



# FOCUSED ULTRASOUND FOUNDATION

## 2017 YEAR IN REVIEW

### Highlights

- **World's first trial to assess focused ultrasound (FUS) treatment of patients with Alzheimer's disease begins**
- **Foundation partners with Cancer Research Institute to develop new treatments for cancer by combining focused ultrasound with immunotherapy drugs**
- **First clinical trial combining FUS and a cancer immunotherapy drug to treat metastatic breast cancer begins**
- **Awareness of focused ultrasound skyrockets due to participation in Consumer Electronics Show in Las Vegas, other events**
- **Pejman Ghanouni, MD, PhD, named Honorary President of 6th International Symposium on Focused Ultrasound 2018; Consumer Technology Association President and CEO Gary Shapiro selected as keynote speaker**
- **Foundation receives unprecedented \$10 million pledge of unrestricted funds from anonymous donor, to be matched 1-for-1**
- **Foundation launches FUS veterinary program to treat companion animals and gain information for use in humans**
- **Asia relationships initiated and strengthened with research sites, manufacturers, investors, and donors**
- **LabTAU in Lyon, France, designated new Center of Excellence**
- **Researchers from France and Italy join Foundation team as Fellows**

# A MESSAGE FROM THE CHAIRMAN

## Dear Friends,

The past year has brought with it many notable achievements, but one milestone best exemplifies the immense progress in the field. There are now more than 100 clinical indications for which focused ultrasound is in various stages of research, development, and commercialization. This is an astonishing increase from the handful that existed when the Foundation was founded in 2006.



Counted among those indications are Alzheimer's disease and pediatric brain tumors, both of which marked their first-in-human treatments this year. Another pioneering trial is the first to combine focused ultrasound and cancer immunotherapy to treat metastatic breast cancer.

The field is not only increasing in size and scope, but it is also maturing as the focus expands beyond research into commercialization. This shift brings new challenges, including developing robust scientific evidence of long-term safety, efficacy, and cost-effectiveness to support regulatory approvals and reimbursement.

The Foundation continues to drive growth in the field, thanks to the involvement of our donors, board, and council and the dedication of our team. Our research program is thriving with an emphasis on brain indications, cancer, and cancer immunotherapy. We also launched a veterinary program this year to expand focused ultrasound's reach into pet medicine. Our hope is to create a win-win scenario where veterinarians will have new, innovative therapies to offer patients, and insights gained in treating dogs and cats will help inform clinical trial design in humans.

We now find that, in such a robust field, our challenge is to maintain focus and devote our finite resources to high-value targets. We are constantly analyzing the field to prioritize the mechanisms of action that are most likely to translate into new applications, and the clinical indications that are most likely to provide true, unique value.

As for 2018, we have already had an exceptional opportunity to raise awareness for the technology at the Consumer Electronics Show in January, which was attended by more than 180,000 people. We are also preparing for our 6th International Symposium at the end of October, which is on target to be our largest to date.

None of this would have been possible without the generous support of our donors, who have become partners in the pursuit of our vision that focused ultrasound will one day be used to improve the lives of millions of patients around the world suffering from a broad spectrum of serious medical disorders.

Thank you, and be well.

**Neal F. Kassell, MD**



# Creating Knowledge: Research Milestones

## EXTERNAL RESEARCH AWARDS PROGRAM

The Foundation committed a total of \$810,000 to fund eight new External Research projects, including the first under the Foundation’s new [veterinary program](#) (“FUS-mediated Enhancement of Chronic Nonhealing Wound Antimicrobial Therapy in Client-owned Dogs”). To date we have funded 63 projects for a total of \$6.1 million. Forty-four of these projects have been completed, at a cost of \$4.4 million, and 98 percent have been presented at scientific meetings. Seventy percent have been published in peer-reviewed journals, and 22 have achieved follow-on funding from the National Institutes of Health and other foundations totaling \$34.6 million. The ratio of Foundation projects that have received follow-on funding has increased from 6:1 last year to 8:1 this year. All projects have royalty or SAFE agreements (“simple agreements for future equity”) to facilitate the Foundation benefiting economically from the research we support.

### Completed external projects, cumulative



Funding provided for completed projects

Follow-on funding

Factor by which the Foundation leverages donors’ contributions

## BRAIN PROGRAM

In 2017, the Foundation was a catalyst in advancing the field of focused ultrasound on a number of important research fronts involving the brain. We funded and witnessed the launch of the first clinical trial using focused ultrasound to treat patients with [Alzheimer’s disease](#). This trial – evaluating the feasibility of opening the blood-brain barrier temporarily, focally, and repetitively – could transform brain treatment options in a way that has not been seen before, by enabling medications to reach the brain.

