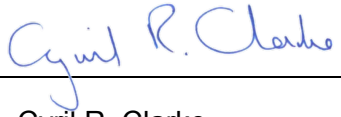
NOMINATION SIGNATURE PAGE

2023 Virginia Outstanding Faculty Awards

Nominations must include this as the cover page of the nomination package PDF submission

Name of Applicant:	Eli Vlaisavljevich
Institution:	Virginia Tech
Category (choose only one): • Baccalaureate Institution • Masters/Comprehensive Institution • Research/Doctoral Institution • Two-Year Institution • Rising Star	Rising Star
Signature of President or Chief Academic Officer:	
Printed Name of President or Chief Academic Officer:	Cyril R. Clarke
E-mail address of President or Chief Academic Officer:	provost@vt.edu
Telephone number of President or Chief Academic Officer:	540-231-6123

MISSION STATEMENT

Inspired by our land-grant identity and guided by our motto, *Ut Prosim* (That I May Serve), Virginia Tech is an inclusive community of knowledge, discovery, and creativity dedicated to improving the quality of life and the human condition within the Commonwealth of Virginia and throughout the world.

SUMMARY OF ACCOMPLISHMENTS

Dr. Eli Vlaisavljevich is an Associate Professor in the Department of Biomedical Engineering and Mechanics (BEAM) at Virginia Tech. Vlaisavljevich is a recognized leader in biomedical research, scholarship, teaching, and mentorship. Vlaisavljevich joined Virginia Tech in 2017 after completing his Ph.D. at the University of Michigan and working for two years at a startup company to advance his paradigm-shifting, bench-to-bedside cancer research into the clinic. Motivated by losing his mother to liver cancer as a child, Vlaisavljevich has worked tirelessly to develop histotripsy for treating liver cancer and other diseases. Vlaisavljevich's passion for biomedical engineering, entrepreneurship, and translational medicine can be seen through his work in the lab, classroom, and community. Vlaisavljevich is passionate about building diverse teams to tackle grand challenges requiring more than a single person, lab, or university. To this end, Vlaisavljevich has built a dynamic research program that involves local, regional, national, and international partnerships with many academic, industry, and non-profit organizations. Under Vlaisavljevich's leadership, this interdisciplinary team is tackling critical problems and making an international impact in clinical medicine, global health, and conservation.

Vlaisavljevich has been exceptionally productive since joining Virginia Tech. He established a research program that has received >35 grants from government and non-profit agencies totaling >$15.9 Million (>$5.2 Million to the V-Lab). This funding has allowed him to grow his research program and continue his track record of **high-impact translational research**. As a young leader in the focused ultrasound (FUS) field, Vlaisavljevich has been in high demand to present his work at leading international conferences. Vlaisavljevich also makes significant contributions to the university's teaching mission through his well-reviewed undergraduate and graduate courses on medical imaging, cancer therapeutics, and medical devices. Outside of the classroom, Vlaisavljevich is devoted to providing meaningful and engaging experiential learning opportunities for the many engineering and medical students in his lab, as well for the student design teams that he mentors in the College of Engineering (CoE) and the Pamplin College of Business. He has also served as the faculty mentor for the Bioactivity Organization, an interdisciplinary student group focused on medical device development, health care entrepreneurship, and commercialization. The extraordinary impact of Vlaisavljevich's work was on full display in 2022 when the promising results of the THERESA Study, the first human trial showing the potential of histotripsy for the treatment liver cancer, were published. At the same time that this landmark clinical trial was being published, Vlaisavljevich was busy leading students from his lab on an outreach trip to Malawi where they are working to establish the first Focused Ultrasound Center of Excellence in Africa. These efforts highlight the impactful nature of Vlaisavljevich's innovative research, as well as his dedication to mentoring students on translational interdisciplinary initiatives that can make a sustainable impact in health outcomes for patients around the world, especially for developing nations.

As a result of his dedication, Vlaisavljevich has received many awards including the Liviu Librescu Faculty Prize (BEAM), a Junior Faculty Award (Institute for Critical Technology and Applied Science, or ICTAS), the Outstanding Assistant Professor Award (CoE), two Gold Pen Awards (BEAM), the Leader in Research Award (BEAM), and the Outstanding Undergraduate Research Mentor Award (Office of Undergraduate Research). He also received the Undergraduate Organization Advisor Award from the Student Engineers' Council, voted on entirely by students. Students in Dr. Vlaisavljevich's lab have received many prestigious awards including a Goldwater Fellowship, Clare Boothe Awards (3), FUSF Internships (3), a MAOP Fellowship, a Torgersen Leadership Scholarship, an NSF Graduate Research Fellowship, a COVES Fellowship, an ICTAS Doctoral Fellowship, New Horizon Graduate Scholarships (2), a Graduate Degree for Minorities Fellowship (1), an NSERC Postgraduate Scholarship, and a P.E.O. Scholar Award. Beyond these accomplishments, Vlaisavljevich's impact can be seen by the overall scope of his interdisciplinary

and translational research program and the way it synergistically interfaces with his highly impactful teaching, mentorship, and service activities.

