2022	External examiner – University of British Columbia’s Doctoral Dissertation (Amanda Cheung)
2022	Examination committee member for Ziwei Feng’s Graduate Board Oral Exam (Hopkins ECE)

### Educational Program Building / Leadership

2013	Mentor, Alumni Mentorship Program, University of Toronto
2014	Mentor, Alumni Mentorship Program, University of Toronto

## RESEARCH ACTIVITIES

### Research Focus

My long-term goal is to initiate and lead meaningful research projects that have potential for clinical translation and generation of commercial enterprises, ultimately benefiting the field of medicine and society at large. Biomedical engineers can make an unparalleled impact, helping patients and saving lives through innovative devices. My interests and expertise are in physics of acoustics, as well as design and fabrication of novel image-guided interventions (primarily ultrasound imaging, and most recently therapeutic ultrasound). My clinical research interests and involvement since my PhD have been primarily in the area of neurosurgery, specifically in brain and spine.

### Research Program Building / Leadership

#### Clinical Collaborations

2017-2020	Engineering Faculty on the Design Team project <ul style="list-style-type: none"> <li>▪ <i>“Monitoring spinal cord blood flow post-operatively for spinal cord injury patients”</i></li> <li>▪ <i>“Quantification of tissue perfusion from power Doppler ultrasound”</i></li> </ul> Clinical collaborator: <b>Dr. Nicholas Theodore, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Redesigning the operating table to accommodate mid-procedure patient repositioning”</i> Clinical collaborator: <b>Dr. Edith Gurewitsch Allen, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Ventricular shunt malfunction detection”</i> Clinical collaborator: <b>Dr. Mark Luciano, MD, PhD</b>
2017-2018	Invited committee member on Design Team project <i>“Transforming mobility in the pediatric ICU”</i> Clinical collaborator: <b>Dr. Sapna Kudchadkar, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Redesigning hearing loss screeners”</i> Clinical collaborator: <b>Dr. Nicholas Reed, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Developing an atraumatic and dynamic brain retractor for deep-seated brain procedures”</i> Clinical collaborator: <b>Dr. Alan R. Cohen, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Re-designing suturectomy surgical toolkits used to cut the skull bone while leaving the surrounding tissues safe”</i> Clinical collaborator: <b>Dr. Edward Ahn, MD</b>
2017-2018	Engineering Faculty on Design Team project <ul style="list-style-type: none"> <li>▪ <i>“Improving fracture management and casting”</i></li> <li>▪ <i>“Redesigning the orthopedic boot”</i></li> </ul> Clinical collaborator: <b>Dr. Jason Hammond, MD</b>
2017-2018	Engineering Faculty on Design Team project <i>“Chronic and portable delivery of neuro-oncology medications via a customized clear cranial implant”</i> Clinical collaborator: <b>Dr. Chad Gordon, DO / Dr. Jon Weingart, MD</b>
2017-2018	Engineering Faculty on Advanced Design Team project <i>“Point-of-care monitoring of tacrolimus levels”</i> Clinical collaborator: <b>Dr. Douglas Mogul, MD</b>
2017-2018	Engineering Faculty on Advanced Design Team project

- “Reusable core needle biopsy device”*  
Clinical collaborator: **Dr. Susan Harvey, MD**
- 2017-2018 Engineering Faculty on continuing Design Team research project  
*“Redesigning bile duct biopsies”*  
Clinical collaborator: **Dr. Clifford Weiss, MD**
- 2017-2018 Engineering Faculty on continuing Design Team research project  
*“Postpartum hemorrhage management in low-resource settings”*  
Clinical collaborator: **Dr. Rachel Seay, MD**
- 2017-2018 Engineering Faculty on Independent Design project  
*“Novel management method for refractory ascites”*  
Clinical collaborator: **Dr. Ashish Nimgaonkar, MD**
- 2017-2018 Engineering Faculty on Independent Design project  
*“Designing the next generation of operating room patient beds”*  
Clinical collaborator: **Dr. Rajiv Iyer, MD**
- 2017-2018 Engineering Faculty on Independent Design project  
*“Normal and pathological vertebral column simulation using 3D printing technology”*  
Clinical collaborator: **Dr. Mari Groves, MD**
- 2018-2019 Engineering Faculty on Independent Design project  
*“Redesigning Scrambler Therapy for Treating Peripheral Neuropathic Pain”*  
Clinical collaborators: **Dr. Alan Belzberg, MD / Dr. Michael Caterina, MD, PhD**
- 2018-2019 Engineering Faculty on Design Team project  
*“Reducing Limb Length Discrepancy in Total Hip Arthroplasty Procedures”*  
Clinical collaborator: **Dr. Julius Oni, MD**
- 2018-2019 Engineering Faculty on Design Team project  
*“Redesigning Dry Powder Inhalers”*  
Clinical collaborators: **Dr. Carlton Lee, PharmD / Dr. Madeep Jassal, MD, MPH**
- 2018-2019 Engineering Faculty on Independent Design project  
*“Reinventing Blood Potassium Level Sensing Home Kit”*  
Clinical collaborator: **Dr. Mohamed G Atta, MD**
- 2018-2019 Engineering Faculty on Design Team project  
*“Endosight: Minimizing Endoscopic Looping during Gastrointestinal Tract Examinations”*  
Clinical collaborator: **Dr. Kenneth Ng, DO**
- 2018-2019 Engineering Faculty on Design Team project  
*“Reducing the rate of unintentional cotton balls left inside brain surgery patients”*  
Clinical collaborators: **Dr. Henry Brem, MD / Dr. Judy Huang, MD**
- 2019-present Engineering collaboration with Anesthesiology and Critical Care Medicine  
*“Continuous Monitoring using ultrasound wearable sensors”*  
Clinical collaborator: **Dr. Aliaksei Pustavoitau, MD**
- 2020-present Engineering collaboration with Neuroscience, Radiology and Neurosurgery  
*“Focused Ultrasound, as a non-invasive therapeutic approach for brain disorders”*  
Basic science collaborator: **Prof. Betty Tyler**
- 2020-present Implantable Ultrasound sensor for post-operative monitoring of patients with spinal cord injury  
Collaborator: Nichols Theodore
- 2021-present Wearable Ultrasound sensors for early detection and monitoring of Deep Vein Thrombosis  
Collaborators: Aliaksei Pustavoitau, George Coles
- 2021-present Implantable Cranial Ultrasound sensor for post-operative monitoring of brain tumor patients  
Collaborators: Chad Gordon, Mehran Armand



2022-present Pre-clinical Focused Ultrasound Research Program  
Collaborators: Yousef Salimpour, Betty Tyler