The Foundation funded five brain research projects this year (in addition to many ongoing projects), including two technical, one preclinical, and two clinical.

### FUSF Brain Program Projects, internal and external, cumulative





# Creating Knowledge: Research Milestones

## BRAIN PROGRAM (CONT.)

### Technical Projects

A number of technical projects supported by the Foundation seek to make treatments for the brain faster, safer, and more effective. Technical projects include: increasing the size of the treatment envelope in order to reach the entire brain; developing treatment-planning software to facilitate patient selection and treatment; improving MR imaging; monitoring tissue temperature rise in the brain and skull (thermometry); confirming targeting accuracy without heating; and monitoring tissue change in real-time during treatment.

### Preclinical Laboratory Studies

A wide variety of Foundation-funded preclinical studies are ongoing throughout the world. Many are related to enhancing tissue ablation (or destruction) including using histotripsy, sonodynamic therapy, and thermal dose delivery.

Other preclinical studies include: 1) using focused ultrasound for [neuromodulation](#) to temporarily block brain activity (to facilitate targeting for ablation for functional disorders including Parkinson's disease and essential tremor); 2) [treatment of tumors](#), including glioblastoma, using focused ultrasound to destroy tissue, deliver drugs, and enhance the immune system's response; 3) [Parkinson's disease](#) studies using stem cells and alpha-synuclein antibodies (via opening the blood-brain barrier with focused ultrasound) to restore function or halt progression of the disease; 4) [Alzheimer's disease](#) projects studying anti-amyloid beta antibody delivery (via opening the blood-brain barrier with focused ultrasound) in mice with the disease; and 5) [stroke](#) projects examining focused ultrasound's ability to improve post-stroke outcomes by delivering stem cells to the affected regions of the brain.

### Clinical Trials

This year has seen progress in clinical (human) trials investigating focused ultrasound to treat various conditions. These include:

#### [Parkinson's Disease – Dyskinesia](#)

Treatment of all 31 patients in a multisite study using focused ultrasound to treat Parkinson's dyskinesia is now complete with the addition of five patients treated in the US. Sites included Brigham and Women's Hospital, Ohio State, Stanford, University of Maryland, University of Virginia, Sunnybrook Health Sciences Centre in Toronto, Canada, and Yonsei University Medical Center in Seoul, Korea.

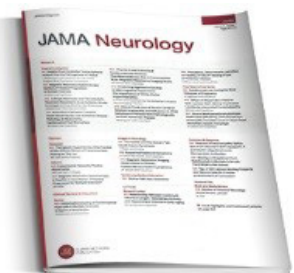
Results from a similar study of 10 patients at Yonsei University Medical Center will also be available soon. Final results of the larger study will be fully analyzed after a two-year follow-up period; however, the initial results from these two trials were positive enough to warrant a pivotal study on safety and efficacy that is currently recruiting patients ([www.clinicaltrials.gov](http://www.clinicaltrials.gov): NCT03319485).

#### [Parkinson's Disease – Tremor](#)

All 27 patients in a study at the University of Virginia assessing the effectiveness of focused ultrasound for tremor-dominant Parkinson's disease have been treated; current results – which demonstrated maintained improvement in movement disorders – have been [presented and published](#) in *JAMA Neurology*.

#### [Dystonia of the Hand](#)

Four of 10 patients in a study investigating the effectiveness of focused ultrasound on dystonia of the hand have been treated at Tokyo Women's Medical University in Japan.





# Creating Knowledge: Research Milestones

## BRAIN PROGRAM (CONT.)/Clinical Trials (Cont.)

### Alzheimer's Disease

At Sunnybrook Health Sciences Centre in Toronto, Canada, six patients were treated in the [first trial](#) using focused ultrasound to temporarily open the blood-brain barrier in patients with early to moderate Alzheimer's disease, to determine its technical feasibility and safety. This study is the first step toward using focused ultrasound to facilitate or enhance delivery of drugs or other therapeutic agents to treat Alzheimer's disease.

### Brain Tumor – Glioblastoma

A pilot trial of the feasibility and safety of temporarily opening the blood-brain barrier with focused ultrasound in order to facilitate drug delivery to glioblastoma patients has been completed. The study involved five patients at Sunnybrook Health Sciences Centre in Toronto, Canada. A larger glioblastoma study is planned for the future.

