





— SHEN NING —

M D - P h D C a n d i d a t e



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I am a MD-PhD candidate, neuroengineer, and medtech innovator at Boston University School of Medicine pursuing a career in interventional radiology with a passion for developing minimally invasive technologies to tackle clinical unmet needs.

EDUCATION

- 2024** **M.D.-Ph.D. – BOSTON UNIVERSITY SCHOOL OF MEDICINE AND MASSACHUSETTS GENERAL HOSPITAL**
Graduate Program for Neuroscience (3.97 GPA). PhD conducted at Massachusetts General Hospital.
PhD defended in May 2022
- 2015** **B.A. – CORNELL UNIVERSITY**
Major: Biology and Society
Minor: Cognitive Science
3.9 GPA
- 2014** **VISTING STUDENT – OXFORD UNIVERSITY**
Course of study: Human Sciences

SELECTED AWARDS

- 2023** Society for Interventional Radiology 2023 Medical Student Scholar (\$1,000) – to attend SIR conference
- 2022** MassMEDIC cohort – top 4 medtech companies selected for 2022 cohort
- 2022** Oxford Creative Destruction Lab Innovator
- 2022** Boston University Graduate Student Innovator of the Year – Top innovator award for PhD student across all Graduate Medical Science PhD departments
- 2022** Boston University innovation lab Innovation pathway award (\$3,000)
- 2022** Rice Business Plan Competition (\$5,800) – 5th place (top 1% of startups)
- 2022** Nucleate Boston – finalist
- 2021** Fulbright Research Award, Switzerland (\$20,000) – 10 spots total
- 2021** NIH Ruth L. Kirschstein National Research Service Award (F30) (\$102,072) – competitive NIH fellowship for MD/PhD training
- 2021** MIT IDEA² Program – finalist cohort
- 2021** ImagineIF! Oxford Accelerator – winner
- 2020** Merck Innovation Cup 2nd place – winning pitch for electroceutical device now incorporated into the Merck Innovation Center's product development pipeline
- 2019** MIT IMPACT Fellow (NIH Funded) – Professional development program for pre- and postdoctoral trainees
- 2019** Boston University Interdisciplinary Arts Grant (\$2000) – in support of the proposed NeuroArts Forum project
- 2019** BUnano Cross-Disciplinary Fellowship (\$17,500)
- 2019** Society for Neuroscience Travel Award (\$2,000)- to attend the International Brain Research Organization World Congress
- 2019** Boston University Graduate Women in Science and Engineering Professional Development Grant (\$100)
- 2018** Boston University Neurophotonics NRT Training Program (NSF funded)
- 2018** Neurophotonics Conference Travel Award (\$1,000) – for 2018 Society for Neuroscience meeting
- 2017** Boston Medical Center Anesthesiology Department Travel Award (\$400) – to attend anesthesiology conference
- 2017** Boston University School of Medicine Conference Travel Award (\$500) – to attend conference at the International Congress of Parkinson's Disease and Movement Disorder

- 2016** Massachusetts Medical Society Service Grant (\$5,000) – for developing a new medical student-run clinic targeted at low-income elderly populations in Boston
- 2015** Cornell Programing Board Grant (\$2,000) – for developing an educational program for Burmese Refugee children in Ithaca, NY, USA
- 2015** Dean's Scholarship (\$564,760) – Boston University School of Medicine scholarship for MD-PhD candidates
- 2014** Experimental Psychology Society Summer Research Scholarship (\$4,000) – summer research stipend for working memory research
- 2013** Shoals Scholarship (\$4,000) – for summer marine biology course on Appledore Island, NH, USA, merit based
- 2013** Deborah M. Nugent Memorial Scholarship (\$20,000)– Cornell University merit-based scholarship
- 2012** Biology Research Fellowship (\$5,000) – for summer research on emerin protein
- 2012** William G. Hoyt Memorial Scholarship (\$15,000) – Cornell University merit-based scholarship
- 2012** S.K. Alfred Sze Scholarship (\$23,000) – Cornell University merit-based scholarship
- 2012** Cornell Arts and Sciences Undergraduate Scholarship (\$11,000) – Cornell University merit-based scholarship

SELECTED PUBLICATIONS

Asuncion-Nadal V, Veciana A, **Ning S**, Terzopoulou A, Sevim S, Chen X, Gong D, Cai J, Garcia-Wendel P, Jurado-Sanchez B, Escarpa A, Franco C, Puigmartí-Luis J, Pané i Vidal S (2022). MoSBOTs: Magnetically Active MoS₂-based Microrobots for Biomedical Applications. *Small*, 18, 2203821.