#### Engineering Research Collaborations

- 2017-2020 Design Faculty on Independent Design Team project
- *“Designing effective polymeric nano-particles for siRNA delivery to treat glioblastoma”*
  - *“Designing, synthesizing, and testing new polymers for non-viral gene delivery”*
- Engineering research collaborator: **Dr. Jordan Green, PhD**
- 2017-2018 Design Faculty on Independent Design Team project  
*“Microsurgical needle driver for a steady-hand robot”*  
Engineering research collaborator: **Dr. Russell H. Taylor, PhD**
- 2017-2018 Design Faculty on Independent Design Team project  
*“Developing computational models to study the mechanisms of delayed afterdepolarization in familial hypertrophic cardiomyopathy”*  
Engineering research collaborator: **Dr. Raimond Winslow, PhD**
- 2017-2018 Design Faculty on the Independent Design Team project  
*“Developing a computational model of DNA flexibility for studying nucleosome positioning”*  
Engineering research collaborator: **Dr. Taekjip Ha, PhD**
- 2018-2019 Design Faculty on the Independent Design Team project  
*“Piezoelectric and Electrostatic Energy Harvesting Device”*  
Engineering research collaborator: **Dr. James E. West, PhD**
- 2019 Design Faculty on the Independent Design Team project  
*“Synergistic effects of combinatorial functional surface functionalization on PEI-PEG DNA nanoparticles”*  
Engineering research collaborator: **Dr. Mao Hi Quan, PhD**
- 2019 Design Faculty on the Independent Design Team project  
*“The use Artificial Intelligence Towards Designing a Foreign Language Translator”*  
Engineering research collaborator: **Dr. Anthon Dahbura, PhD**
- 2019 Design Faculty on the Independent Design Team project  
*“Design of an apparatus suitable for the collection of bimanual reaching data from patients with neurological disorders”*  
Engineering research collaborator: **Dr. Reza Shadmehr, PhD**

#### Inventions, Patents, Copyrights

- 2013 Co-inventor, Ultrasonic array for bone sonography (WO/2014/186,903)
- 2013 Co-inventor, Ultrasonic signal processing for bone sonography (WO/2014/186,904)
- 2014 Co-inventor, Ultrasound transducer probe, Canadian design patent (CA/2015-12-15/155249)
- 2017 Co-inventor, Flexible control and guidance of minimally invasive focused ultrasound (62/464,511), provisional patent application, converted to a PCT patent application on Feb 2018 (PCT/US18/20159)  
Note on the translational impact of the work: current licensing negotiations on the way with JHTV
- 2017 Co-inventor, Novel system and methods that enable triage of patients through a smart referral process in hospitals, disclosed to Johns Hopkins Technology Ventures
- 2018 Co-inventor, Method and system to monitor cerebrospinal fluid flow through cerebral shunts, disclosed to Johns Hopkins Technology Ventures on Mar 2018
- 2018 Co-inventor, Monitoring spinal cord blood flow to determine points of intervention and decrease secondary phase injury, disclosed to Johns Hopkins Technology Ventures on Mar 2018
- 2018 Co-inventor, Piezoelectric bone cutter for craniostylosis neurosurgery, disclosed to Johns Hopkins Technology Ventures on Mar 2018, Invention ID: D15314
- 2018 Co-inventor, Methods and systems for smart adaptive clinical assistant: a touch-free approach towards controlling operating room toolkits, disclosed to Johns Hopkins Technology Ventures on May 2018, Invention ID: D15324
- 2018 Co-inventor, A machine learning automated method for calculating clinically-relevant spinal parameters from CT or MRI images with potential implications to determine the surgical viability of a patient, disclosed to Johns Hopkins Technology Ventures on June 2018. Invention ID: D15336

- 2019 Belzberg M, **Manbachi A** and Gordon C. Sonolucent burr hole and implantable acoustic lens permitting and enhancing transcranial ultrasound, disclosed to Johns Hopkins Technology Ventures on Apr 2020, Invention ID: D15736
- 2019 Gordon C, Belzberg M, and **Manbachi A**. Cranial implant devices, systems, and related methods. U.S. Provisional Patent Application No. 62/899,962. Filed Oct 2019
- 2019 Ainechi AM, Kambhampati S, Coles G, **Manbachi A**, Theodore N. Multi-modality wearable patch for monitoring tissue perfusion, disclosed to Johns Hopkins Technology Ventures on Apr 2020, Invention ID: D15551
- 2020 Bender E, Chaurasia A, Jithendra A, Li R, McCarren K, State C, Takasuka H, Yan J, Oni J, **Manbachi A**. Imaging system and methods for intraoperative measurement of mm-scale 3D distances and angles, disclosed to Johns Hopkins Technology Ventures on Apr 2020, Invention ID: D16402
- 2020 Anderson W, Gamo NJ, Hwang B, **Manbachi A**. Hand-held hybrid imaging and forward firing focused ultrasound transducer for the treatment of chronic subdural hematoma, disclosed to Johns Hopkins Technology Ventures on Apr 2020, Invention ID: D16310
- 2021 **Manbachi A**, Coles G, Ainechi AM, Kambhampati S, Theodore N. Devices, systems, and methods for monitoring and treatment of injuries. PCT patent filed, 6 Oct 2021
- 2021 **Manbachi A**, Theodore N. Systems and methods for monitoring and treatment of injuries using one or more wearable devices. PCT patent filed, 6 Oct 2021
- 2021 **Manbachi A**, Theodore N. Acute cerebrospinal fluid management implant. PCT patent filed, 6 Oct 2021
- Note on the translational impact: functional prototypes built, animal studies (porcine and rodent models of spinal cord injury) and FDA pre-submission meetings under way
- 2021 **Manbachi A**, Theodore N. Systems and methods for monitoring and treatment of an injury. PCT patent filed, 6 Oct 2021
- Note on the translational impact: functional prototypes built, animal studies (porcine and rodent models of spinal cord injury) and FDA pre-submission meetings under way. On 6 Jan 2023, the FDA granted breakthrough device designation to this invention.
- 2022 Abramson HG, Huang J, **Manbachi A**, Theodore N. Systems and methods for automatic detection and localization of foreign body objects during (and after) neurosurgery. Invention ID: C17180. Provisional Application submitted by priority date: 18 Feb 2022
- Note on the translational impact: JHTV technology transfer office has granted licensing option to Longevity Neuro LLC.
- 2022 **Manbachi A**, Theodore N. and Pustavoitau A. Patient triage using wearable devices. Application No.: 63/390,711. Provisional Application submitted by priority date: 20 July 2022
- 2022 Kerensky M, Kempinski K, Thakor N, Theodore N. and **Manbachi A**. Methods, systems, and computer readable media for storing and processing ultrasound audio data. Application No.: 63/390,713. Provisional Application submitted by priority date: 20 July 2022
- 2023 Smit C, Robinson K, Kempinski Leadingham KM, Theodore N and **Manbachi A**. Apparatus and methods for placement or fixation of spinal implants. Invention ID: C 17716. Disclosed: 8 Jan 2023.