### Obsessive-Compulsive Disorder

Focused ultrasound has been used to treat five patients with obsessive-compulsive disorder at Sunnybrook Health Sciences Centre in Toronto, Canada. [This trial](#) is in follow-up to a study of 12 patients treated at Yonsei University Medical Center in Seoul, Korea. Additional studies are planned for this year.

### Depression

The Foundation funded two pilot trials to treat patients with treatment-refractory depression. The initial study of four patients was completed in Korea, and a six-patient study is screening patients for treatment in Canada.

### Neuropathic Pain

The University of Virginia and the Foundation are co-sponsoring clinical research at UVA to treat craniofacial neuropathic pain. The University of Maryland has also received Foundation funding to treat centrally located neuropathic pain. Both institutions are currently screening patients for treatment.

## BODY PROGRAM

Seven clinical trials in our Body Program have been initiated or completed including: breast cancer immunotherapy (US), head and neck cancer (Canada), osteoid osteoma (US and Canada), [facetogenic back pain](#) (Canada), and neuropathic pain for stump neuroma (Israel).

## CANCER PROGRAM

### Andrew Lockhart Award Established



The Foundation established a cash prize in memory of Andrew Lockhart (pictured left), who died in 2016 after a hard-fought battle with cholangiocarcinoma (bile duct cancer). The annual \$75,000 cash prize is given to an investigator who demonstrates outstanding potential to contribute to advancing cancer treatment using focused ultrasound. The [Andrew J. Lockhart Memorial Prize](#) is made possible by the generous contributions of Andrew's friends and family. The first winner of this prize is [Richard Price, PhD](#), Professor of Biomedical Engineering, Radiology, and Radiation Oncology at the University of Virginia. Dr. Price has led focused ultrasound research projects on drug and gene delivery across the blood-brain barrier, drug and gene delivery to skeletal muscle to promote new blood vessel growth, and the mechanical effects of ultrasound-activated microbubbles to ablate tumors.

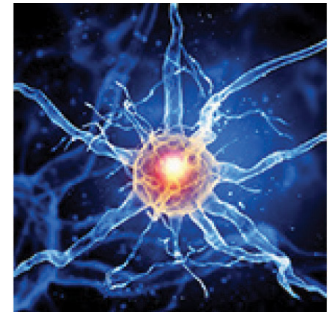


# Creating Knowledge: Research Milestones

## CANCER IMMUNOTHERAPY PROGRAM

### First Trial Combining Focused Ultrasound and an Immuno-oncology Drug Begins for Breast Cancer

A ground-breaking [clinical trial](#) for women diagnosed with stage IV metastatic breast cancer began enrolling patients at the University of Virginia Health System. Led by Patrick Dillon, MD, Associate Professor of Hematology and Oncology, and David Brenin, MD, FACS, Associate Professor of Surgery and Chief of Breast Surgery, the pilot trial combines two therapies: focused ultrasound to destroy part of the primary breast tumor or metastatic tumors, and a cancer immunotherapy drug, Merck's medication pembrolizumab (Keytruda®). Fifteen women will be enrolled in the study.



Multiple cancer immunotherapy preclinical studies are ongoing. Highlights include:

- The use of focused ultrasound plus immunotherapy for malignant melanoma metastases to the brain; this project is co-funded by the Cancer Research Institute, the Melanoma Research Alliance, and a Foundation donor.
- A Foundation-led six-site collaborative project evaluating the effect of different focused ultrasound sonication parameters on the immunogenicity in glioblastoma tumors. Collaborators include: Brigham and Women's Hospital, University of Virginia, Georgia Tech, University of Michigan, University of Maryland, and Sunnybrook Health Sciences Centre in Toronto, Canada.
- Studies assessing the relative effectiveness of different sonication parameters in treating breast cancer, pancreatic cancer, and glioma.

## PEDIATRICS PROGRAM

### Osteoid Osteoma Pilot Study Completed

All 10 patients in a pilot study assessing the effectiveness of focused ultrasound for osteoid osteoma – disabling, painful benign bone tumors – at Toronto's SickKids Hospital in Canada have been treated. Initial results are encouraging in the alleviation of pain from these tumors. Final results will be published after the follow-up period of six months.

Three of 56 patients in a new osteoid osteoma study comparing FUS with radiofrequency ablation (RFA) have also been treated in the US.