Ning S, Jorfi, M., Patel, S. R., Kim, D. Y., & Tanzi, R (2022). Neurotechnological Approaches to the Diagnosis and Treatment of Alzheimer's Disease. *Frontiers in Neuroscience*, 360.

Lima R, Gootkind EF, DelaFlor D, Yockey LJ, Bordt EA, D'Avino P, **Ning S**, Heath K, Harding K, Zois J, Park G, Hardcastle M, Grinke KA, Grimm S, Davidson SP, Forde PJ, Hall KJ, Neilan AM, Matute JD, Lerou PH, Fasano A, Shui JE, Edlow AG, Yonker LM (2020). Establishment of a pediatric COVID-19 biorepository: unique considerations and opportunities for studying the impact of the COVID-19 pandemic on children. *BMC Med Res Methodol* 20, 228.

Kwak SS, Washicosky KJ., Brand E, Maydell VD, Aronson J, Kim S, Capen DE, Cetinbas M, Sadreyev R, **Ning S**, Bylykbashi E, Xia W, Wagner S, Choi SH, Tanzi RE, Kim DY (2020). Amyloid- β 42/40 ratio directly drives tau pathology in 3D human neural cell culture models of Alzheimer's disease. *Nature Communications*. 11, 1377.

Ning S and Jorfi M (2019). Beyond the sleep-amyloid interactions in Alzheimer's disease pathogenesis. *Journal of Neurophysiology*. 122 (1): 1-4.

Ning S and Jorfi M (2019). P75 as a molecular memory switch. *arXiv:1912.1144*

Kong YL, Zou X, McCandler CA, Kirtane AR, **Ning S**, Zhou J, Abid A, Jafari M, Rogner J, Minahan D, Collins JE, McDonnell S, Cleveland C, Bense T, Tamang S, Arrick G, Gimbel A, Hua T, Ghosh U, Soares V, Wang N, Wahane A, Hayward A, Zhang S, Smith BR, Langer R, Traverso G (2019). 3D-printed gastric resident electronics. *Advanced Materials Technologies*. 4, 1800490.

Raje P and Ning S, Branson C, Saint-Hilaire M, Ponce de Leon M, Hohler AD (2019). Self-Reported Exercise Trends in Parkinson's Disease Patients. *Complementary Therapies in Medicine*. 42, 37-41.

Ghosh U, **Ning S**, Wang Y, Kong YL (2018). Addressing unmet clinical needs with 3D printing technologies. *Advanced Healthcare Materials*. 7(17), e1800417.

Zokaei N, **Ning S**, Manohar SS, Feredoes E, Husain M (2014). Flexibility of representational states in working memory. *Frontiers in Human Neuroscience*. 8:853.

In preparation or under review:

Ning S, Hanning U, Nogueira RG, Meyer L, Psychogios M, Zaidat OO, Hassan AE, Masoud HE, Mujanovic A, Kaesmacher J, Nguyen TN, Abdalkader M. Progress and Future Prospects in Robotic Interventional Neuroradiology. *In preparation for submission in Feb 2023.*

Logeswaran A, **Ning S**, Nannery M, Chaudhry F, Dumas K, Higgins M. Characteristics and Practice of Morbidity and Mortality Review in Interventional Radiology in America. *Submitted to JVIR.*

Chaudhry F, **Ning S**, Logeswaran A, Nannery M, Chaudhry F, Dumas K, Higgins M. Perceptions of Morbidity and Mortality Review amongst Interventional Radiologists in North America. *Submitted to JVIR.*

Boyko A, **Ning S**, Nannery M, Chaudhry F, Dumas K, Higgins M. Attitudes and Practices of M&M Programs of GME Accredited IR programs in the United States of America. *Submitted to Academic Radiology.*