### Technology Transfer Activities

- 2013-2015 CEO and Founder, Spinesonics Medical Inc., Toronto, Canada
- 2016-present Technical Advisor, Neurosonics Medical (Minimally Invasive Focused Ultrasound for Neuro-oncology), Baltimore, MD – Note: the company is potentially interested in licensing one of our patent applications ((PCT/US18/20159) and is in the process of licensing negotiations
- Apr 2021 Informational Meeting with FDA (Q210447) about the prototypes of DARPA BG+ program
- Jan 2023 Johns Hopkins Technology Ventures given licensing option to Longevity Neuro (Invention ID C17180).
- Jan 2023 FDA breakthrough device designation granted to our MUSIC device invention. (Invention ID: 15551)

### Research Demonstration Activities

- May 2021 Touring the HEPIUS lab to *internal* group (Dr. Richard Bennett, President of the Johns Hopkins Bayview Hospital).
- May 2021 Touring the HEPIUS lab to *internal* group (Dr. Susanna Thon, Johns Hopkins Electrical Engineering).
- June 2021 Touring the HEPIUS lab to *internal* group (Dr. Aliaksei Pustavoitau, Anesthesiology).
- July 2021 Touring the HEPIUS lab to *external* group (Jesse Christopher, CEO of Longevity, Baltimore, MD).

July 2021	Touring the HEPIUS lab to <i>internal</i> group (Dr. Ed Schlesinger, Dean of Hopkins Engineering).
Aug 2021	Touring the HEPIUS lab to <i>external</i> group (Asaf Toker, CEO of Matricelf, Israel).
Sept 2021	Touring the HEPIUS lab to <i>external</i> and <i>internal</i> group, as part of our grand opening event. External visitors: Dr. Alfred Emondi (DARPA); Dr. Emily White and Dr. Suzanne LeBlang (Focused Ultrasound Foundation); Kyle Morrison and Theresa Jacoby (Sonic Concepts, LLC); Sheri Lewis and Suzy Kennedy (Applied Physics Laboratory, APL); Internal visitors: Dr. Redonda Miller (virtual, President of the Hopkins health system); Dr. Richard Bennett (President of the Johns Hopkins Bayview hospital); Dr. Landon King (Executive Vice Dean, Johns Hopkins Medicine); Dr. Geoffrey Ling (Professor of Neurology, Johns Hopkins Medicine); Dr. Ed Schlesinger (Dean, Johns Hopkins Engineering); Dr. Larry Nagahara (Associated Dean of Research, Johns Hopkins Engineering); Dr. Henry Brem (Professor and Chair, Johns Hopkins Neurosurgery);
Oct 2021	Touring the HEPIUS lab to <i>internal</i> group (Dr. Mehran Armand, Johns Hopkins Orthopedics).
Nov 2021	Touring the HEPIUS lab to <i>internal</i> group (Dr. Amiethab Aiyer, Johns Hopkins Orthopedics).
Dec 2021	Touring the HEPIUS lab to <i>internal</i> group (Dr. Michael Caterina, Johns Hopkins Neurosurgery Pain Institute).
Jan 2022	Touring the HEPIUS lab to <i>internal</i> group (Dr. Youseph Yazdi, Center for Bioengineering Innovation and Design, Johns Hopkins Biomedical Engineering).
Feb 2022	Touring the HEPIUS lab to <i>internal</i> group (Dr. Yousef Salimpour, Johns Hopkins Neurosurgery Pain Institute).
Mar 2022	Touring the HEPIUS lab to <i>internal</i> group (Dr. Claire Hur, Johns Hopkins Mechanical Engineering).
Mar 2022	Touring the HEPIUS lab to <i>external</i> group (Dr. Hannah Claridge, Head of Neurotechnology, TTP plc, Cambridge, England, United Kingdom).
June 2022	Touring the HEPIUS lab to <i>internal</i> group (Dr. Matthias Ringkamp / Dr. Gang Wu, Johns Hopkins Neurosurgery Pain Institute).
July 2022	Touring the HEPIUS lab to <i>internal</i> group (Johns Hopkins Bayview, Administrative Residency Program).
July 2022	Touring the HEPIUS lab to <i>internal</i> group (Johns Hopkins Patient Advocacy Advisory Group).
Apr 2022	Touring the HEPIUS lab and <i>external</i> demo to CDR JP Chrétien, DARPA BTO program manager
July 2022	Touring the HEPIUS lab to <i>external</i> patient advocate from Pittsburgh, PA.
July 2022	Touring the HEPIUS lab to <i>external</i> company (CraniUS, Baltimore, MD).
Aug 2022	Touring the HEPIUS lab to <i>external</i> executive (Alan Ravitz, Chief Engineer National Health Mission Area, Johns Hopkins Applied Physics Laboratory, Laurel, MD).

## ORGANIZATIONAL ACTIVITIES

### Institutional Administrative Appointments

2008-2009	Vice President Internal Executive, Biomedical Engineering Students Association, University of Toronto
2011	Charity Coordinator Executive, Biomedical Engineering Student Association, University of Toronto
2013	Iron Ring Ceremony Registration Officer, Convocation Hall, University of Toronto
2013	Department Ambassador for Scientific Day, Journal of Visualized Experiments
2013	Departmental Representative for student body, 5-year cycle external review, IBBME Department, University of Toronto
2016	Invited judge for departmental scientific day presentations
2017	Organizer, Undergraduate Students Design Course Annual Kickoff event: <a href="https://www.bme.jhu.edu/news-events/news/undergrads-kick-off-semester-design-sprint-challenge/">https://www.bme.jhu.edu/news-events/news/undergrads-kick-off-semester-design-sprint-challenge/</a>
2018	Organizer and instructor, one-week intersession workshop on business communications skills: <a href="https://www.bme.jhu.edu/news-events/news/bme-launches-one-week-intersession-workshop/">https://www.bme.jhu.edu/news-events/news/bme-launches-one-week-intersession-workshop/</a>
2018	Co-organizer, Johns Hopkins CBID Shark Tank event
2018-2019	Co-organizer, 2018 Johns Hopkins Healthcare Design Competition
2018-2019	Member of Master's program Admissions Committee, Johns Hopkins Center for Bioengineering Innovation and Design
2019	Member of PhD program Admissions Committee, Johns Hopkins BME Department

### Editorial Board Appointments

- 2013-present Editorial Peer Review Board member, Journal of Visualized Experiments:  
<https://www.jove.com/authors/peer-review>
- 2016--present Reviewer, SPIE's Journal of Medical Imaging: <https://www.spiedigitallibrary.org/journals/journal-of-medical-imaging/volume-4/issue-1/010101/JMI-2016-List-of-Reviewers/10.1117/1.JMI.4.1.010101.full>
- 2019--present Reviewer, SPIE's Journal of Biomedical Optics: <https://www.spiedigitallibrary.org/journals/journal-of-biomedical-optics/volume-25/issue-1/010101/2019-List-of-Reviewers/10.1117/1.JBO.25.1.010101.full>
- 2020--present Associate Editor –Springer's *Medical & Biological Engineering & Computing Journal*:  
<https://www.springer.com/journal/11517/editors>
- 2021--present Editorial Advisory Board – Elsevier's Ultrasonics Journal:  
<https://www.journals.elsevier.com/ultrasonics/editorial-board/amir-manbachi-phd>
- 2022--present Review Editor on the Editorial Board of Neural Technology  
(Specialty section of Frontiers in Neuroscience).
- 2022--present Guest Editor on Special Issue on “*Current Methods in Focused Ultrasound Research*”  
(Journal of Visualized Experiments, JoVE)  
<https://www.jove.com/methods-collections/1866/current-methods-in-focused-ultrasound-research>