### Brain Benign Tumor Study Begins

In 2017, researchers at Nicklaus Children's Hospital in Miami, Florida, researchers performed the first procedure in a young adult patient with a brain tumor. [The trial](#) aims to demonstrate feasibility and safety of using focused ultrasound to ablate a variety of benign tumors located in the central part of the brain in 10 patients, ages 8 to 22. The first patient treated had a type of benign tumor that resulted in repeated seizures; six months post-treatment the patient has remained seizure-free. A second patient, recently treated, is also doing well.



**Nicklaus  
Children's  
Hospital**

MIAMI CHILDREN'S HEALTH SYSTEM 

# Creating Knowledge: Research Milestones

## VETERINARY PROGRAM

The Foundation launched a [veterinary program](#) in late 2017 to study focused ultrasound therapies for the treatment of companion animals. The initiative enables veterinary researchers to offer state-of-the-art therapies to their patients, while collecting data to accelerate the adoption of the technology for human applications. The first study in this program will take place in early 2018 at the Virginia-Maryland College of Veterinary Medicine (VMCVM) at Virginia Tech in Blacksburg, Virginia, and will use focused ultrasound to treat soft tissue tumors, such as sarcomas and mast cell tumors, in dogs.



FUSF staff celebrated Pet Cancer Awareness Month in November with our furry friends.

## Centers of Excellence Program

### LABTAU RECEIVES CENTER OF EXCELLENCE DESIGNATION

The Foundation designated a unit of the French National Institute for Health and Medical Research (INSERM) in Lyon, France, as a new [Center of Excellence](#). INSERM Unit 1032, the Laboratory of Therapeutic Applications of Ultrasound (LabTAU), is located within a large medical and research community and conducts important translational and clinical research with a multidisciplinary, highly qualified, and complementary team of physicians and scientists. The Center has special expertise in commercializing technology and creating strategic interfaces between engineering and medicine, and LabTAU scientists have considerable experience translating focused ultrasound research from the laboratory to the bedside. There are now seven FUS Centers of Excellence around the world.



## Convening the Community

### WORKSHOPS

The Foundation continued to organize invitational workshops designed to gather experts in the field to produce roadmaps of technical, preclinical, and clinical studies needed to further the development and adoption of focused ultrasound to treat specific disorders.

#### Psychiatric Disorders

Together with Sunnybrook Health Sciences Centre, the Foundation co-hosted a workshop October 18-20, 2017, in Toronto, Canada, to create a roadmap of studies leading to new [treatments of psychiatric conditions](#). The group of 30 attendees discussed the state of the technology, past studies, current challenges, and future preclinical and clinical research directions for using focused ultrasound to treat or modulate conditions such as obsessive-compulsive disorder and depression; a [white paper](#) (summary report) has been disseminated.

#### Blood-Brain Barrier

The Foundation hosted a workshop November 16-17, 2017, in Washington, DC, to document the state of the field for using [focused ultrasound to open the blood-brain barrier](#). The goal was to answer key questions, identify knowledge and technology gaps, and create an updated roadmap of current and future clinical studies. Experts in focused ultrasound, neurology, neurosurgery, neuroradiology, and neuroscience attended the two-day meeting together with scientific staff from the Foundation, FDA scientists, and manufacturer representatives; a [white paper](#) has been disseminated.

# Convening the Community

## 2018 SYMPOSIUM PLANS UNDERWAY

Focused ultrasound pioneer [Pejman Ghanouni, MD, PhD](#), Assistant Professor of Radiology at Stanford University, has been chosen to serve as the Honorary President for the 6th International Symposium on Focused Ultrasound, to be held October 21-25, 2018, in Reston, Virginia. Dr. Ghanouni has an impressive clinical reputation in focused ultrasound at Stanford, where the majority of his work is related to benign and metastatic bone tumors, uterine fibroids, and soft tissue tumors.



Thought leader and influencer Gary Shapiro, President and CEO of the Consumer Technology Association – which sponsors the Consumer Electronics Show, the largest technology show in the world – has been selected as a keynote speaker.

Additionally, more than 20 leading clinicians and scientists have joined the Symposium’s scientific program committee.

## MEETINGS SPONSORED

The Foundation exhibited at and/or sponsored 11 scientific meetings. Highlights include: Therapeutic Ultrasound Winter School in Des Houches, France; International Society for Therapeutic Ultrasound in Nanjing, China; and Society for Thermal Medicine in Tucson, Arizona.

