Open-Sourced Ideas: The Next Innovation

Exploring the problem-solving power of combining experts with crowds.

In the early-2000s, microsecond-long bursts of energy delivered to the brain by implanted electrodes disrupted the abnormal electrical differences that can help differentiate between healthy and diseased brain tissue. In DBS, very brief pulses of electricity are delivered to the brain by implanted electrodes. These disrupt the abnormal electrical differences that can help differentiate between healthy and diseased brain tissue.

Half of OCD patients do not respond to drug or behavior therapies, but a pioneering brain-treatment for the disorder was approved by the FDA in 2002 after a decade of use in an experimental therapeutic system. DBS treatment can deliver up to 10,000 volts to the brain, but these pulses are very brief—often immediately.

The reason these microsecond-long bursts of energy are effective is that they can reach very deep brain regions, much faster than psychiatric drugs.

If Stevens business professor and Associate Dean of Research Nickerson and colleagues are correct, they will open a profound affect on the future of design, manufacturing, and supply chains.

Reminding ideas to innovations.

His work — supported by several National Science Foundation (NSF) awards — explores the possibility that discoveries at the boundary of science can be improved by involving people outside the organization with different perspectives, the novelty of ideas being recombined, remixed and recombined.

Nickerson’s team concluded that significant efforts to innovate and succeed.

Collaboration with MIT, CMU

Nickerson also explored a significant collaboration with the MIT Sloan School of Management, where he co-authored a study of the power of crowdsourcing.

After surveying 40,000 to 60,000 distance ratios of Thalamic signals, the team concluded that significant modifications, re-using and re-invention of collective information, moving from the actions of individuals, rather than many.

Tavassolian’s innovation takes the next logical step: microchip quantum processing.

For one study, Nickerson and colleagues collaborated with researchers at Duke to study, improve ‘brain pacemaker’ therapies for neurodegenerative diseases, such as Parkinson’s disease. Afflicting millions in the U.S. and at least 7 million to 10 million worldwide, it is estimated that 10 million people have been driven to disability by the disorder. Left untreated, the condition can eventually lead to memory loss, rigidity, and full paralysis.

Nickerson’s team has proposed a new method to arrive at better treatment options.

The research at Stevens focuses on critical industries such as healthcare, energy, finance, and manufacturing and supply chains. It is open to the public.

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Stevens research team collaborates with Duke to study, improve ‘brain pacemaker’ therapies for neurodegenerative diseases...
Quantum Networking Closer to Reality

NSF-ERI supports Stevens research to develop microchip quantum processing technology

Stevens has received $2.6 million in new faculty start-up funding over the past two years to develop quantum photonic chips and interconnect technologies. The researchers believe these technologies have the potential to revolutionize the way we communicate, process data and secure information. "NSF-ERI and ERIC funds make it possible for our faculty to pursue this new work," said Dean of the School of Engineering and Applied Science Christos Georgiou. "Our students, researchers and alumni are excited to be a part of this new research frontier that can facilitate the future of cybersecurity, biotechnology and medicine." "This collaborative team is bringing together a diverse group of technical expertise and experience, as well as a strong support system, to advance this research," said Professor Yuping Huang, professor of physics and co-investigator of the project. "We are very grateful to the NSF and ERIC for their support, and we are excited to see how this work will impact the future of photonics and quantum science." "We believe this platform will allow optimal," noted Huang, "and we are very excited about the potential applications of this technology in various fields." "This is a crucial step in the development of quantum computing," said Professor Hongbin Li, professor of electrical and computer engineering. "Our team is working on integrating both classical and quantum computing systems to enable efficient and scalable quantum computing." "We are very grateful to the NSF and ERIC for their support, and we are excited to see how this work will impact the future of photonics and quantum science," said Professor Yuping Huang, professor of physics and co-investigator of the project. "We are very grateful to the NSF and ERIC for their support, and we are excited to see how this work will impact the future of photonics and quantum science." 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Stevens Moves Determinedly into Healthcare Research

Quantum Networking Closer to Reality

THE BIG SCREEN

- It’s been a year of significant advances from Stevens, including an additional $2.6 million from the U.S. Army, Navy, and NIH, supporting new research on cybersecurity, medical data, and green technology.
- In healthcare, Stevens researcher Thomas Lee has received two NSF-funded projects totaling $685,000 for developing an intelligent software platform that can model human-computer communication and help medical professionals.
- Stevens’ Maritime Security Center, directed by Philippos Mordohai, received nearly $200,000 from the NSF to investigate improved fabrication of solar cells and deposition of polymer nanocomposite materials.

Disciplines include cybersecurity, medical data, green technology

For more on Stevens research awards, honors and publications, visit budding.stevens.edu.

Stevens faculty have received significant new research funding support from the U.S. Department of Defense (DoD) to investigate challenges in cybersecurity and the deployment of green technology. These investments in cybersecurity and the protection of financial and governmental data, among other areas of inquiry, are critical to maintaining national security and ensuring the safety of borders, ports and harbors; and the cybersecurity of government and production systems.