### Professional Societies

- 2011--present Canadian Medical and Biological Engineering Society, member
- 2011--present Clinical Engineering Society of Ontario, member
- 2012--present North American Spine Society, member
- 2013-present Ontario Brain Institute Entrepreneurs Program, alumnus
- 2015--present American Heart Association, student member

### Conference Organizer

- 2009 Departmental Annual Conference (IBBME Scientific Day 2009), Institute for Biomaterials and Biomedical Engineering, University of Toronto

### Consultantships

- 2015-2016 Spinesonics Medical Inc. (Toronto, Ontario, Canada)
- 2015-2016 Artin Biomed Inc. (Toronto, Ontario, Canada)
- 2018-present Neurosonics Medical Inc. (Baltimore, Maryland, USA)
- 2022-present Longevity NeuroSolutions (Baltimore, Maryland, USA)

## RECOGNITION

### Awards, Honors

- 2006-2007 Engineering Society Award, University of Toronto
- 2011 Graduate Student Endowment Fund Scholarship, University of Toronto
- 2011 Faculty of Applied Science and Engineering TA Award, nominee, University of Toronto
- 2011-2014 Ontario Graduate Scholarship, Ontario Ministry of Training, Colleges and Universities
- 2013 University of Toronto TATP Teaching Excellence Award, finalist, University of Toronto
- 2014 2-Minute Thesis Video Departmental Competition, first place, Institute for Biomaterials and Biomedical Engineering, University of Toronto
- 2015 Science, Action! Video Contest, first place, Natural Sciences and Engineering Research Council of Canada
- 2015 Inventor of the Year Award, University of Toronto
- 2018 Nominated by the Johns Hopkins University students as a 2018 “Career Champion”, Career Center
- 2018 Nominated by the Johns Hopkins University BME students as “*The Professor most likely to be found in the lab on the weekends!!!!*”
- 2018 Whiting School of Engineering's Robert B. Pond Sr. Excellence in Teaching Excellence Award, Johns Hopkins University
- 2022 Baltimore Business Journal's 2022 class of 40 Under 40 honorees:  
<https://www.bizjournals.com/baltimore/news/2022/09/19/baltimore-business-journal-40-under-40-2022.html>



- [2023](#) 2023 Maryland Inno Fire Award, recognizing our lab as one of the top 8 most innovative programs and one of only two medical entities:  
<https://www.bizjournals.com/baltimore/inno/stories/awards/2023/03/06/inno-fire-awards-2023-companies-revealed.html>

### Invited Talks

#### JHMI/Regional

- 2016 Invited speaker, Johns Hopkins FastForward's Alliance pitch competition
- 2017 Invited speaker, Johns Hopkins Innovation Factory Summit
- 2017 Invited speaker, Johns Hopkins Neurosurgery Grand Rounds, invited by Dr. Henry Brem:  
<https://twitter.com/JHUBME/status/926545804369842177>
- 2017 Invited speaker, Johns Hopkins Undergraduate Engineering Sampler, invited by Dr. Michael Falk, Vice Dean of Undergraduate Education
- 2018 Invited speaker, Karp lab, Brigham and Women's Hospital, Harvard Medical School
- 2018 Invited speaker, Johns Hopkins Institute for Clinical and Translational Research, CATALiST Seminar
- 2018 Invited speaker, wearables and sensors, JHU BME instrumentation course. Invited by Dr. Nitish Thakor
- 2018 Invited speaker, Design, Johns Hopkins University, Whiting School of Engineering, Family Weekend
- 2018 Invited speaker, Design, Innovation and problem solving. Maryland Institute College of Art (MICA) Invited by Leslie Speer (Chair of Product Design)
- 2019 Invited speaker, Johns Hopkins Whiting School of Engineering's Inaugural DARPA day
- 2021 Invited interview, Habits and Hacks with Amir Manbachi, PhD | Faculty Factory Podcast | Episode 106 (29 Jan 2021) Invited by Dr. Kimberly Skarupski, Senior Associate Dean for Faculty Development, Johns Hopkins Medicine. <https://youtu.be/xG-BFk0k5l0>
- 2021 Invited speaker, Maryland Development Center's Healthtech Entrepreneurs monthly meetup (19 Aug 2021), Invited by Dr. Nao J Gamo
- 2021 Invited speaker, BME-X Symposium: Advances in Ultrasound Imaging (21 Sept 2021). Invited by Dr. Jeffrey H Siewerdsen
- 2022 Invited speaker (internal), Johns Hopkins Hospital, Sentinel Event Group's meeting for RCA (Root Cause Analysis) associated with patient safety, re foreign body objects (11 Mar 2022), Invited by Valerie Strockbine and Dr. Peter Hill.
- 2023 Invited speaker (internal), Johns Hopkins Hospital, Department of Neurosurgery's Grand Rounds (12 Jan 2023), invited by Dr. Henry Brem

#### National

- 2018 Invited speaker, Engineering Design Education, UNC & NC State Joint Department of Biomedical Engineering. Invited by Dr. Devin Hubbard.
- 2021 Invited speaker, GBM Workshop: Minimally Invasive Focused Ultrasound for Neurosurgical Treatments (27 May 2021) Invited by Focused Ultrasound Foundation: <https://youtu.be/Uk142KJfUao>
- 2021 Invited speaker (external), Focused Ultrasound Foundation, Charlottesville, VA. (1 Oct 2021), Invited by Dr. Emily White, Dr. Neal Kassal
- 2022 Invited speaker (external), George Mason University, Virginia, USA (25 Feb 2022), Invited by Dr. Shaghayegh Bagheri
- 2022 Invited speaker (external) on the topic of "Recent Advances in Neuromodulation Technologies" (10 Mar 2022), invited by 19th Annual World Congress for Brain Mapping and Therapeutics
- 2022 Invited speaker (external), University of Hawai'i at Mānoa (4 May 2022) Invited by Tyler Ray
- 2022 Invited speaker (external), BK Medical's MasterClass, Chicago, USA (18 Jun 2022), Invited by Meraj Khan, Kerri Desmarais, Brittany Griffith, Scott Whitely.
- 2022 Invited speaker (external), Terasaki Institute, LA, USA (12 Sept 2022), Invited by Ali Khademhosseini.
- 2022 Invited speaker (external), University of Florida's Department of Neurosurgery's Grand rounds, Gainesville, Florida, USA (15 Sept 2022), Invited by Dr. Colleen Kock and Dr. Brian Hoh.
- 2023 Invited speaker (external), Brown University, School of Engineering, Rhode Island, USA (13 Feb 2023), Invited by Dr. David Borton
- 2023 Invited speaker (external), Mass General Brigham (MGB)'s Center for ,Ultrasound Research and Translation (CURT), Boston Massachusetts, USA (14-15 Mar 2023), Invited by Dr. Anthony Samir.