Nazareth B, **Ning S**, Nannery M, Chaudhry F, Dumas K, Higgins M. Barriers and Solutions to Optimizing Morbidity and Mortality Review in the field of Interventional Radiology. *Submitted to Radiology.*

Ning S, Rompala A, Washicosky K, Kumar DK, Kumar N, Kim I, Rodriguez A, Choi SH, Park J, Tanzi RE, Kim DY. Magnetic removal of amyloid- β species blocks tau pathology in 3D human neural cell culture models of AD. *Submission to Science Advances.*

Ning S, Picazo AV, Tang Q, Hertle L, Pujante CF, Sevim S, Wintle JFL, Puigmarti-Luis J, Chen X, Nelson B, Pane i Vidal S. BaTiBOTs: Piezo-electric microrobots for amyloid degradation. *Submission to Advanced Materials.*

Ning S, Hebisch M, Washicosky K, Brand E, Kruskop J, J, Tanzi RE, Kim DY. Impact of five common hydrogels in A β aggregation and 3D culture modeling. *In preparation.*

PATENTS

Wearable ultrasound devices and methods of use. *Inventors: Dragana Savic and Shen Ning.* U.S. Application No. 63299131. PCT filed 1/13/23.

Modulation of immune markers using targeted ultrasound stimulation. *Inventors: Dragana Savic and Shen Ning.* U.S. Application No. 63/438,665. Provisional filed 1/12/23.

Devices and uses thereof for Alzheimer's disease therapy. *Inventors: Rudolph E. Tanzi, Se Hoon Choi, Shen Ning, and Doo Yeon Kim.* Application No. 63/353,499. Provisional filed 6/17/22.

RESEARCH EXPERIENCE

- | | | |
|----------------------|---|-------------------|
| 2022- Present | BMC (Advisors: Thanh N. Nguyen, MD and Mohamad Abdalkader, MD)
<i>Medical Student Researcher at Boston Medical Center</i>
<ul style="list-style-type: none">Multi-center study on sex differences in late-window endovascular stroke thrombectomy outcomesResearch on Robotic Interventional Neuroradiology and facilitate collaboration with NanoFlex, a spin-off from the Multi-Scale Robotics Lab in Switzerland from my Fulbright Fellowship | <i>Boston, MA</i> |
| 2021- 2023 | Multi-Scale Robotics Lab (Advisors: Bradley Nelson, PhD and Salvador Pane i Vidal, PhD)
<i>Fulbright Research Fellow at ETH Zurich, Switzerland</i>
<ul style="list-style-type: none">Piezoelectric nanomaterials paired with ultrasound for amyloid protein degradation.Fabricate multi-functional biotemplated microrobots for magnetic navigation and piezoelectric amyloid protein degradationResulted in 3 publications at the intersection of material science and neuroscience | <i>Zurich</i> |