# Fostering Collaboration

## FOUNDATION PARTNERS WITH CANCER RESEARCH INSTITUTE

The Foundation and the Cancer Research Institute (CRI) have [established a partnership](#) to advance the development of new focused ultrasound and cancer immunotherapy treatments. Both organizations recognize that the intersection of the latest developments in focused ultrasound therapy and cancer immunotherapy offers a highly promising opportunity for combination approaches to treat a variety of cancers. “This partnership formalizes a long-standing relationship between CRI and the Focused Ultrasound Foundation,” said Jill O’Donnell-Tormey, PhD, CEO and Director of Scientific Affairs at CRI. “We believe that focused ultrasound is a valuable tool that could increase efficacy in cancer immunotherapy treatments.” Twenty-eight institutions have already expressed interest in participating in jointly funded Foundation-CRI projects in the near future.

Other relationships with stakeholders that were established and/or strengthened this year include: the Medical Imaging & Technology Alliance, the Biden Cancer Initiative, FasterCures, the National Institute of Biomedical Imaging and Bioengineering, and many others.

## REPORT DETAILS CONTINUED GROWTH IN FUS FIELD WORLDWIDE

The Foundation’s [2017 State of the Field Report](#) was released this past summer, documenting the state of focused ultrasound around the world. Highlights this year include the increasing numbers of research sites and regulatory approvals, the dramatic upswing in first-in-human treatments, and the increasingly favorable regulatory landscape. This year’s report, available this summer, also features a new longitudinal view of how the field has grown over time.





# Cultivating the Next Generation

## MERKIN FELLOWS CONTRIBUTE TO FOCUSED ULTRASOUND RESEARCH

Two Research Fellows who were generously funded this year by the [Richard Merkin Visiting Fellowship in Focused Ultrasound](#) have joined the Foundation: researcher [Frederic Padilla, PhD](#), of the Laboratory of Therapeutic Applications of Ultrasound (LabTAU) in Lyon, France, and neurosurgeon [Francesco Prada, MD](#), of the Istituto Neurologico Carlo Besta in Milan, Italy. Padilla is continuing the preclinical breast cancer immunotherapy project started by last year's Merkin Fellow, Cyril Lafon, PhD, and also doing additional experiments aimed at making treatments safer and more controlled (by reducing cavitation). Prada is a leader in ultrasound-guided neurosurgery and is working collaboratively with UVA researchers on several preclinical focused ultrasound brain projects, including the use of sonodynamic therapy and microvascular ablation for the treatment of gliomas.

## Foundation Fellows, Interns, and Global Scholars Programs, Cumulative

<b>17</b> Fellows	<b>48</b> FUSF Interns	<b>72</b> Global scholars	<b>47</b> Institutions represented
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## STUDENT RESEARCHERS AWARDED FOR FUS WORK

The Foundation continues to strive to cultivate the [next generation](#) of scientists working in the field of focused ultrasound. [Three such young researchers](#) – Guillaume Maimbourg from Institut Langevin in Paris, France, Sarah Brüningk from the Institute of Cancer Research, and Amirah Aly from Northeastern University – earned awards this summer for their work in focused ultrasound.

The Foundation selected 19 global scholars, four summer interns, and two winter interns to work alongside our team in 2017. The [Claude Moore Charitable Foundation](#) is a generous funder of the Foundation's summer intern program.



FUSF Summer interns Sarah Hunter-Chang, Lindsey Abramson, and Cassandra Tulenko.

[Read More >](#)

# Overcoming Barriers

## REIMBURSEMENT

The Foundation continues to support the efforts of manufacturers to obtain [reimbursement](#) from the Centers for Medicare and Medicaid Services and commercial insurance companies, in particular this year regarding essential tremor and prostate cancer.

## REGULATORY

In its quest to support industry partners and academic clinical research sites in their [regulatory efforts](#), the Foundation has established relationships with the FDA Division of Neurological and Physical Medicine Devices and the Office of Device Evaluation. We were pleased that more than 10 FDA regulatory and scientific staff attended the [Foundation's blood-brain barrier workshop](#) in the fall.

# Increasing Awareness

## EVENTS & SPEAKING OPPORTUNITIES: SPREADING THE WORD ABOUT FUS

The Foundation participated in 13 awareness opportunities together reaching more than 5,000 attendees with information about focused ultrasound technology.

### Biennial Awareness Event

More than 150 people attended the [Foundation's biennial awareness event](#) in Charlottesville, Virginia, in May. As in past years, attendees included the Foundation's Board of Directors, Council, and staff, as well as focused ultrasound clinicians, researchers, patients, donors, and community members interested in the impact of this innovative technology. Four physicians spoke about their respective work with focused ultrasound.