#### International

- 2013 Invited speaker, Alumni Reunion Panelist, Division of Engineering Science, University of Toronto

- 2013-2014 Invited speaker, From undergrad to medical technology startup, Club for Undergraduate Biomedical Engineering, University of Toronto
- 2015 Invited speaker, The story of a student entrepreneur, Biomedical Engineering Undergraduate Seminar Series, University of Toronto
- 2015 Invited speaker, The story of a student entrepreneur: turning PhD research into an investment opportunity, Techna Rounds, Institute for the Advancement of Technology for Health, Canada
- 2015 Invited speaker, Ultrasound navigated spine surgery, NeuSTEP, Canada
- 2020 Invited speaker, Sharif University (Tehran, Iran) student association's "BioMed Journal Club" (26 July 2020): <https://youtu.be/5Fj-gRk1E5A>
- 2021 Invited speaker, e-Seminar Series on Translational Biomedical Engineering, national caliber virtual seminar (10 March 2021), Invited by Drs. Houman Savoji (University of Montreal, Canada) and Mohsen Akbari (Univ of Victoria, Canada): <https://youtu.be/abbK8hzFvFw>
- 2021 Invited speaker, "*an evening with an academic entrepreneur*" on the Clubhouse platform (10 Apr 2021) Invited by Dr. Houman Savoji (University of Montreal, Canada)
- 2022 Invited speaker (external), University of Manitoba, Canada (17 Feb 2022), Invited by Dr. Elham Salimi
- 2022 Invited speaker (external), University of Toronto's Engineering Science Undergraduate Division. (8 Jun 2022) Invited by Shivang Mistry
- 2022 Invited speaker (external), Feng Chia University's department of Chemical Engineering, Taichung, Taiwan (13 Jun 2022), Invited by Dr. Yi-Chen Ethan Li, Assistant Professor
- 2023 Invited talk (external), EPFL's NeuroRestore, Lausanne, Switzerland (17 July 2023), Host: Dr. Robin Demesmaeker
- 2023 Invited talk (external), Wyss Center for Bio and NeuroEngineering, Geneva, Switzerland (18 July 2023), Host: Dr. Tracy Laabs

#### Visiting Professorship

- 2022 Invited speaker (external), Northwestern University, Chicago, USA (3 Mar 2022), invited by Northeastern University's BME and Neurosurgery departments
- 2022 Invited speaker (external), University of Utah, Salt Lake City, Utah, USA (30 Sept 2022), invited by Florian Solzbacher, Department Chair
- 2023 Invited speaker (external), University of Maryland Baltimore (UMB)'s Institute for Clinical and Translational Research (ICTR) Enrichment Seminar, Baltimore, MD, USA (10 Jan 2023), invited by Dr. Stephen Davis, Department of Medicine's Chair: <https://elm.umaryland.edu/announcements/2022/Towards-Building-a-Clinically-Inspired-Ultrasound-Innovation-Hub.php>

## OTHER PROFESSIONAL ACCOMPLISHMENTS

### Conference Posters

- Manbachi A**, Hoi YM, Steinman DA. Characterization of common carotid artery curvature and its impact on velocity profile shape. American Society of Mechanical Engineers Summer Bioengineering Conference. Naples, FL, USA. June 2010.
- Manbachi A**, Lashkari B, Mandelis A, Cobbold RSC. Bone sonography: models for studying the propagation of fast and slow waves in trabecular bone. Institute for Biomaterials and Biomedical Engineering, Departmental Scientific Day. Toronto, ON, Canada. May 2012.
- Manbachi A**, Keshavarzian A, Gdyczynski C, Ginsberg HJ and Cobbold RSC. Low-frequency radial imaging array for ultrasound-navigated spinal fusion surgery. Biomedical Engineering Society conference. San Antonio, TX, USA. October 2014.
- Vora P, Chiang E, Barnes K, Cai S, Chen C, Subramanya A, Chaurasia A, Rosen A, **Manbachi A**, Eghrari A, Allen RH. A device for preloaded, tri-folded grafts to facilitate Descemet's Membrane Endothelial Keratoplasty. Biomedical Engineering Society Annual Meeting. Phoenix, AZ, USA. October 2017.
- Gamo NJ, Iyer R, Zhang X, Ellens N, Belzberg M, Yazdi Y, Siewerdsen JH, Cohen AR, Brem H, Groves M, **Manbachi A**. Minimally invasive focused ultrasound for ablative neuro-oncology: design and fabrication. American Association of Neurological Surgeons (AANS) 2018 Annual Scientific Meeting. Presented as e-poster, ID: 42594.
- Gamo NJ, Iyer R, Keshavarzian T, Restaino S, Morrison K, Yazdi Y, Cohen AR, Brem H, Groves M, **Manbachi A**. Design, manufacturing and cadaveric validation of a minimally invasive focused ultrasound theranostic device for ablative neuro-oncology. poster presentation, Congress of Neurological Surgeons. Houston, TX, USA. October 2018.

7. Allred G, Blair T, Chen V, Gould A, Khatri S, Liu J, Mahatme R, Murty N, Headley E, Zwernemann M, Hammond J, **Manbachi A**. Design, development, and evaluation of a remoldable, jammable orthosis to improve distal radius fracture management. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #337.
8. Bhethanabotla R, Deng C, Tran L, Yoo SJ, Mou J, Ye J, Igboko M, Tu K, Diaz C, Iyer R, Cohen A, **Manbachi A**. Design and validation of a novel expandable brain retractor for accessing deep-seated lesions. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #420.
9. Gamo NJ, Iyer R, Restaino S, Morrison K, Cohen A, Brem H, Groves M, **Manbachi A**. Design, development and cadaveric validation of a minimally invasive theranostic device for ablative neuro-oncology. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #2359.
10. Hu K, Lapinski M, Mischler G, Punnoose J, Chan L, Coronado A, Koo M, Najmi R, Allen RH, Seay R, **Manbachi A**. Reusable intrauterine tamponade for managing postpartum hemorrhage in low-resource settings. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #51.
11. Kambhampati S, Ainechi A, Kyranakis S, Cai E, Dashora H, Park A, Shen J, Zhang S, Powers J, Zwernemann M, Kaushik A, Wang J, Chai R, Ying G, Zhang YS, Silwick L, Nodel A, Molina C, Suk I, Gorelick N, Tyler B, Yazdi Y, Theodore N, **Manbachi A**. Application of Doppler ultrasound to measurement of spinal cord blood flow in spinal cord injuries. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #303.
12. Lee JM, Ye B, Fernandes G, Wu E, Wolfinger B, Mogul D, **Manbachi A**. At-home automated device for therapeutic monitoring of tacrolimus. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #44.
13. Liao I, **Manbachi A** and Thakor N. Sound Psyche: a mobile application to promote mental health in the college demographic. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #930.
14. Navarro D, Schlesinger D, Najmi R, Ayyappan V, Zhao W, Wiegand H, Hemmati S, Kleine A, Heier C, Luciano MG, **Manbachi A**. Experimental characterization of valve behavior in hydrocephalus shunts. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #338.
15. Navarro D, Schlesinger D, Najmi R, Ayyappan V, Zhao W, Wiegand H, Hemmati S, Kleine A, Heier C, Luciano MG, **Manbachi A**. Computational modeling of valve behavior in hydrocephalus shunts. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #855.
16. O'Sullivan A, Lu R, Musmanno O, Burnette E, Kedia V, Rines J, Fischer C, Seabrooke A, Allen R, **Manbachi A**, Weiss C. Design, development, and validation of an improved biopsy device for diagnosing cholangiocarcinoma. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #2987.
17. Sukardi S, Pennington Z, Ahmed AK, Sciubba D, **Manbachi A**. Design, development and validation of an automated method of calculating parameters from CT scans: with potential implications to determine the surgical viability of a patient. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #311.
18. Triantis S, Zawicki V, Hinson L, Lee M, Callanan M, Harvey S, **Manbachi A**. Design, development and evaluation of a core needle biopsy device towards reducing the risk of contamination in low-resource settings. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #575.
19. Ung G, Kim H, Obert RT, Liang T, Iyer R, Groves M, **Manbachi A**. Design and validation of 3D printed spinal vertebral phantoms for medical education. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #891.
20. Wei J, Ahmed AK, Sciubba D, **Manbachi A**. Design and development of an automated method of calculating parameters from spinal radiographs. Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Poster presentation, abstract ID #339.
21. Arpornsuksant P, Bai Y, Egyen-Davis D, Kedia V, Lee C, Pitaktong I, Xu M, Zhu L, **Manbachi A**, Jassal M, Lee C. Design and validation of a dry powder inhaler adaptor to enhance delivery of asthma medication. Biomedical Engineering Society 2019 Annual Meeting. Respiratory Bioengineering, Drug Delivery track, Respiratory Bioengineering, Philadelphia, PA, USA. Poster presentation, abstract ID #517.
22. Belzberg M, Chavez F, Morrison K, Xiong KT, Mahapatra S, **Manbachi A**. Benchtop validation of an ultrasound-guided, ultrasound-therapy neurosurgery probe on tissue mimicking phantoms. Biomedical Engineering Society 2019 Annual Meeting. Biomedical Imaging and Instrumentation, Track. From Diagnostics to Theranostics and Image-Guided Therapy. Philadelphia, PA, USA. Poster presentation, abstract ID #66.
23. Chaurasia A, State C, Yan J, Li R, McCarren K, Takasuka H, Jithendra A, Bender E, Oni J, **Manbachi A**. A novel method for assessing leg length intraoperatively using an infrared motion controller. Biomedical Engineering