TEACHING: Experiential Learning for Scientists, Engineers, and Entrepreneurs

A significant area of achievement for Vlaisavljevich is his exemplary record in teaching and mentoring students. Vlaisavljevich is highly active in the classroom through his work teaching undergraduate courses in Medical Imaging (BMES 3134) and Medical Devices (BMES 3144). At the graduate level, Vlaisavljevich has led a Graduate Seminar Series (BMES 5994), taught sections of Fundamentals of Cancer (TBMH 5024), and has developed a new course on Cancer Detection and Therapeutics (BMES 5984). He uses his industry and clinical experience to prepare students for future careers as engineers, scientists, entrepreneurs, and medical doctors. Vlaisavljevich has received extremely positive teaching reviews in all of his classes, with average SPOT scores of 5.72 for his graduate courses and 5.86 for his undergraduate courses (out of 6). Students in these courses have continuously praised his hands-on teaching style and his integration of fundamental curriculum with practical considerations such as the economic, regulatory, and equity impacts involved with the development of new medical technologies.

Vlaisavljevich has also demonstrated an outstanding commitment to mentoring students in design teams and professional organizations. Highlights of these activities include:

- ***Bioactivity:*** Vlaisavljevich has served as the faculty advisor for Bioactivity, an organization that gives students a way to pursue health care entrepreneurship and gain important hands-on experience to prepare for careers in the medical device field.
- ***Engineering Design Teams:*** Vlaisavljevich has mentored Biological Systems Engineering (BSE) and Engineering Science Mechanics (ESM) design teams working on projects including DNA extraction, tendon regeneration, and biofilm removal.
- ***Management Consulting:*** In 2020, Vlaisavljevich mentored a team of business students in a consulting course in the Department of Management.
- **ISTU Student Board:** In 2022, through his role on the board of the International Society of Therapeutic Ultrasound (ISTU), Vlaisavljevich founded the first ever ISTU student board consisting of grad student representatives from across the world, with equal representation from North America, Europe, and Asia (and plans to add students from Africa in 2023 through his TEAM Malawi initiative). Vlaisavljevich currently serves as the faculty advisor for this student board that is focused on enhancing international student engagement in medical research.

DISCOVERY: Interdisciplinary, Translational Research to Address Grand Challenges

Vlaisavljevich has established a highly productive research program that is developing histotripsy and other FUS technologies. Histotripsy is the first completely non-invasive, non-thermal, and non-ionizing cancer ablation method. To state it plainly, he is using sound waves to destroy tumors without making a single incision. Vlaisavljevich's experience in the medical device industry has allowed him to create a lab that develops technologies from bench-to-bedside. This work includes projects developing histotripsy for treating solid tumors and nanoparticle-mediated histotripsy (NMH) for the targeted ablation of metastatic tumors. Vlaisavljevich also develops FUS methods for applications beyond cancer including infections and neurological disorders. In addition to this work on human medical applications, he is developing treatments for cancer in dogs through his veterinary collaborations and has a large project developing DNA extraction methods to combat the mass extinction crisis facing the plant and animal kingdoms. To accomplish these goals, he has assembled a large group of interdisciplinary students from diverse backgrounds. The V-Lab currently consists of nine undergrads, three M.S. students, ten Ph.D. students, and eight medical students. This core team has collaborators in the Virginia Tech Colleges of Engineering, Science, and Veterinary Medicine and also works closely with scientists, engineers, and clinicians at the Universities of Virginia, Michigan, Washington, and Wisconsin as well as international partners throughout North America, Europe, Asia, and Africa. Vlaisavljevich also partners with industry and

non-profit companies such as HistoSonics, the Focused Ultrasound Foundation, the American Kennel Club, the Gordon and Betty Moore Foundation, and Conservation X Labs. These partnerships provide a rich environment for students to participate in translational research supported by >$15.9 Million in grant funding to date. The five key research areas in the V-Lab are: 1) histotripsy, 2) NMH, 3) acoustically active biomaterials, 4) FUS neuromodulation, and 5) bioengineering for conservation and global health.