Nir Lipsman, MD, PhD, FRCS, from Sunnybrook Health Sciences Centre in Toronto, Canada, presented early results from a new study in which the blood-brain barrier was opened in patients with Alzheimer's disease.

[Watch Now >](#)



Pejman Ghanouni, MD, PhD, from Stanford University, discussed his FUS pediatric work with desmoid tumors and the responsibility to be as minimally invasive as possible with this young patient population.

[Watch Now >](#)



Franco Orsi, MD, PhD, EBIR, Director of Interventional Radiology at the European Institute of Oncology in Milan, Italy, provided details about the clinical outcomes and advantages of treating pancreatic cancer with focused ultrasound.

[Watch Now >](#)



Craig Slingluff, MD, from the University of Virginia Cancer Center, spoke about the potential of focused ultrasound as a means of enhancing cancer immunotherapy.

[Watch Now >](#)

## FOUNDATION CHAIRMAN SHARES FUS WITH THOUSANDS AT MILKEN CONFERENCE

Foundation Chairman Neal F. Kassell, MD, attended the [Milken Institute Global Conference](#) in Beverly Hills, California. Dr. Kassell shared the story of focused ultrasound at a plenary session of 4,000, and then introduced former Vice President Joe Biden who discussed the Cancer Moonshot. In addition, Dr. Kassell participated in a panel, "Things That Will Blow Your Mind" – one of the best-attended panels with the [most online views](#) of the conference – which included discussion of various fields of neuroscience that are advancing ways in which the brain interfaces with technology. He also authored a blog, as part of the Milken Conference LinkedIn series, which discussed the field of focused ultrasound and received hundreds of "likes," comments, and shares. The Milken Institute Global Conference annually convenes the best minds in the world to tackle the most stubborn challenges.



# Increasing Awareness

## PRESENTATIONS/LECTURES

Foundation staff gave presentations to the Hong Kong Club in China and to Chang Gung Memorial Hospital in Taipei, China; Capital Flamekeepers in Washington, DC; and the Society of the Four Arts in Palm Beach, Florida. Foundation Chairman Neal F. Kassell, MD, also lectured at the Frank Batten School of Leadership and Public Policy at the University of Virginia.

## FUS AWARENESS SKYROCKETS AT 2018 CONSUMER ELECTRONICS SHOW

After months of preparation in 2017, the Foundation [participated in CES 2018](#) in early January in Las Vegas, Nevada, to raise awareness of focused ultrasound technology among an unprecedented worldwide audience of tens of thousands of fellow global innovators, technology-minded consumers, and journalists. Known as the “Global Stage for Innovation,” CES featured more than 3,900 exhibitors and hosted 7,000 journalists and at least 170,000 industry professionals, consumers, and other influencers. It is produced annually by the Consumer Technology Association.



Foundation Board member and best-selling author John Grisham and Foundation Chairman Neal F. Kassell, MD – joined by Foundation staff – participated in a wide variety of strategic outreach activities, including an “Unveiled” media event; [Gary’s Book Club interview](#) with CTA President Gary Shapiro to discuss Grisham’s *The Tumor*; onsite media interviews; two booths/exhibits featuring focused ultrasound technology; and a panel discussion about organizations that use technology to better the world and change lives. The show resulted in more than 700 direct new leads, thousands of new visitors to our website, and media coverage with a combined reach of nearly 100 million people.



## ACAC FITNESS CENTERS RAISES MORE THAN \$90,000 FOR THE FOUNDATION

The Foundation received a generous donation of more than \$90,000 from acac Fitness & Wellness Centers. The money was raised during acac’s most successful [“Work Out and Give Back”](#) campaign to date. “We were honored to partner with acac, as our organizations have a common goal of improving lives,” said Neal F. Kassell, MD. “This donation is invaluable in supporting our efforts to advance focused ultrasound as a standard of care and spread the word about this innovative technology.” Added acac owner, Phil Wendel, “Partnering with the Focused Ultrasound Foundation was a natural fit, and we are proud to support a fellow Charlottesville-based organization that is changing lives around the world.” The program reached more than 65,000 acac members at 12 locations.



## SUPPORTERS FUNDRAISE WITH CREATIVITY

- Artist and author [Peter Skinner](#) donated the proceeds from his painting exhibit at Les Yeux du Monde gallery in Charlottesville, Virginia, to the Foundation.
- The E Street Cinema in Washington, DC, hosted a [special screening](#) of *Argo*, the 2012 film depicting Foundation Council member Tony Mendez’s remarkable role in the 1979 rescue of American hostages from Iran. Tony and his wife, Jonna (also a Council member), attended the screening, answered audience questions, and generously requested that proceeds from the evening’s ticket sales benefit the Foundation.