Society 2019 Annual Meeting. Orthopaedic and Rehabilitation Engineering, Track. Philadelphia, PA, USA. Poster presentation, abstract ID #634.

24. Kambhampati S, Ainechi A, **Mahapatra S**, **Belzberg M**, **Zhu A**, **Pennington Z**, Westbroek E, Jian B, Suk I, Yazdi Y, Theodore N, **Manbachi A**. Can ultrasound detect spinal cord blood flow in patients with spinal cord injuries? Biomedical Engineering Society 2019 Annual Meeting. Biomedical Imaging and Instrumentation, Track. Ultrasound Imaging and Therapeutic Ultrasound (US). Philadelphia, PA, USA. Poster presentation, abstract ID #811.
25. **Vora P**, **Inserni M**, **Lai A**, **Lapinski M**, **Wang J**, **Kim M**, **Lee D**, **Yu R**, Clarke W, Arroyo N, **Manbachi A**, Atta M. Development of a portable, at-home blood potassium monitoring device. Biomedical Engineering Society 2019 Annual Meeting. Undergraduate Research & Design, Track. Device Technologies and Biomedical Robotics. Philadelphia, PA, USA. Poster presentation, abstract ID #492.
26. Kerensky M, Liang R, Curry EJ, **Thakor N**, **Theodore N**, **Manbachi A**. 513 Towards Obtaining One Billion Recordings Per Cubic Millimeter for the Validation of Focused Ultrasound Transducers: How Can Robust Systems Help With Translational Activities? *Journal of Clinical and Translational Science*. Cambridge University Press; 2022;6(s1):105–.
27. Kerensky M, **Doloff JC**, **Thakor N**, **Theodore N**, **Manbachi A**. 524 How Can I Provide My Patient Insights in a Nontraditional Advocacy Role? *Journal of Clinical and Translational Science*. Cambridge University Press; 2022;6(s1):109–.
28. Kerensky M, **Doloff JC**, **Thakor N**, **Theodore N**, **Manbachi A**. 216 An Example for Establishing a Clinically Translational Innovation Lab at a University Setting. *Journal of Clinical and Translational Science*. Cambridge University Press; 2022;6(s1):35–.

#### Oral / Podium Presentations

1. Gioffi M, Moretti M, **Manbachi A**, Chung BG, Khademhosseini A, Dubini G. Shear stress and cell docking inside micro fluidic systems: a computational and experimental study. European Society of Biomechanics Congress. Lucerne, Switzerland. July 2008.
2. **Manbachi A**, Aly AH, Ginsberg H, Cobbold RSC. Ultrasound guidance for spinal fusion surgery. Clinical Engineering Society of Ontario. Toronto, Canada. November 2010.
3. Lashkari B, Mandelis A, **Manbachi A**, Cobbold RSC. Photoacoustic and ultrasonic signature of early trabecular bone loss. First Canadian Conference and Workshop on Photoacoustics and Photothermics of Biosystems. Sunnybrook Institute, Toronto, Canada. May 2012.
4. **Manbachi A**. Pedicprobe: an ultrasound navigation probe for spinal fusion surgery. Ontario Centres of Excellence Discovery Conference, 3-min student video competition. Toronto, Canada. May 2013. (Won third place.)
5. **Manbachi A**. Spinesonics Medical Inc. presents: device that allows visualization of screw positioning during insertion into the spine. Ontario Centres of Excellence Discovery Conference. Toronto, Canada. May 2013. (Awarded OBI Entrepreneurs Fellowship.)
6. **Manbachi A**. Design and fabrication aspects for ultrasound-guided spine surgery. Artimino Ultrasound Conference. Florence, Lake Rosseau, Canada. June 2013.
7. **Manbachi A**, Lee M, Foster FS, Ginsberg HJ, Cobbold RSC. Design and fabrication of a low-frequency (1-3 MHz) ultrasound transducer for accurate placement of screw implants in the spine. SPIE Medical Imaging Conference. San Diego, CA, USA. February 2014. Proc. SPIE 9040, Medical Imaging 2014: Ultrasonic Imaging and Tomography, 90400H. doi: 10.1117/12.2042965
8. De Silva T, Punnoose J, Uneri A, Goerres J, Jacobson M, Ketcha MD, **Manbachi A**, Vogt S, Kleinszig G, Khanna AJ, Wolinsky JP, Osgood G, Siewerdsen JH. C-arm positioning using virtual fluoroscopy for image-guided surgery. SPIE Medical Imaging. Orlando, FL, USA. February 2017.
9. **Manbachi A**, De Silva T, Uneri A, Jacobson M, Goerres J, Ketcha M, Han R, Aygun N, Thompson D, Ye X, Vogt S, Kleinszig G, Molina C, Garzon-Muvdi T, Raber MR, Groves M, Wolinsky JP, Siewerdsen JH. Clinical translation of the LevelCheck algorithm for automatic localization of target vertebrae in spine surgery. North American Spine Society Annual Meeting. Orlando, FL, USA. October 2017.
10. **Zhang X**, Ellens NPK, **Belzberg M**, Miller P, Cohen AR, Brem H, Siewerdsen JH, **Manbachi A**. Design of a low-power, minimally invasive high intensity focused ultrasound device for ablative applications in neuro-oncology: a simulation study. 59th AAPM Annual Meeting & Exhibition. Denver, CO, USA. July-August 2017. (Top 17% of submissions selected for podium presentation.)
11. **Kiyasseh D**, **Lopez R**, **Borders D**, **Morikubo M**, **Achebe CN**, **Marintelli I**, **Mukhopadhyay P**, **Escovar H**, **Caldwell J**, **Johnson C**, **Gurewitsch E**, **Manbachi A**. Design, development, and validation of an approach to shift and lift patients intraoperatively: towards fast and safe repositioning of patients between supine and lithotomy.