2018- 2023	<p>Tanzi Lab (Advisors: Rudolph Tanzi, PhD and Doo Yeon Kim, PhD) <i>Graduate Researcher at MassGeneral Hospital</i></p> <ul style="list-style-type: none"> • Develop a novel treatment methodology to reduce Alzheimer's disease pathology using antibody conjugated paramagnetic nanoparticles • Design and test a microfluidic brain-on-a-chip platform for high-throughput drug screening of Alzheimer's disease drugs in collaboration with Dr. Roger Kamm, PhD at MIT 	Charlestown, MA
2017- 2018	<p>Neurophotonics Center (Advisor: David Boas, PhD) <i>Graduate Researcher at Boston University</i></p> <ul style="list-style-type: none"> • Applied various optical imaging modalities to understand neurovascular changes in Alzheimer's disease • Imaging experience with optical coherence tomography, two photon microscopy, laser speckle imaging, and intrinsic optical signal imaging 	Boston, MA
2017	<p>Langer Lab (Advisors: Bob Langer, ScD and Giovanni Traverso, MB BChir, PhD) <i>Graduate Researcher, rotation student at MIT</i></p> <ul style="list-style-type: none"> • Utilized 3D printing design and fabrication techniques to tackle challenges in drug delivery • Published a scientific review paper on biomedical applications of 3D printing • Performed <i>in vitro</i> testing of a novel 3D printed electronic drug delivery 	Cambridge, MA
2013-2014	<p>Cognitive Neurology Group (Advisor: Masud Husain, MD) <i>Undergraduate Researcher at Oxford University</i></p> <ul style="list-style-type: none"> • Developed and tested working memory computer tasks to be used as early diagnostic tools for Parkinson's and Alzheimer's disease • Investigated the flexibility of working memory states, which resulted in a publication in <i>Frontier in Human Neuroscience</i> 	Oxford, UK
2013-2014	<p>Brain and Cognition Lab (Advisor: Christina Anna Nobre, PhD) <i>Undergraduate Researcher at Oxford University</i></p> <ul style="list-style-type: none"> • Assisted in designing and optimizing computer-based experiments to quantify responses to emotional stimulus in visual working memory • Conducted experiments to analyze the effects of emotion on visual working memory • Contributed significantly to the pilot experiments that culminated in a publication in <i>Emotion</i> 	Oxford, UK
2012-2015	<p>Lammerding Lab (Advisor: Jan Lammerding, PhD) <i>Undergraduate Researcher at Cornell University</i></p> <ul style="list-style-type: none"> • Mastered surgical techniques to create a constriction in the abdominal aorta as a model to examine vascular defects of HGPS (Hutchinson-Gilford Progeria Syndrome) • Conducted independent research project elucidating vascular smooth muscle cell depletion in Hutchinson-Gilford Progeria Syndrome and presented the research at an international conference 	Ithaca, NY

SELECTED TALKS

2020	<p>BU GPN Progress Report "Targeted antibody-conjugated magnetic nanoparticles for the treatment of Alzheimer's disease". Boston, MA. December 2020.</p>
2020	<p>Genetics and Aging Research Unit – Unit Talk "Magnetic disruption of amyloid β in Alzheimer's disease". Charlestown, MA. June 2020.</p>
2019	<p>Korea Research Institute of Bioscience and Biotechnology (KRIBB) Seminar "Rapid removal of Amyloid-β aggregates using superparamagnetic nanoparticles". Daejeon, South Korea. September 2019.</p>
2019	<p>Graduate Program for Neuroscience Retreat "Brain-in-a-dish". Essex, MA. June 2019.</p>

- 2019** Graduate Program for Neuroscience Seminar Series
"Developing a superparamagnetic nanoparticle therapy for Alzheimer's disease." Boston, MA. May 2019.
- 2018** Boston University MD/PhD Program Presentation
"In vivo Imaging of Microvascular Changes in Animal Models of Neurodegeneration." Boston, MA. August 2018
- 2017** Boston University MD/PhD Program Presentation
"Oligomeric tau shows greater toxicity than tau fibrils." Boston, MA. August 2017
- 2012** Cornell Summer Institute for Life Sciences Symposium Presentation
"Laminopathic mutations lead to emerin mislocalization and impaired myocardin related transcription factor-A (MRTF-A) translocation." Ithaca, NY. August 2012.