# Increasing Awareness

## THOUGHT LEADERSHIP

### UVA Case Study Examines Foundation's Efforts to Accelerate FUS

The Frank Batten School of Leadership and Public Policy at UVA did a [case study](#) examining the Foundation as a model for innovation and social entrepreneurship. Co-authored by Assistant Professor of Public Policy, Bala Mulloth, PhD, and the Foundation's Chief Scientific Officer, Jessica Foley, PhD, the case study provides background about the Foundation's organization and its efforts to accelerate the development and adoption of a new medical technology. It also examines future challenges in convincing the current healthcare paradigm to embrace a disruptive technology like focused ultrasound. The case study was published by UVA's Darden School of Business and is currently taught at the University's Batten and Darden schools.

### World Economic Forum Blog Features Foundation Article

Foundation Chairman Neal F. Kassell, MD, wrote a [blog](#) for the World Economic Forum titled "[We Know Sound Soothes Us. But What if It Could Kill a Tumor?](#)" in which he explained focused ultrasound – how it works, the evidence, and the outlook – to a new worldwide audience. The World Economic Forum is committed to improving the state of the world and engages the foremost political, business, and other leaders of society to shape global, regional, and industry agendas. Dr. Kassell is a member of the Forum's Global Future Council on Neurotechnology and Brain Science.

## MEDIA COVERAGE

We have continued to be very aggressive with our broadcast, print, and digital media outreach efforts. Throughout 2017, focused ultrasound had 386 media hits, as compared to 317 in 2016. Several major news outlets featured focused ultrasound prominently, achieving our largest media reach to date.

### Read More Below:



## PATIENTS SHARE PERSONAL, LIFE-CHANGING FUS SUCCESS STORIES

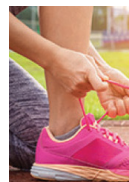
[Patient testimonials](#) continue to serve as a helpful tool in spreading the word and raising awareness about focused ultrasound by sharing the human-impact side of the FUS story. Four patients, profiled by the Foundation this year, offer their inspiring stories of drastically improved quality of life after focused ultrasound treatment.



Peter:  
Essential  
Tremor  
[Watch Now >](#)



Sunny:  
Essential  
Tremor  
[Read More >](#)



Amy:  
Uterine  
Fibroids  
[Read More >](#)



Steve:  
Parkinson's  
Disease  
[Watch Now >](#)

# Increasing Awareness

## WEB TRAFFIC AND SOCIAL MEDIA ENGAGEMENT CONTINUE TO CLIMB

The Foundation's presence in social media and online continues to grow, with targeted outreach efforts attracting a steady stream of followers, both new and recurring. Web traffic is up more than 50 percent in recent years (excluding [The Tumor](#)-related traffic spike in 2016). In 2017, we launched an Instagram account, resumed our blog on Medium.com, devoted more energy to our LinkedIn presence, added a "[Research Roundup](#)" feature to our website, and hired a social media expert to enhance related external communications efforts. Please be sure to follow us on Facebook, Twitter, LinkedIn, Instagram, YouTube, and Medium.



## Aggregating and Sharing Knowledge

### NEWSLETTER SUBSCRIBERS REACH NEARLY 10,000

Our monthly newsletter continues to be popular with a growing circulation of 9,800 subscribers. This year featured a redesigned template and nearly 200 stories. Focus Features were produced on topics including essential tremor (both a field/scientific version and one geared toward our "Stay in Touch" list of more than 20,000 consumers/patients) and our State of the Field report.

### PRESENTATIONS AND PUBLICATIONS

#### Scientific Meetings

Foundation staff along with former and current Research Fellows attended 23 scientific meetings and presented at 11. Highlights include John Snell, PhD, Technical Director of the Foundation's Brain Program, presenting at the International Society for Magnetic Resonance in Medicine meeting, and Jessica Foley, PhD, the Foundation's Chief Scientific Officer, presenting at meetings of the UVA Women in Medicine and Science and of the [Richmond Joint Engineers Council](#).

A contingent from the Foundation traveled to Nanjing, China, for the 17th International Symposium for Therapeutic Ultrasound (ISTU). Jeff Aubry, PhD, past Research Fellow, and Dong-guk Paeng, PhD, past Merkin Fellow presented.



Jeff Aubry, PhD (left) and Dong-guk Paeng, PhD (right).