Army, Navy, NIH, NSF Support New Research

Stevens’ research efforts have been recognized by the U.S. Department of Defense (DoD), the National Institutes of Health (NIH), and the National Science Foundation (NSF), as well as other federal agencies. These investments in research are critical to maintaining national security and ensuring the safety of borders, ports and harbors; and the cybersecurity of government and production systems.

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The project will be directed by computer science professor Ergin Pamir and electrical engineering professor Maria-Florina Balcan, with significant contributions from the National Institutes of Health (NIH) and the National Science Foundation (NSF). The project will focus on developing new algorithms for adaptive signal radar and communications systems, including novel adaptive signal processing techniques for radar and communications systems. The project will be funded by the National Institutes of Health (NIH) and the National Science Foundation (NSF), and will support a two-year project to investigate how adaptive signal processing techniques can be used to improve radar and communications systems. The project will involve collaboration with the University of Washington, the University of California, and other institutions.

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**Quantum Networking Closer to Reality**

NSF-ERI supports Stevens research to develop microchip quantum processing

**Stevens Moves Determinedly into Healthcare Research**

**Exploring the Interaction of AI and Creativity**

**Disciplines include cybersecurity, medical data, green technology**

**Stevens faculty have received significant new research funding**

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**Stevens Research**

**Fall 2016**

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New Avenues in Parkinson's, OCD Research

Stevens research team collaborates with Duke to study, improve 'brain pacemaker' therapies for neurodegenerative diseases

With its known causes or cures, both obsessive-compulsive disorder and Parkinson's disease affects millions worldwide.

The right therapies, however, can significantly improve the quality of life for individuals with Parkinson's. Half of OCD patients do not respond to conventional treatments, but a pioneering new treatment for the disorder was approved by the FDA in 2009, after more than a decade of use as an alternative Parkinson's treatment: deep-brain stimulation (DBS).

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In DBS, very brief pulses of electricity are delivered to the brain implanted electrodes. These stimulate the regions of the brain associated with obsessive-compulsive symptoms; among other advances.

Some Parkinson's tremors have been shown to affect 2 million to 5 million in the U.S. and at least 7 million to 10 million worldwide (possibly many more), according to government estimates.

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Stevens Institute of Technology, The Innovation University®, is a premier, private research university located on the historic “Ivy Gold Coast” along the Jersey River in Hoboken, New Jersey. As a leader in critical industries such as healthcare, energy, finance, and technology, Stevens is home to more than 300 full-time faculty members in an interdisciplinary, student-centered environment, where more than 6,600 undergraduate and graduate students collaborate with companies and government agencies to address the foremost challenges facing society. More than 145 years. Within the university’s three schools and one college, Stevens is home to three national research centers of excellence, as well as joint research programs focused on critical industries such as healthcare, energy, finance, and technology to confront global challenges. Stevens is home to three national research centers of excellence, as well as joint research programs focused on critical industries such as healthcare, energy, finance, and technology to confront global challenges.

ABOVE STEVENS

Stevens research team collaborates with Duke to study, improve ‘brain pacemaker’ therapies for neurodegenerative diseases

With the known causes or cures, both obsessive-compulsive disorder (OCD) and Parkinson’s disease affect millions worldwide.

The right therapies, however, can significantly improve the quality of life for individuals with Parkinson’s and OCD, however, remains arduous.

“Parkinson’s and related neurological and psychiatric disorders, including obsessive-compulsive disorder (OCD), affect 2 million to 5 million in the U.S. and at least 7 million to 10 million worldwide (possibly many more),” says George McConnell, a Stevens assistant professor of chemical and biological engineering, who is an expert on an emerging non-invasive treatment approach.

Half of OCD’s patients do not respond adequately to medications, but a pioneering new treatment for the disorder was approved by the FDA in 2009. A decade of use of an ablative Parkinson’s treatment—deep brain stimulation (DBS)—has led to very brief pulses of electricity to be delivered to the implanted electrodes. These chronic shunting of the neurons—"...or sort of tamp down neurons," explains McConnell—is in the region of the electrodes, often immediately.

Some Parkinson’s tremors have been shown to dissipate with a few seconds of DBS use. Tardigrades control can take longer, on the order of minutes or seconds. Although quality of life for individuals with Parkinson’s can be improved with medications or surgery, symptoms worsen as the disease progresses.

Obsessive-compulsive disorder is estimated to affect 2 million to 3 million in the U.S., and millions worldwide. It can cause irrational thinking, anxiety, depression and self-harming behaviors. Treatment is usually through a combination of antidepressant medications and cognitive behavioral therapy (CBT), along with psychotherapy. DBS, however, is being explored as a potential therapy.

“Diagnosis of Parkinson’s and other neurodegenerative diseases afflicts 1 million patients in the U.S. and at least 7 million to 10 million worldwide (possibly many more),” says McConnell, a Stevens assistant professor of chemical and biological engineering, who is an expert on an emerging non-invasive treatment approach.

Because millimeter waves can penetrate deeply into the body, they can be used for purposes such as imaging internal organs. Small millimeter-wave imaging is cheaper, but it takes more time and energy to conduct.

Because millimeter-wave imaging is cheaper, but it takes more time and energy to conduct, it can become more practical for medical cases where time and cost are of primary concern.

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