SELECTED CONFERENCE POSTERS

- 2022** AD/PD 2022
Shen Ning, Joseph Park, Catarina Teves, Trey Moore, Alex S Rodriguez, Shaun R Patel, Se Hoon Choi, Rudolph E Tanzi and Doo Yeon Kim. "Removal of amyloid- β aggregates using superparamagnetic iron oxide nanoparticles". Poster presentation. Barcelona, Spain, March 2022.
- 2019** International Brain Research Organization World Congress
Shen Ning, Alexander Rompala, Nanda Kumar Navalpur Shanmugam, Inkyu Kim, Stephanie Hartman, Deepak Kumar Vijaya Kumar, Alex S. Rodriguez, Shaun Patel, Se Hoon Choi, Rudolph E. Tanzi and Doo Yeon Kim. "Rapid removal of Amyloid- β aggregates using superparamagnetic nanoparticles". Poster presentation. Daegu, South Korea, September 2019.
- 2018** Society for Neuroscience
Kivilcim Kılıç, Evren Erdener, **Shen Ning**, Smrithi Sunil, Anderson Chen, David Boas. "Ex-Vivo Angiography for Deeper Imaging in Chronic Stroke Models". Poster presentation. San Diego, CA, November 2018.
- 2017** 21st Annual Photonics Center Neurophotonics Symposium
Shen Ning, Evren Erdener, Jianbo Tang, Rachel Bennett, Anderson Chen, Kivilcim Kilic, Sava Sakadzic, Bradley T. Hyman, David Boas. "In vivo Imaging of Microvascular Changes in Animal Models of Neurodegeneration". Poster presentation. Boston, MA, November 2017.
- 2017** Boston University MD/PhD Retreat
Shen Ning, Yong Lin Kong, Jaimie Rogner, Robert Langer, Giovanni Traverso. "In Vitro Drug Release Studies of Progesterin in a Polymer-Based Ingestible Retention Device". Poster presentation. Boston, MA, Sept 2017.
- 2013** Progeria Research Foundation Conference
Chin Yee Ho, Philipp Isermann, **Shen Ning**, Valerie Verstraeten, Yu Guo, Haiyuan Yu, Francis Collins, and Jan Lammerding. "Vascular smooth muscle cell dysfunction in Hutchinson-Gilford progeria syndrome". Poster presentation. Bethesda, MD, April 2013.

REVIEWER

Advanced Functional Materials
Tissue Engineering and Regenerative Medicine
Frontiers in Neurology

PROFESSIONAL SOCIETIES

Society of Interventional Radiology	2022-Present
Tri-alpha National Honors Society	2021-Present
The Society for Neuroscience	2018-Present
American Medical Association Member	2015-Present
Massachusetts Medical Society	2015-Present

2021-Present	<p>INIA Biosciences Boston, MA <i>Co-founder, CEO (iniabiosciences.com)</i></p> <ul style="list-style-type: none"> • Non-invasive wearable ultrasound medical device to modulate the immune system • Represented BU at highly competitive pitch competitions and accelerator programs locally and internationally: <ul style="list-style-type: none"> ○ MassChallenge 2021, BU New Venture Competition, TechStars, Hello Tomorrow Deep Tech Innovator, Imagine If Global Accelerator (Oxford local winner), MIT IDEA² 2021 cohort, MIT 100K Competition semifinalist, MIT Sloan Healthcare Innovations Prize finalist, MIT Sandbox cohort, Antler Global Accelerator (runner-up), Nucleate Semifinalist, ASUio finalist ○ Rice Business Plan Competition Finalist (first time in the last 5+ years for a BU student to be selected in the biotech/medtech sector at this highly selective competition) ○ shortlisted for Forbes 30 under 30
2021-2022	<p>Nucleate Boston, MA <i>Vice President of Expansion, Co-Managing Director of Nucleate Switzerland (nucleate.xyz)</i></p> <ul style="list-style-type: none"> • Nucleate is a free and collaborative non-profit organization that facilitates the formation of pioneering life sciences companies. • Manage expansion of Nucleate to 28 new cities nationally and internationally, mainly with a focus on Europe • Facilitate the formation of the Nucleate Switzerland chapter starting in October 2022
2020-2022	<p>Medical Innovation and Technology (MInT) Program Boston, MA <i>Founder, Co-director</i></p> <ul style="list-style-type: none"> • Founded and built innovate program to aimed to formulate BU student and trainee teams to address unmet clinical needs • Raised \$12,000 to fund the program and winning teams at three prize levels • Featured in <i>The Brink</i>, <i>BU Today</i>, and others, acquired by Nucleate
2019-2022	<p>Science Rehashed Inc. Boston, MA <i>Co-founder, co-host, and co-director (sciencerehashed.com)</i></p> <ul style="list-style-type: none"> • Co-founded a non-profit media/podcast company aimed to bring recent groundbreaking scientific discoveries to scientists and science enthusiasts across the globe for free • Recognized as a top podcast in the life sciences by Apple podcast, won the 2020 Life Science Non-profit pitch, featured in <i>BU Today</i>, <i>BostonInno</i>, <i>MGH Benchpress</i>, <i>Harvard Gazette</i> • Hosted world-renowned scientists including <i>George Church</i>, <i>Bob Langer</i>, and <i>Nobel Laureates</i>
2018-2019	<p>New England Graduate Women in Science and Engineering (NE GWISE) Boston, MA <i>Co-Chair, Advocacy Chair</i></p> <ul style="list-style-type: none"> • Organize annual retreat and Spring for Action forum to tackling gender issues in academia across multiple universities in New England • Coordinate with GWISE groups across New England to establish new chapters and advocate for new innovative initiatives
2018-2019	<p>Boston University Neuroscience Graduate Student Organization Boston, MA <i>Professional Development Chair</i></p> <ul style="list-style-type: none"> • Organized professional development events to expose Neuroscience graduate students to different career options • Apply for a competitive grant to fund an interdisciplinary event, the NeuroArts Forum, a collaboration between the Neuroscience department and student organizations to bring in guest speakers to speak about the intersection of neuroscience and the arts
2018-2019	<p>Boston University Graduate Women in Science and Engineering (BU GWISE) Boston, MA <i>Professional Development Co-Chair</i></p>