Histotripsy: The first non-invasive, non-thermal, and non-ionizing cancer therapy

- ***Overview:*** The primary focus of the V-Lab is to develop histotripsy as a non-invasive, high precision, and image-guided cancer ablation method.
- ***Clinical Translation:*** Vlaisavljevich has led the development of histotripsy for treating liver cancer, including a recently published Phase I trial. This trial, named "The Theresa Study" after Vlaisavljevich's mother who died of liver cancer, was the first study of histotripsy cancer ablation in humans. A larger second trial (#Hope4Liver) is now underway, building on this success.
- ***New Applications****:* Vlaisavljevich is a world leader in histotripsy research and development. By studying the physics underlying the histotripsy process, the V-Lab is developing custom devices (transducers, amplifiers, robotics) for new applications including kidney, pancreatic, breast, soft tissue, bone, and brain cancers.
- ***Immunomodulation:*** The V-Lab is also studying the use of histotripsy to activate the immune system, with initial results showing histotripsy can stimulate a systemic anti-tumor immune response. This finding has the potential to be another paradigm shift in cancer care.
- ***Veterinary Medicine*****:** Vlaisavljevich is working with the Virginia Tech Veterinary Clinic to test histotripsy for treating canine soft tissue, bone, and brain tumors, with results suggesting histotripsy has the potential to improve cancer care for both dogs and humans.

NMH: Nanoparticle-mediated histotripsy for targeted cancer cell ablation

- ***Overview:*** Vlaisavljevich is the lead inventor of NMH for targeted cancer cell ablation. NMH uses perfluorocarbon nanoparticles to selectively apply histotripsy without the need for image guidance, representing an improved method for treating metastatic tumors.
- ***NMH Projects:*** Multiple projects in the V-Lab are developing targeted gas-filled and fluid-filled nanoparticles for treating breast and brain tumors.
- ***Nanoparticles for MRgFUS:*** Vlaisavljevich is also partnering with the University of Virginia and Brigham Young University to develop acoustic coupling media doped with magnetic nanoparticles to improve transcranial FUS procedures.

Acoustically active biomaterials for biofilm removal and tissue engineering

- ***Biofilm Removal****:* The V-Lab is developing FUS methods and biomaterials for treating device-related infections. Two papers and an NIH grant are in progress based on promising initial work.
- ***Hydrogels:*** The V-Lab is designing ultrasound drug-eluting hydrogels in partnership with Michigan Tech in a study funded by an NIH R15 grant. The ultimate goal is to combine this method with histotripsy to develop an "ablate and replace" therapy as a non-invasive alternative to organ transplant in the same way that histotripsy is an alternative to surgery.

FUS neuromodulation: Non-invasive treatments for neurological disorders

- ***Depression:*** The V-Lab is partnering with neuroscience collaborators to develop transcranial FUS for treating depression, chronic pain, and other neurological disorders.
- ***Stroke:*** Vlaisavljevich is testing methods for inducing vasculomodulation after ischemic stroke.

Bioengineering for conservation and global health

- ***FUS DNA Extraction:*** Vlaisavljevich is partnering with Conservation X Labs to develop FUS methods for rapidly extracting DNA from timber and other complex plant tissues. The goal of this work, which is funded by a grant from the Gordon and Betty Moore Foundation, is to develop a field-deployable device to improve the policing of illicit wildlife trading.

- ***Global Health Equity*:** Through his recent TEAM Malawi initiative [Technology-Education-Advocacy-Medicine], Vlaisavljevich is leading a transdisciplinary effort, based upon a community wellness model of health, designed to meet the challenges of resource-limited environments through community-based participatory research. The goal of this work is to establish the first FUS Histotripsy Center of Excellence in Africa and develop accessible, affordable, and sustainable healthcare solutions for Malawi and other low-and-middle income countries (LMICs).

INTEGRATION OF KNOWLEDGE

Vlaisavljevich's impact cannot be fully understood by viewing his respective research, teaching, mentorship, and service accomplishments in isolation. Although he has excelled in each of these areas, one of the most impressive aspects of his work is the synergistic way his interdisciplinary and translational research program integrates with his teaching and mentorship activities – as is illustrated throughout this summary. In the classroom, for instance, Vlaisavljevich utilizes his background in medical devices, including experience with both large and small companies, to develop a curriculum that better prepares students for future jobs in the medical field. As part of these efforts, he has integrated content on regulatory standards, quality systems manufacturing, and clinical trials into his various courses. He has also leveraged his academic, industry, and non-profit partnerships to facilitate a diverse group of guest speakers from around the world that supplement his core curriculum. Finally, he has utilized the unique equipment and prototyping capabilities in his lab to provide hands-on experience for students in his classes and design teams to better prepare them for their future careers. Outside of the classroom, Vlaisavljevich also has a unique ability to synergistically leverage his various activities to provide entrepreneurship and outreach opportunities for students with a variety of interests ranging from engineering and fundamental physics to clinical oncology, health equity, and venture capital investing.

