CAREER AWARD FOR DAVID FRAKES

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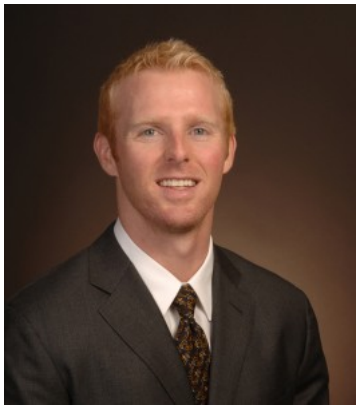

David Frakes' research of cardiovascular fluid dynamics and the impact on the onset, progression and treatment of major diseases such as heart disease, stroke and aneurysms has earned him a National Science Foundation CAREER Award.

Frakes, assistant professor in the School of Biological and Health Systems Engineering and the School of Electrical, Computer and Energy Engineering, is focusing on advanced simulation and modeling of intracranial aneurysms (ICAs) to help design and execute optimal patient treatments.

The prestigious NSF CAREER Award recognizes young engineers and scientists who demonstrate the potential to become research and education leaders in their field. The award will provide approximately $430,000 over five years.

"We need computer models of blood vessels and medical devices that perform realistically so that we can create effective interventional planning tools for physicians ," says Frakes.

ICAs account for approximately 20,000 deaths in the U.S. alone. Current endovascular devices used to treat ICAs have led to a 50 percent reduction in the death rate over the last decade. Frakes' research aims to reduce that even further.

ICA treatment is a relatively tractable fluid dynamic problem, Frakes says. Unlike vessels near the heart that require very complicated simulations, cerebral vessels can be modeled more robustly, which presents an attractive starting point for cardiovascular fluid dynamic research. Yet the general methods developed through this research hold promise for much wider application in disease treatment.

Frakes is using imaging-driven engineering tools, physical and computational modeling, and fluid dynamic measurement and simulation as the methodological basis for development of advanced device-based cardiovascular disease treatment.

Through the Inside Out education program, Frakes will engage high school and undergraduate students in his research. The program gives students access to valuable and highly unavailable technologies used in fluid dynamics research—showing them how anatomy is imaged with MRI and how rapid prototyping can be used to replicate anatomy in physical form.

"One of the key points is to get students interested in, and demonstrate the value of, engineering," says Frakes. "Our research is very visual and also tied to the sense of touch. Students may not understand how an MRI works, but they can see results on the screen, build models with their hands, and understand the capabilities of cutting-edge research technologies."

Frakes credits past funding from the Brain Aneurysm Foundation, the American Heart Association and the ASU Foundation's Women & Philanthropy program in helping him build a foundation for his research. He also cites the strong clinical collaboration with Barrow Neurological Institute that has made his work possible.

Frakes joined ASU in 2008. He holds a B.S. in electrical engineering, M.S. in electrical engineering, M.S. in mechanical engineering, and a Ph.D. in bioengineering from the Georgia Institute of Technology.