- Biomedical Engineering Society 2018 Annual Meeting. Atlanta, GA, USA. Accepted for podium presentation, in Device Technologies and Biomedical Robotics, “Assistive Technologies” session. (Oct, 2018)
12. Chaurasia A, Yan J, Li R, McCarren K, State C, Takasuka H, Bender E, Jithendra A, Oni J, **Manbachi A**. An evaluation of sensing technologies to measure intraoperative leg length for total hip arthroplasty. *Design of Medical Devices* DMD2020-9056 (Track 6: Surgical Tools) <https://youtu.be/wyFK2gqWGD0>
  13. Vora P, Inserni M, Lai A, Lapinski MM, Wang J, Kim MJ, Lee D, Yu R, **Manbachi A**, Atta MG. Development of a portable blood potassium monitoring device for dialysis patients. *Design of Medical Devices* DMD2020-9066 (Track 5: Sensors).
  14. Kim JH, Um R, Iyer R, Theodore N, **Manbachi A**. Development of voice-controlled smart surgical bed. *Design of Medical Devices* DMD2020-9065 (Track 6: Surgical Tools)
  15. Balamurugan M, Chung K, Kuppoor V, Mahapatra S, Pustavoitau A, **Manbachi A**. Usdl: inexpensive medical imaging using deep learning techniques and ultrasound technology. *Design of Medical Devices* DMD2020-9109 (Track 2: Neuroengineering) <https://youtu.be/LytHHUuuLFE>
  16. Bechtold R, Garlow B, Tandon A, Szewc A, Liu R, Zhu W, Musmanno O, Coles G, Gorelick N, Suk I, Huang J, Brem H, **Manbachi A**. Minimizing cotton ball retention in neurological procedures. *Design of Medical Devices* DMD2020-9042 (Track 6: Surgical Tools) <https://youtu.be/IK0gKGLTcKI>
  17. Mahapatra S, Kaovasia TP, Ainechi S, Ainechi A, Acord M, Curry EJ, Aghabaglou F, Tyler B, Theodore N, **Manbachi A**. Design of an ultrasound probe holder to minimize motion artifact during sonography. *Proceedings of the 2021 Design of Medical Devices Conference*. 2021 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2021. V001T01A003. ASME. <https://doi.org/10.1115/DMD2021-1049>
  18. Yoo SJ, Mou J, Elizabath R, Sivakumar A, DeBrabander R, Shifman M, Tu K, Ishida W, Fouda M, **Manbachi A**, & Cohen AR. The Design and Use of a Minimally-Invasive, Expandable Retractor for Deep-Seated Brain Lesions. *Proceedings of the 2021 Design of Medical Devices Conference*. 2021 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2021. V001T13A005. ASME. <https://doi.org/10.1115/DMD2021-1023>
  19. Acord M, Kaovasia TP, Gamo NJ, Xiong T, Curry EJ, Aghabaglou F, Morrison K, Tyler B, Luciano M, **Manbachi A**. Design and fabrication of a focused ultrasound device for minimally invasive neurosurgery: reporting a second, miniaturized and MR-compatible prototype with steering capabilities. *Proceedings of the 2021 Design of Medical Devices Conference*. 2021 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2021. V001T13A009. ASME. <https://doi.org/10.1115/DMD2021-1062>
  20. Zeng Y, Acord M, Kaovasia TP, Miao P, Sun J, Tong S, Curry EJ, Aghabaglou F, Theodore N, Thakor N, **Manbachi A**. A miniature laser speckle contrast imager for monitoring the neuromodulatory effect of transcranial ultrasound stimulation. *Proceedings of the 2021 Design of Medical Devices Conference*. 2021 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2021. V001T09A001. ASME. <https://doi.org/10.1115/DMD2021-1038>
  21. Hersh AM, Weber-Levine C, Awosika T, Theodore J, Bauer SJ, Quiroz VM, Zmily OM, Tsehay Y, Kerensky M, **Manbachi A**, Theodore N, Doloff JC. Upregulation of genetic biomarkers of cellular response in a porcine model of spinal cord injury. 2022 AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Las Vegas, NV, USA. February 2022.
  22. Hersh AM, Tsehay Y, Weber-Levine C, Awosika T, Kerensky M, Routkevich D, Zeng Y, Shah P, Liu A, Curry E, Aghabaglou F, **Manbachi A**, Theodore N. Low-intensity focused ultrasound stimulation increases local blood flow to the spinal cord. 2022 Annual Integrative Ultrasound Meeting. San Diego, CA, USA. March 2022.
  23. Hersh AM, Tsehay Y, Awosika T, Weber-Levine C, Kerensky M, Routkevich D, Abramson H, Kempski K, Aghabaglou F, Curry E, **Manbachi A**, Theodore N. Intraoperative non-contrast enhanced ultrasound to investigate spinal cord perfusion in a porcine model of spinal cord injury. 2022 Annual Integrative Ultrasound Meeting. San Diego, CA, USA. March 2022.
  24. Mess G, Thombre R, Kerensky M, Curry EJ, Aghabaglou F, Alomari S, Brem H, Theodore N, Tyler B, **Manbachi A**. Designing a murine model of human glioblastoma brain tumor: development of a platform for validation using ultrasound elastography. *Proceedings of the 2022 Design of Medical Devices Conference*. 2022 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2022. V001T08A001. ASME.
  25. Thombre R, Mess G, Curry EJ, Mejia R, Liang R, Aghabaglou F, Kerensky M, Abramson H, VanSickle R, Tyler B, Theodore N, & **Manbachi A**. Design and development of system components for therapeutic ultrasound devices: enhancing focused ultrasound treatments using cones with clinical and ergonomic considerations. *Proceedings of the 2022 Design of Medical Devices Conference*. 2022 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2022. V001T05A001. ASME. <https://doi.org/10.1115/DMD2022-1030>
  26. Abramson H, Curry EJ, Sampath K, Wissman J, Mess G, Thombre R, Mahapatra S, Aghabaglou F, Theodore N, Pustavoitau A, **Manbachi A**. Towards a universal device for point-of-care medicine: a custom transducer for long-term monitoring of local vascular flow via ultrasound imaging. *Proceedings of the 2022 Design of Medical Devices*