SERVICE

Vlaisavljevich has made significant contributions through service to his department, college, university, and surrounding community. In addition to his direct mentoring roles, Vlaisavljevich serves on >15 other graduate committees across five departments. He is an active member of the ICTAS Center for Engineered Health, the Wake Forest Comprehensive Cancer Center, the Virginia Tech Office of Undergraduate Research Advisory Board, and the Regenerative Medicine and Computational Tissue Engineering interdisciplinary graduate education programs (IGEPs). Vlaisavljevich is actively involved in many international organizations including serving as a board member for the International Society of Therapeutic Ultrasound. Beyond his direct service roles, Vlaisavljevich continues to serve the Virginia Tech mission as a leader in establishing local, regional, and international partnerships. These efforts include his engagement with local organizations such as the Blacksburg and Christiansburg Rescue Squads, his multiple industry partnerships, and his growing connections with international organizations such as Conservation X Labs, National Geographic, the Moore Foundation, the Focused Ultrasound Foundation, and the TEAM Malawi initiative. Finally, considering the events of 2020, it should be noted that Vlaisavljevich played an important role in Virginia Tech's initial response to COVID-19. In the early days of the outbreak, he organized a rapid response within BEAM to gather resources for first responders including establishing methods for manufacturing PPE using rapid prototyping equipment. This is just one example of his continual service to Virginia Tech and the surrounding communities during his tenure.

SUMMARY

Dr. Eli Vlaisavljevich is one of the true rising stars at Virginia Tech. Vlaisavljevich's accomplishments to date, particularly his success in research and student mentoring, have been extraordinary. With his outstanding research record, strong collaborations across multiple disciplines, and his dedication to teaching and mentorship, Vlaisavljevich is well positioned to continue to make significant contributions at Virginia Tech and beyond in the years to come.

PERSONAL STATEMENT

It has been a great privilege to serve as a faculty member in the Department of Biomedical Engineering and Mechanics (BEAM) at Virginia Tech. When I joined the department in 2017, I was excited to establish a translational biomedical research program within a unique interdisciplinary environment. I was also excited to contribute to a Biomedical Engineering (BME) program within a culture that supports hands-on learning methods. My time at Virginia Tech has exceeded expectations as I have been given endless opportunities to grow my research program and develop interactive teaching and mentorship roles to train the next generation of scientists, engineers, medical doctors, and entrepreneurs. I have benefited from collaborations within BEAM, the College of Engineering, the Virginia-Maryland College of Veterinary Medicine, and the Virginia Tech Carilion (VTC) School of Medicine as well as with other local, regional, and international partners. Virginia Tech's motto is *Ut Prosim*, or "That I May Serve." In my experience, this motto is better translated as "that WE may serve." Whether in the lab, classroom, surrounding community, or around the globe, my experiences have been characterized by a collaborative, interdisciplinary, and team approach to science. It is a privilege to work with many great students and collaborators striving to make discoveries and develop innovative technologies that address complex problems.

My first task after joining Virginia Tech was to establish a multi-disciplinary research program investigating the physical mechanisms with which ultrasound interacts with tissue while remaining focused on developing therapies for specific clinical applications. I have extensive experience working with multi-disciplinary teams on research projects ranging from basic physics to clinical medicine. Our group includes students from multiple engineering departments and the VTC School of Medicine. These students work collaboratively on projects developing histotripsy tumor ablation, NMH cancer cell ablation, acoustically active biomaterials, and FUS neuromodulation. Our biggest success to date has been the completion of a Phase I clinical trial treating human liver cancer patients with histotripsy. The Theresa Study, which was conducted in honor of my mother who died of liver cancer, was the culmination of many years of fundamental research and device development. Although this milestone is the most attention-grabbing, I am just as excited about our work developing histotripsy and other FUS methods for new applications. For example, Jessica Gannon, a current student in my lab, is leading a pancreatic cancer project, which was motivated by the loss of her father and has shown extremely promising results.

My experiences with liver cancer, Jess's motivation for defeating pancreatic cancer, and other similar stories in our group serve as a constant reminder of why I am involved in this work. Our non-profit, academic, industry, and clinical partners keep us focused on our end goals, whether it is treating depression, cancer, or biomaterial-associated infections. My passion for translational research even caused us to branch out (literally) and use FUS to extract DNA from timber and other plant tissues to help address the mass extinction crisis facing the world. I never thought I would be treating trees in my lab, but I am excited to have created a culture that allows us to pursue projects beyond the boundaries of any one discipline. It is an honor to work with so many brilliant scientists, engineers, clinicians, administrators, volunteers, and community members. My lab fits perfectly within the interdisciplinary culture at the university and is just one growing node nested within the larger innovative ecosystems of Virginia Tech, the Commonwealth, and beyond. I feel privileged to have this job and look forward to continuing to work on projects that extend beyond the walls of our lab to help patients and others in the surrounding community and around the globe.