#### Published Papers

Members of the Foundation's scientific team published seven scientific papers on topics ranging from enhanced drug delivery to noninvasive neuromodulation, thalamic mapping, and cell survival data in ablative treatments.



# Aggregating and Sharing Knowledge

## FOUNDATION CHIEF MEDICAL OFFICER LEADS FIBROID EFFORT

Radiologist Suzanne LeBlang, MD, Co-Chief Medical Officer for the Foundation, served as the Medical Director for the [Fibroid Education Center](#), which was created to provide information about the full spectrum of uterine fibroid treatment options, including “Curawave” (focused ultrasound) which can improve quality of life and maintain the option for future fertility. The Fibroid Education Center informed thousands of women about focused ultrasound as a preferred fibroid treatment.

## SEMINAR SERIES: WEBINARS REACH THOUSANDS

The Foundation hosted five webinars in 2017, aimed at providing current information about focused ultrasound from experts in the field. In January, Jill O’Donnell-Tormey, PhD, CEO and Director of Scientific Affairs at the Cancer Research Institute (CRI), gave a webinar on cancer immunotherapy and CRI’s role in elevating this promising treatment modality into a field of medical research. In June, Joo Ha Hwang, MD, Associate Professor of Medicine (Gastroenterology) at the University of Washington and a leading expert on pancreatic cancer, presented a webinar for hundreds of participants in which he highlighted gaps in current therapies and the role focused ultrasound could play in treating pancreatic cancer. Additional webinar sessions included Elisa Konofagou, Columbia University, discussing opening the blood-brain barrier; Chandan Guha, Albert Einstein College of Medicine, discussing focused ultrasound combination approaches for treating cancer; and Rick Hamilton, Optum, discussing machine learning and artificial intelligence. More than 300 people logged in to watch the presentations live and ask questions, and more than 6,500 have since watched the sessions online.



Jill O’Donnell-Tormey, PhD  
[Watch Now >](#)



Joo Ha Hwang, MD  
[Watch Now >](#)



Elisa Konofagou  
[Watch Now >](#)



Chandan Guha  
[Watch Now >](#)



Rick Hamilton  
[Watch Now >](#)

## Finances

### ALLOCATION OF FUNDS 2017

The Foundation spent \$7,026,036 this year. Research comprised 60 percent of our spending, with 10 percent allocated to development, and 14 percent to administrative costs. Our commitment to our donors is paramount, and we are proud to say we continue to hold the highest ratings by GuideStar and Charity Navigator – leading online tools that assess nonprofits’ financial and organizational transparency.

### FUS PARTNERS ESTABLISHED

On an increasingly frequent ad hoc basis, the Foundation has been fostering relationships among FUS manufacturers seeking financing or partnerships, investors, and/or academic research laboratories. In order to formalize these activities, the Foundation has created a new program, FUS Partners, designed to maximize efficiency and efficacy by creating systems and structure. FUS Partners provides an opportunity for the Foundation to monetize its efforts and further accelerate the development and adoption of focused ultrasound.

# \$ Fundraising

## 2017 FUNRAISING GOAL: \$8 MILLION

The fundraising goal for 2017 was \$4 million in cash and \$4 million in pledges, to be paid in 2018. Approximately \$2.9 million in cash and \$3.4 million from nine pledges was raised toward our goal for a total of \$6.3 million. (This shortfall was related to timing issues; the deficit has already been resolved as of January 2018.) The Foundation was also pleased to welcome 121 new donors to the team in 2017, who together contributed more than \$300,000.

An exceptionally generous anonymous donor pledged [\\$10 million of unrestricted funds](#) that need to be matched 1-for-1 by 2022. Beginning July 6, 2017, every dollar received will be matched, allowing us to literally double down on our research efforts. We hope you will consider helping us meet our goal of raising an additional \$10 million by 2022, resulting in a total gift of \$20 million. The transformational nature of this match means that not only will your gift be multiplied, but so will its impact on the lives of countless patients.

Our existing donors, [Council](#), and [Board of Directors](#) have been essential in fundraising for the Foundation. Special thanks to Council member Shirley Lin, who was integral in launching our fundraising and awareness initiative in Asia in 2017.

## Turning Vision into Reality

### TO OUR DONORS:

Your support means that research, patient access, and awareness are expanding exponentially, bringing us closer to a day when focused ultrasound could be an option to treat and manage dozens of devastating medical conditions. We appreciate your generosity and the important role you play in advancing this technology that has the potential to improve millions of lives.

### THANK YOU!

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If you would like additional information or want to discuss how you can support our mission, please contact:

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