- Conference*. 2022 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2022. V001T01A001. ASME. <https://doi.org/10.1115/DMD2022-1006>
27. [Liang R](#), [Kerensky M](#), [Curry EJ](#), [Mess G](#), [Thombre R](#), [Kamal S](#), [Aghabaglou E](#), [Mejia R](#), Chavez F, Morrison K, Thakor N, Theodore N, **Manbachi A**. Designing an accurate benchtop characterization device: an acoustic measurement platform for localizing and implementing therapeutic ultrasound devices and equipment (amplitude). *Proceedings of the 2022 Design of Medical Devices Conference*. 2022 Design of Medical Devices Conference. Minneapolis, MN, USA. April 2022. V001T10A003. ASME. <https://doi.org/10.1115/DMD2022-1046>
  28. [Hersh A](#), [Weber-Levine C](#), **Manbachi A** and Theodore N. Advances in Ultrasound for Spinal Cord Injury, From Imaging to Treatment. Presented by N. Theodore as a podium in 84<sup>th</sup> Annual Meeting of the American Academy of Neurological Surgery, Colorado. Sept28-Oct1 2022.
  29. [Kempski K](#), [Abramson HG](#), [Perdomo-Pantoja A](#), [Thombre R](#), Gordon C, Armand M, and **Manbachi A**. Design of a custom flexible ultrasound transducer as an implantable sensor for long-term post-operative brain monitoring. *2022 IEEE International Ultrasonics Symposium (IUS)*, Venice, Italy, 2022, pp. 1-4, doi: 10.1109/IUS54386.2022.9958345.
  30. [Routkevitch D](#), [Hersh AM](#), [Kempski Leadingham KM](#), [Kerensky M](#), Theodore N, Thakor NV, and Manbachi A. "FlowMorph: Morphological Segmentation of Ultrasound-Monitored Spinal Cord Microcirculation," *2022 IEEE Biomedical Circuits and Systems Conference (BioCAS)*, Taipei, Taiwan, 2022, pp. 610-614, doi: 10.1109/BioCAS54905.2022.9948639.
  31. [Kumar A](#), [Tsehay Y](#), [Kerensky MJ](#), Gonzalez E, Bell MAL, Theodore N, Thakor NV, and **Manbachi A**. "Computational Modeling Towards Focused Ultrasound Therapy for Spinal Cord Injury: Visualization of Beam Propagation through Patient-Specific Anatomy" *2023 SPIE Medical Imaging Conference*, San Diego, US.
  32. [Kumar A](#), [Punnoose J](#), [Kempski Leadingham KM](#), [Kerensky MJ](#), Theodore N, Thakor NV, and **Manbachi A**. "A Patient-specific Preplanning Treatment Algorithm for Focused Ultrasound Therapy of Spinal Cord Injury," *2023 11th International IEEE/EMBS Conference on Neural Engineering (NER)*, Baltimore, MD, USA, 2023, pp. 1-4, doi: 10.1109/NER52421.2023.10123718.
  33. [Routkevitch D](#), [Menta AK](#), [Kats N](#), Baca E, Soulé Z, [Kempski Leadingham KM](#), [Hersh AM](#), Theodore N, Thakor NV, and **Manbachi A**. "Measurement of Single-Vessel Flow Parameters for Vascular Characterization of Spinal Cord Injury," *2023 11th International IEEE/EMBS Conference on Neural Engineering (NER)*, Baltimore, MD, USA, 2023, pp. 1-4, doi: 10.1109/NER52421.2023.10123780.

### Community Services

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|-----------|---|
| 2011      | Deputy Returning Officer, Elections Canada  |
| 2011      | Electoral Campaign Volunteer, Provincial Elections Candidate of the Richmond Hill riding, Ontario, Canada   |
| 2011      | Supervising Deputy Returning Officer, Elections Ontario, Canada   |
| 2011      | Charity Coordinator Executive, Biomedical Engineering Student Association, University of Toronto  |
| 2013      | Iron Ring Ceremony Registration Officer, Convocation Hall, University of Toronto  |
| 2013      | Department Ambassador for Scientific Day, Journal of Visualized Experiments   |
| 2013      | Departmental Representative for student body, 5-year cycle external review, IBBME Department, University of Toronto   |
| 2016      | Invited judge for departmental scientific day presentations   |
| 2017      | Organizer, Undergraduate Students Design Course Annual Kickoff event:<br><a href="https://www.bme.jhu.edu/news-events/news/undergrads-kick-off-semester-design-sprint-challenge/">https://www.bme.jhu.edu/news-events/news/undergrads-kick-off-semester-design-sprint-challenge/</a>    |
| 2018      | Organizer and instructor, one-week intersession workshop on business communications skills<br><a href="https://www.bme.jhu.edu/news-events/news/bme-launches-one-week-intersession-workshop/">https://www.bme.jhu.edu/news-events/news/bme-launches-one-week-intersession-workshop/</a> |
| 2018      | Co-organizer, Johns Hopkins CBID Shark Tank event   |
| 2018      | Invited speaker at Johns Hopkins Mini MedHacks event, Apr 7 <sup>th</sup>   |
| 2018      | Scientific Judge for abstract submission to the BMES (Biomedical Engineering Society)'s Mid-Atlantic Research Day   |
| 2018-2019 | Member of Master's program Admissions Committee, Johns Hopkins Center for Bioengineering Innovation and Design  |
| 2018      | Round Table moderator, in BMES-IDEA, biannual national meeting of Design Instructors  |
| 2018      | Session Chair, in "Innovation and Design" at BMES (Biomedical Engineering Society)'s Annual Meeting   |
| 2018-2020 | Co-organizer, Johns Hopkins Healthcare Design Competition   |
| 2018-2020 | Scientific Journal Reviewer, Annals of Biomedical Engineering   |
| 2019      | Member of PhD program Admissions Committee, Johns Hopkins BME Department  |

2019 Conference Abstract Reviewer, Biomedical Engineering Society Annual Meeting  
2019 Session Chair, in “Biomedical Imaging and Instrumentation” track at BMES (Biomedical Engineering Society)’s Annual Meeting  
2019-2020 Judge of the National Collegiate Inventors Competition  
2019-2020 Scientific Journal Reviewer, Medical and Biological Engineering and Computing  
2020-present Reviewer and track chair, Design of Medical Devices Conference 2020  
2020-present Associate Editor, Medical & Biological Engineering & Computing Journal  
2020-present Scientific Reviewer for National Science Foundation (STTR, keywords: Neuro and Imaging)  
2021-present Editorial Advisory Board – Elsevier’s *Ultrasonics* Journal  
2022 External examiner – University of British Columbia’s Doctoral Dissertation (Amanda Cheung)  
2022 National Science Foundation (NSF) Panel Reviewer on Major Research Instrumentation (MRI)  
2022 Examination committee member for Ziwei Feng’s Graduate Board Oral Exam (Johns Hopkins Electrical Engineering Department)  
2022 Grant Reviewer for Applied Physics Laboratory and Whiting School of Engineering’s Surpass program