In addition to my lab, I have many rewarding teaching and mentorship roles. In my courses on medical imaging, medical devices, and cancer therapeutics, I work hard to include active learning opportunities for students. I also leverage my industry and clinical partnerships to teach topics from multiple perspectives. Outside of the classroom, I have worked extensively with many different engineering design teams, business consulting teams, and the Bioactivity Student Organization. These efforts help students gain experience in medical device development that will better prepare

them for careers in industry, such as being exposed to quality systems engineering and FDA regulatory processes. Students from these groups have received significant recognition including being finalists at the Virginia Tech Apex Entrepreneur Challenge and winning 1st Place in The IdeaFest Pitch Competition in 2018. All of these efforts are supported by partnerships with clinical and industry collaborators that provide our students with direct connections to the medical device industry and the frontlines of clinical care.

Much of my time is centered on building programs to expand interdisciplinary research and entrepreneurship. I am a member of the ICTAS Center for Engineered Health; the Faculty of Health Sciences; the Translational Biology, Medicine, and Health interdisciplinary graduate program; and the Regenerative Medicine and Tissue Engineering interdisciplinary graduate education programs. I am also a board member for the Virginia Tech Office of Undergraduate Research. Beyond the university, I serve on the board of the International Society of Therapeutic Ultrasound and also have important relationships with non-profits, such as the Virginia-based FUS Foundation, National Geographic, Conservation X Labs, and the Gordon and Betty Moore Foundation. I am also proud of my many collaborations throughout the U.S., Europe, and Africa. Grant funding is often a competitive endeavor, but science is a team sport, and I have been successful in acquiring funding in large part due to these many significant internal and external partnerships.

Finally, the most rewarding part of my job has been working with our amazing students as they strive to develop technologies that will make real impacts on people's health and wellbeing. Many of my students have already advanced to graduate school or positions with medical device companies. Undergraduates in my labs have received prestigious awards, such as FUS Global Internship Awards, the Torgersen Leadership Award, Claire Boothe Luce Fellowships, 1st place at the Biomedical Research Conference for Minority Students, a Fralin Undergraduate Scholarship, a Goldwater Fellowship, an NSF Graduate Research Fellowship, an ACC Meeting of the Minds Award, and Multicultural Academic Opportunities Program Internships. My graduate students have received awards at international conferences and earned multiple New Horizon Graduate Scholarships, an ICTAS Doctoral Fellowship, an NSERC Postgrad Scholarship, and a P.E.O. Scholar Award. I have also been successful in mentoring a large group of medical students, which has provided a unique experience for them to lead research projects, publish papers as lead authors, and present innovative research at international conferences. These students have likewise won awards for their exemplary research accomplishments. Finally, a postdoc in my lab, Hal Holmes, won a prestigious Schmidt Science Fellowship, a Moore Inventor Fellowship, and the Pritzker Environmental Genius Award. Even more important than these awards is the impact that the members of my lab are having on the world. In addition to developing improved medical technologies that can offer non-invasive treatments for cancer and other diseases, our students are focused on tackling grand challenges in global health. For instance, our recent TEAM Malawi FUS initiative, started by Mariam Hasan, an undergraduate student in my lab who is passionate about women's health and global health equity, has the potential to significantly improve healthcare options in Malawi and other resource limited countries

To conclude, I want to reiterate how fortunate I feel to work in this "job" each day. As I constantly remind my students when I give lectures on the history of medical devices, we work in a field where the greatest discoveries are accomplished by committee. No single person is responsible for our sophisticated imaging systems or the intricate robotic equipment that is used to perform safer and more effective surgeries in our hospitals today. These systems were built by many dedicated engineers, scientists, clinicians, volunteers, and others who worked together over the course of many years. When it comes to my lab, the real (rising) stars are the technological solutions we are developing as a result of our collaborative efforts. I am excited to grow as a faculty member in the coming years as we continue to build interdisciplinary programs focused on tackling complex challenges in medicine, global health, and environmental conservation.

ABBREVIATED CV - *ELI VLAISAVLJEVICH*

ultrasound-lab.beam.vt.edu

EDUCATION

University of Michigan, Ann Arbor, MI MS 2013, PhD 2015
3.91 GPA / NSF Graduate Research Fellowship / 2015 Towner Prize for PhD Research

Michigan Technological University, Houghton, MI BS 2010
4.0 GPA / Goldwater Scholar / 2009 Provost's Award for Scholarship

CURRENT POSITION

Associate Professor: Virginia Tech, Biomedical Engineering and Mechanics 2022-present

- **Research:** Director – Focused Ultrasound Laboratory
  - Research mentor to 11 PhD, 4 MS, 10 MD, and >35 undergraduate students
- **Teaching:** Medical Imaging (BMES 3134), Medical Devices (BMES 3144), Cancer Detection and Therapeutics (BMES 5984), Fundamentals of Cancer (TBMH 5024), Graduate Seminar (BMES 5994), Senior Design (ESM 3114, BSE 4125, MGT 4084)

RESEARCH AND ACADEMIC HONORS (selected)

