

Magnetic Fields Healing Brains



Dan Sievenpiper
Professor, Electrical and Computer Engineering

CURRENT RESEARCH

High resolution magnetic coil arrays for noninvasive treatments of neurological disorders

Transcranial magnetic stimulation (TMS) is a therapy that uses a magnetic field to activate the brain. An electromagnetic coil is held against the head and short electromagnetic pulses are administered through the coil. The pulses are able to stimulate nerve cells in targeted brain regions and has been tested as a treatment tool for various neurological and psychiatric disorders including migraines, depression, anxiety, schizophrenia, and Parkinson's disease. Dr. Dan Sievenpiper, of University of California, San Diego, is developing a new high-resolution magnetic coil array that will allow researchers to generate signals inside the human brain that are currently impossible with existing systems. Dr. Sievenpiper's noninvasive system will be used for treating depression and other neurological disorders in ways that are currently impossible with existing transcranial magnetic stimulation systems, or for patients who have no other treatment options. It will also provide feedback for prosthetics and other neurological interfaces.

Rather than the trial and error approach that TMS currently makes use of, with this new electronically scannable, high-resolution system, researchers can develop new research approaches like scanning the brain, apply different treatments at the same time, and electronically sweep through different wave forms until they find the right one. Dr. Sievenpiper and his team have already demonstrated success with a simple version of the magnetic coil array and have therefore shown that they can create a scannable magnetic field on a flat plane with low power. By scaling up, he and his collaborator, Dr. David Feiffel, will be able to make something that is more formable with more coils and more...

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AFFILIATION

 University of California, San Diego

AWARDS

- URSI Issac Koga Gold Medal, 2008
- Fellow of the IEEE, 2009
- Associate editor of IEEE Antennas and Wireless Propagation Letters, 2010
- Chair of the IEEE Antennas and Propagation Society Administrative Committee on New Technology Directions

RESEARCH AREAS

Life Science, Neurological / Cognitive, Veteran's Causes, Neurological / Cognitive

FUNDING REQUEST

Your contributions will support Dr. Dan Sievenpiper and his collaborators to develop a high resolution magnetic coil array for a new brain interface for noninvasive treatment of depression and other neurological disorders. Your donations will support the roughly \$200K per year that will enable he and his team to make the concept ready for commercialization in the next two years. Your donations will help to create improved treatments for a variety of neurological and psychiatric disorders.

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