



## SHARPhub Story #2

Dr. Lisa Friis, PhD  
C.E. and M.J. Spahr Professor and Chair,  
Mechanical Engineering  
University of Kansas

*“SHARPhub has helped us go from proof of concept to clarity on how to bring our research to the patients who need it.”*

Dr. Lisa Friis currently leads a team of researchers on a quest to use piezoelectric biomaterials in spinal implants to stimulate bone growth using low-level electrical signals. This development entails not only the creation of a new material, but also understanding its potential impact on future implants, and creating new designs to incorporate these changes.

The initial effort is on using the implant to ***increase the clinical success rate of lumbar spinal fusion, which is currently lower than 80% for over half a million patients.***

*“We need to make certain that the composite material we’ve created can be put inside implants with circuitry, then convert the signal to help heal bone,”* said Dr. Friis.

Other research teams have used electrical signals to heal bone but used a battery-based power system, which meant invasive surgery to place the battery under the skin and install it, then further surgery to remove it once it had lost power. It also meant that, while the battery was active, the electrical signal was on continuously so there was a surplus of current delivered to the bone.

The University of Kansas team led by Dr. Friis has developed a method of producing an electrical signal that is activated by muscle movement, requiring far less surgery, and doing a better job of promoting healing and producing new bone material.

The team has also been working on how to use a similar technology with soft tissues to promote healing. Using medically safe ultrasound to apply mechanical forces to the piezoelectric material through the skin appears to be the best route. The combined processes could revolutionize the treatment of injuries such as torn ACLs, hernias, ulcerated skin, even healing from plastic surgery.

It also has the potential to provide long-needed help for people who have difficulty healing, such as diabetics and tobacco users.

*“A SBIR grant from NIH would be immensely helpful in our ability to take this to the next level, to discover what we’re doing will do to heal at a cellular level,” said Dr. Friis. “It will also allow us to get the critical data required to raise venture money to perform future clinical trials on both the hard and soft tissue products, and get FDA approval.”*

SHARPhub, an initiative of BBC Entrepreneurial Training & Consulting, has provided Dr. Friis and her team with guidance on creating more successful funding proposals as well as helping them shape plans for bringing this technology to patients.

*“My first company, Evoke Medical, is now seeking investors but we got to this point with advice and direction from BBCetc seminars I attended,” said Dr. Friis. “Because SHARPhub is aligned with BBCetc, I had full faith we would get the guidance we needed.”*

SHARPhub has been instrumental in helping the research team develop a successful proposal to secure funding through the National Institutes of Health (NIH). It has also given them the understanding of what is needed to start and manage a company to deliver the innovation to patients — creating operating agreements, handling all legal and financial matters, and more.

Working with SHARPhub has helped reduce the fear of failure by reducing the risk. Requesting funding and starting a business are not necessarily skills — or even interests — of a research staff. SHARPhub gives innovators the clarity and confidence to move forward.