- Gold Pen Award *(VT BEAM)* 2020, 2022
- Outstanding New Assistant Professor *(College of Engineering)* 2020
- Outstanding Undergrad Research Mentor *(Office of Undergraduate Research*) 2020
- Leader in Research Award *(VT BEAM)* 2020
- Liviu Librescu Faculty Prize *(VT BEAM)* 2019
- Engineering Organization Advisor Award *(Student Engineers' Council)* 2019
- Junior Faculty Award *(VT ICTAS)* 2019
- Richard and Eleanor Towner Prize for Outstanding Ph.D. Research 2015
- NSF Graduate Research Fellowship 2010-2015

APPOINTMENTS AND DIVERSITY INITIATIVES (selected)

- Assistant Professor, VT Biomedical Engineering and Mechanics 2017-2022
- Board Member: Office of Undergraduate Research 2020-
- Director: TEAM Malawi Focused Ultrasound Initiative 2022-
- Faculty Mentor: Multicultural Academic Opportunities Program 2019-
- Faculty Mentor: New Horizons Program 2019-
- Faculty Mentor: Clare Booth Luce Fellowship program 2019-2022
- Faculty Host: Future Faculty Development Program 2019
- Participant: Virginia Tech HBCU Research Summit 2018, 2019, 2020, 2021
- Member/Advisor: Regenerative Medicine IGEP 2019-
- Member/Advisor: Computational Tissue Engineering IGEP 2019-
- Member: Wake Forest Baptist Comprehensive Cancer Center 2020-
- Faculty Mentor: Multicultural Academic Opportunities Program 2019-
- Faculty Mentor: New Horizons Program 2019-

OUTREACH AND PROFESSIONAL SERVICE (selected)

- Board Member: International Society of Therapeutic Ultrasound 2021-
- Member: ICTAS Center for Engineered Health 2018-
- Founding Director: International Society of Ultrasound Student Board 2022
- Member: Virginia Tech COVID-19 Response Team 2020
- Faculty Mentor: Bioactivity Student Organization 2018-2021
- Grant Reviewer: FUS Foundation, Schmidt Foundation, VT CoE, ICTAS, iThrive of Virginia
- Led "TEAM Malawi" student/faculty outreach trip in June 2022 to Malawi, Africa, in order to establish academic, research, and clinical partnerships.

- Peer Reviewer: Ult Med Biol, Phys Med Biol, IEEE TUFFC, J Biomech Eng, IEEE TBME
- International partnerships: Spain, Italy, Canada, Switzerland, Turkey, and Malawi
- Industry partnerships: HistoSonics, Intelligenza Trasparente, Daxsonics, others
- Non-profit partnerships: FUS Foundation, American Kennel Club, Conservation X Labs, National Geographic, Gordon and Betty Moore Foundation, others

GRANT FUNDING (selected from >$15M total, >$5M share)

1. ***Gordon and Betty Moore Foundation***, "Investigation of Non-thermal FUS for the Rapid Extraction of DNA from Timber and Plant Tissues," 11/1/2019-10/31/2023, $1,098,129, PI.
2. ***NIH (R01)***, "Developing methods for precise, safe and target-location specific histotripsy of liver tumors," 07/01/2021-06/30/2026, Total: $3,004,064, Site PI.
3. ***NIH (*R21**)**, "Nanoparticle-mediated Histotripsy (NMH) for Noninvasive and Targeted Ablation of Metastatic Breast Cancer," 1/1/2020-12/31/2024, $602,632, PI.
4. ***NIH (*R01**)**, "Noninvasive histotripsy ablation of fibrotic tissue in benign prostatic hyperplasia," 9/01/2019-8/31/2024, $375,318, Site PI.
5. ***Focused Ultrasound Foundation***, "Immunostimulatory response to histotripsy in dogs with naturally-occurring soft tissue tumors," 3/1/2020-2/28/2021, $162,460, Co-PI.
6. ***American Kennel Club***, "Ultrasound-guided histotripsy ablation of canine brain tumors through an acoustically transparent cranial window," 1/1/2021-12/31/2022, $120,000, Co-I.
7. ***NIH (R01),*** "Deploying Histotripsy Based Tumor Ablation Strategies to Treat Pancreatic Cancer," 05/01/2022 – 06/30/2026, Total: $2,050,287, Co-I.
8. ***SebastianStrong Foundation,*** "Focused Ultrasound Consortium for Treatment of Children Diagnosed With Diffuse Midline Gliomas," 08/1/2022 – 7/31/2024, $672,665, Co-PI.
9. ***NIH (R21),*** "Ultrasound-guided Intrinsic Threshold Histotripsy for the Non-invasive Ablation of Uterine Fibroids," 09/01/2022 – 08/31/2024, $422,175, PI.
10. ***NIH (R01),*** "Iron Based Coupling Media (IBCM) for MRI-guided Transcranial Ultrasound Surgeries." 09/30/2022 – 06/30/2026, $1,893,775, Co-I.