- Hosted the largest graduate student-organized event featuring women leaders in science and engineering
- Collaborate with the BU Provost office to develop new professional development programs for graduate students

2016-2017

Boston University Alzheimer's Disease Center Ambassador Program
Ambassador

Boston, MA

- Engaged in ADC related scientific conferences and participated in Alzheimer's outreach and advocacy events
- Served as a peer mentor for undergraduates and medical students interested in medicine and neurology, respectively

2011-2014

Cornell Undergraduate Research Board

Ithaca, NY

Event Coordinator for Fall Events, Peer Mentorship Program Coordinator

- Organized Cornell's largest research poster forum to encourage undergraduates to showcase and discuss their research projects

MENTORSHIP EXPERIENCE

2019-2021

Trey Moore - undergraduate student at Boston University completed his senior thesis with honors

2018-2020

Rebecca Soilson - undergraduate student at Harvard University completed her senior thesis with honors

2019

Sofia Nastri- undergraduate student at Boston University

2016

Kira Brenner - undergraduate student at Harvard University, graduated with honors for her thesis

ADDITIONAL INTERESTS

2015-Present

Harvard and MIT Ballroom Dance Teams

Boston, MA

Competitor at the highest level, Competition Committee Logistics Chair, Dance Instructor

- 2021 Eastern United States Dancesport Championships Standard Rising Star 1st place (current national rank for amateur ballroom)
- 2021 Eastern United States Dancesport Championships Standard Amateur 2nd place
- 2019 Harvard Invitational Championship Standard 3rd place
- 2018 Harvard Invitational Pre-championship Standard 1st place
- 2018 Harvard Invitational Championship Standard 2nd place
- 20th CBDF Academy Cup Ballroom Dance Competition team match (Beijing, China) 3rd place
- 2018 Boston University Open Standard Championship 1st place
- 2018 La Classique Du Quebec (Montreal, Canada) Amateur Championship 3rd place
- 2017 Tufts University Open Standard Championship 1st place
- 2017 Brown University Open 2nd Place

2015-2019

Boston University School of Medicine Vagina Monologues

Boston, MA

Co-director, performer

- Directed two successful Vagina Monologues shows
- Raised over \$4,000 annually through the Vagina Monologues show. All proceeds were donated to the Boston Medical Center Domestic Violence Program and local non-profit organizations

2014-2015

D. A. N. C. E (Dance iNspired Cultural Education)

Ithaca, MA

Founder

- Formulated innovative project plan to establish a humanities and performance art program to teach history and cultural awareness through art and dance to local Burmese refugee children (ages 7-12)
- Received a prestigious grant (\$2000) from the Cornell University Programing Board to fund the goals of the project

2012-2014

AIESEC

Boston, MA

Winter Intern

- Worked with local NGO to assist in the daily activities of the underprivileged population in Warsaw and Budapest

2012-2014

Amber Dance Troupe

Boston, MA

Co-President, Treasurer, performer

- Coordinated logistics with the largest performance hall venue managers and technicians at Cornell to run the troupe's most important showcase of the year
- Established a successful fundraising campaign to fund after school activities for local Burmese refugee children

TECHNICAL

CODE Python, MATLAB, LaTeX

DESIGN CAD, Adobe Illustrator