SELECTED PUBLICATIONS (FROM >64, h-index: 23, i10-index: 37)

1. Vidal-Jove, et al. "First-in-man histotripsy of hepatic tumors: the THERESA trial, a feasibility study." International Journal of Hyperthermia (2022)
2. Childers C, et al. Focused Ultrasound Biofilm Ablation: Investigation of Histotripsy for the Treatment of Catheter-Associated Urinary Tract Infections (CAUTIs). IEEE TUFFC (2021).
3. Holmes H, et al. Focused Ultrasound Extraction (FUSE) for the Rapid Extraction of DNA from Complex Tissue Matrices. Methods in Ecology and Evolution (2020).
4. Vlaisavljevich E, et al. Visualizing the Histotripsy Process: Bubble Cloud-Cancer Cell Interactions. Ultrasound Med Biol. (2016).
5. Vlaisavljevich E, et al. Nanodroplet-mediated histotripsy for image-guided targeted ultrasound cell ablation. Theranostics. (2013).

Complete List: ***https://scholar.google.com/citations?user=hQSypTUAAAAJ&hl=en&oi=ao***

SELECTED PRESENTATIONS (FROM >80)

1. Focused Ultrasound for Non-invasive, Image-guided Cancer Therapy. Malawi Institute of Science and Technology, Blantyre, Malawi, Africa, June 26, 2022 (Invited)
2. Tissue Ablation using Histotripsy: Basic Mechanisms, Clinical Translation, and Emerging Applications. Congress of Korean Society of Ultrasound in Medicine, May 12, 2022 (Invited)
3. Non-invasive, Non-thermal, and Non-ionizing Tumor Ablation using Histotripsy. University of Washington, Seattle, WA, July 30, 2021 (Invited)
4. Histotripsy as a Non-invasive and Tissue Selective Cancer Ablation Method. Jefferson University Department of Radiology, Philadelphia, PA, April 17, 2019 (Invited)
5. Non-invasive Image-guided Liver Cancer Ablation using Histotripsy. Dalhousie University Department of Biomedical Engineering, Halifax, NS, Canada, April 12, 2018 (Invited)

STATEMENTS OF SUPPORT

Professor Vlaisavljevich is a distinguished teacher, researcher, and entrepreneur who applies his extensive knowledge and experience to mentor and prepare students to serve as future leaders and innovators in their fields. His commitment to his students' success is equaled only by his research achievements and expertise in histotripsy (the first non-invasive, non-thermal, and non-ionizing cancer therapy) and other technologies. Dr. Vlaisavljevich's transdisciplinary work in BME translational medicine continues to elevate Virginia Tech's global reputation and prepare students for careers and opportunities in a variety of medical and disease research industries. – **Dr. Cyril Clarke, Executive Vice President and Provost, Virginia Tech (Supervisor)**

Dr. Vlaisavljevich has worked tirelessly to establish an internationally respected research program that spans multiple fields from biomedical engineering to conservation. He has published >60 papers in leading journals, has multiple patents, is an author on >80 conference presentations, has given >10 invited talks at international universities, and has received ~$16M in external funding. To achieve his bench-to-bedside goals, he has formed important industry and non-profit partnerships that greatly expand the impact of his research and the opportunities for our students. . . [He is] also one of the most active faculty members when it comes to mentoring students in his lab and design teams. Due to his efforts, students have gained unique and valuable experience in medical device development and health care entrepreneurship. – **Dr. Jennifer Wayne, Department Head, Biomedical Engineering and Mechanics, Virginia Tech (Supervisor)**

[He is] the ideal candidate to be recognized with the Rising Star Award. As a scientist, inventor, entrepreneur, mentor and teacher, he is the whole package. His work at the frontier of translating fundamental discoveries is transformational and likely to have far reaching benefits. The manner in which he incorporates learners into discovery and application not only opens up new horizons for students but also brings diverse perspectives to solve problems that are multi-dimensional and complex. Without the engagement of Dr. Vlaisavljevich, many new partnerships and initiatives of the VT health sciences enterprise would not have been as successful including those with the Children's National Hospital, the Focused Ultrasound Foundation, the VT Cancer Research Alliance, and the VT-Carilion cancer collaborative, to name just a few. His presence. . .brought a level of collegiality and true collaboration that often set the tone for the entire programs. In summary, Dr. Vlaisavljevich is truly a rising star and a model of an outstanding faculty member who is substantially advancing VT's research, teaching, and service missions with the thread of *Ut Prosim* throughout all he does. – **Dr. Michael J. Friedlander, Vice President for Health Sciences and Technology, Virginia Tech (Supervisor)**

As the former Department Head that recruited him in 2017, I am proud of how he has emerged as a leader at Virginia Tech. Dr. Vlaisavljevich's personal story of developing histotripsy for treating a disease that took his mother's life is something that resonates with our students. His passion for basic science, engineering, entrepreneurship, and translational medicine can be seen in the lab, classroom, and community. He has established an internationally respected research program and has been extremely active in research, teaching, and student mentoring. . . [He has] received >35 research grants for >$16M, unprecedented numbers at this stage of his career. . . Finally, I am proud of his outreach work through his many industry, non-profit, and international partnerships. – **Dr. Pamela VandeVord, Associate Dean for Research and Graduate Studies, N. Waldo Harrison Professor of Biomedical Engineering, Virginia Tech (Supervisor)**

His dedication to advancing the field of focused ultrasound tumor ablation will have a tremendous impact on improving the prognosis and outcome for both veterinary and human cancer patients. Not only is Dr. Vlaisavljevich an excellent researcher, as evidenced by his impressive achievements, he is also an ideal colleague. His tireless work ethic, positive outlook, deep belief in team science, and genuine kindness towards others, are only a few of the attributes that make

him a “one-of-a-kind” outstanding colleague. Dr. Vlaisavljevich is also a dedicated mentor to his students that provides the guidance to ensure they optimize their learning and are well-poised for successful careers. **– Dr. Joanne Tuohy, DVM, PhD, Assistant Professor, Surgical Oncology, Virginia-Maryland College of Veterinary Medicine (Colleague)**

The culmination of [Dr. Vlaisavljevich’s work] led to our Phase I clinical trial in patients with primary and metastatic liver tumors, which was named ‘The Theresa Study’ after his mother who passed from liver cancer. From the significant preclinical work to the development of the company’s first clinical system and the actual name of the study, Dr. Vlaisavljevich played an instrumental role in this first-in-man study. . . As we continue to build on the legacy of The Theresa Study, we are working closely with the team at Virginia Tech as they develop histotripsy for treating liver, brain, pancreas, bone, and soft tissue tumors as well as other exciting applications outside of oncology. Dr. Vlaisavljevich is motivated by a patient-first approach that has left its mark on our company forever. We are reminded of this each day as we build on the legacy of the Theresa Study. – **Mike Blue, President and CEO, HistoSonics (Colleague)**

[I] had the pleasure of working with Dr. Vlaisavljevich for over three years on a biomedical design team and in his Therapeutic Ultrasound Lab. One of his greatest attributes is his ability to guide the team to make our own educated and informed decisions. His knowledge and experience are invaluable in helping guide our young minds to think bigger, broader, and better. . . Our serendipitous encounter with Bioactivity led to me working in his lab to research cancer therapies during the most difficult time in my life. Four days after completing my freshmen year, my father passed away from pancreatic cancer. Through Vlaisavljevich’s mentorship, I was able to find my path after being completely knocked down by life. I can see his passion and purpose which has driven me to pursue more, achieve more, and never stop searching for answers. [He] has profoundly impacted my education and life more than any other educator before him. – **Jessica Gannon, Mechanical Engineering, Undergraduate Research Assistant (Student)**

[W]hat we found most impressive is his full embrace of grand visions and interdisciplinary collaboration. While many professors in medical device development would not look twice at a project in conservation technology, he immediately welcomed us into his lab to start a project that applies his focused ultrasound technology as a new tool to enable rapid DNA testing at the front lines of conservation. This technology is poised to become an impactful part of our programs that are focused on preventing illegal timber and wildlife trafficking. . . Dr. Vlaisavljevich’s ability to effectively communicate across fields and foster not only interdisciplinary collaboration but seamlessly integrate diverse skillsets represents the future of innovation and aligns with our model for solving the world’s most wicked problems. Through all his accomplishments, Dr. Vlaisavljevich remains an incredibly kind person who genuinely wants to make a positive impact in any way he can, values that we believe to be indicative of great leaders. – **Alex Dehgan, CEO (Community Leader); Hal Holmes, Chief Engineer (Colleague); Conservation X Labs**

Dr. Vlaisavljevich’s research embodies this patient-focused approach, and his research in histotripsy has the potential to revolutionize cancer treatment as the first completely non-invasive and non-thermal cancer ablation method. . . His level of intellectual curiosity is everything a premier research institute could ever want from a faculty member. Additionally, Dr. Vlaisavljevich possesses a skill set we don’t see very often – ability to work with industry and other academic institutions. . . [He] shares the important values of our Foundation as well as the data-driven, results-oriented, and patient-centric approach we strive to promote. Whether through his personal motivation for fighting cancer or his willingness to collaborate with industry partners, he embodies a mission-driven, collaborative, and entrepreneurial spirit focused on developing new FUS technologies. . . We look forward to partnering with him as he continues the legacy of the State of Virginia being the world leader in the development of focused ultrasound technologies. – **Dr. Neal F. Kassell, CEO and Chairman, Focused Ultrasound Foundation (Community Leader)**