

NC National Guard - Family Assistance Centers - \$1.6 million

North Carolina National Guard

Claude T. Bowers Military Center

4105 Reedy Creek Road

Raleigh, NC 27607

The North Carolina National Guard (NCNG) is seeking federal funds to establish Family Assistance Centers (FACs) across the state to provide essential support and services to families of members of the NCNG and of all the other Armed Services. In recent years, the NCNG has experienced an unprecedented operational pace, with over 95 of its force mobilized, and current indications are that this pace will continue for the foreseeable future. These mobilizations have a significant effect on Guard families and children, who experience this impact not only during the deployment, but prior to and especially after the service member returns. Since NCNG families are spread throughout the state, in many cases they cannot easily access services on military installations.

FACs provide consistent and continuous vital support and services to the families of members of the NCNG and the Armed Services, including counseling, health care information, financial advice, employer support, legal support and guidance, crisis referral, community outreach, veteran affairs and more.

This program would significantly reduce the impact of deployment on families and would directly contribute to sustaining and retaining a strong North Carolina National Guard.

ITC - Nanofluidic Lubricants for Increased Fuel Efficiency in Heavy Duty Vehicles - \$1.5 million

International Technology Center

P.O. Box 13740

Research Triangle Park, NC 27709

The non-profit International Technology Center (ITC) is seeking federal funding for research into the use of nanofluidic lubricants to increase fuel efficiency in military vehicles. The military has identified energy cost and availability as one of the key threats to U.S. global military reach and superiority and has prioritized research into increasing energy efficiency. Nanofluidic lubricants are fluids that contain a small concentration of microscopic particles (made from diamonds or other materials) that alter their chemical properties in ways that enhance performance. Adding nanofluidic lubricants to motor oil, transmission fluid, fuel, or coolant can significantly reduce friction and wear, increasing fuel efficiency by up to 20 percent.

The proposed project will (1) save taxpayer money by increasing energy efficiency of any military vehicle powered by an engine (including wheeled vehicles, airplanes, and ships), thereby reducing energy usage and costs; (2) help reduce U.S. military dependence on foreign oil; and (3) promote the development of nanofluids that could have significant positive benefits for taxpayers, such as nanofluidic motor oil to increase commercial vehicle fuel efficiency.

NC State - Carbon Nanotechnology Energy Conversion and Storage Program - \$4 million

North Carolina State University

Raleigh, NC 27695

International Technology Center

P.O. Box 23740

Research Triangle Park, NC 27709

NC State and ITC are seeking federal funds for the development of innovative energy conversion and storage technologies for military applications. The military has identified energy cost and availability as one of the key threats to U.S. global military reach and superiority and has prioritized research into increasing energy efficiency. Currently, however, most major research efforts are directed toward developing new energy sources rather than identifying ways to better utilize existing energy sources.

Thermal energy (heat), which is produced whenever fuel is burned, can be captured, converted, and used to produce energy rather than wasted. This initiative would develop innovative ways to more efficiently convert and store energy for use in existing energy sources and devices, including hydrogen fuel cells. The research would produce devices based on nanoscale diamond materials, which have unique surface properties for thermal-to-electrical energy conversion and energy storage. Improving the efficiency of existing energy sources and devices will help the military more effectively meet its energy needs, improve its operational capabilities, and save taxpayer money by decreasing energy costs.

NC State - Integrated Electronic Product Design Initiative - \$3 million

North Carolina State University

Raleigh, NC 27695

As a national leader in engineering research, North Carolina State University is seeking federal funding for the development of innovative electronic devices for military applications. In light of the rapidly changing nature of today's national security challenges, there is an increasing demand among our military and intelligence services for advanced electronic devices for purposes such as disabling improvised explosive devices and improving signal intelligence capabilities. However, due to the low volumes of such specialized devices that are typically needed, engineering and production processes can be cost-ineffective and unreliable. Researchers at NC State are actively developing both new electronic technologies and improved production capabilities to produce them economically and efficiently. The proposed funding would be used to bring these capabilities together into an Integrated Product Design Initiative, in collaboration with other universities and military stakeholders. By improving the quality and lowering the cost of critical military technologies, the proposal would advance core national security interests while saving taxpayer money.

RTI International - 3-D Technology for Advanced Sensor Systems - \$3 million

RTI International

P.O. Box 12194

Research Triangle Park, NC 27709

RTI International, a not-for-profit scientific research and development organization, is seeking federal funds for the continued development of three-dimensional packaging of electronic systems for portable applications. The military has a growing need for improvements to the weight and volume of electronic systems in order to enhance performance of portable electronic devices such as sensors. Currently, most electronic devices rely on two-dimensional microchips (similar to those used in computers), which are limited in their power and sophistication. By layering microchips on top of each other and interconnecting them vertically as well as horizontally, RTI has pioneered the production of three-dimensional microchips that can improve the performance and reduce the weight of electronic devices. Continued funding will be used to transition this breakthrough technology out of the laboratory and into operational environments, significantly advancing U.S. national security interests.

UNC Chapel Hill - Center on Experiential Technologies for Urban Warfare and Disaster Response - \$3.7 million

University of North Carolina at Chapel Hill

225 Sitterson Hall

Campus Box 3175

Chapel Hill, NC 27599

The Center on Experiential Technologies for Urban Warfare and Disaster Response at UNC-Chapel Hill is a national leader in virtual reality environments and high-performance computing, modeling, and simulation. UNC Chapel Hill is seeking federal funds to continue developing next-generation modeling, simulation, visualization and experiential technologies that facilitate training experiences for key 21st-Century security challenges such as urban

warfare, close-proximity combat in large population masses, insurgent and terrorist scenarios, and natural disasters. The military increasingly uses such simulated training to improve the operational capabilities of units that are likely to encounter such scenarios. These activities will enhance U.S. national security by preparing military personnel, first responders, intelligence personnel, and other governmental officials to better understand, analyze, and respond to complex conflict situations, terrorist attacks, and large scale disasters.

UNC Chapel Hill - Preclinical and Translational Research Center - \$3 million

Lineberger Comprehensive Cancer Center

UNC School of Medicine

Chapel Hill, NC 27599

The Lineberger Cancer Center at UNC Chapel Hill is seeking federal funding to accelerate the discovery of the molecular signatures for cancers with the goal of improving early detection and developing effective treatment of cancers. Cancer, the second-leading cause of death in the United States, remains a top threat to the health of Americans, including military service members. Although there are significant federal investments in cancer research, only 5 percent of new treatments for major cancers are approved for clinical use. The vast majority are not approved because current methods of testing potential drugs prior to human trials have limited accuracy.

The Pre-Clinical and Translational Research Center would drive the development of new technologies to identify novel approaches to attack cancer, such as improved cancer modeling for drug discovery, and bioinformatics to better identify important genetic and epigenetic targets and proteins that can be used for drug screening and developing new therapeutics. The Department of Defense spends over \$40 billion per year in order to maintain benefits for 9.2 million eligible military members, their families, and retirees, a significant percentage which

relates to cancer treatment. Better detection and treatment would have significant benefits for public health and would reduce the proportion of the federal budget that must be devoted to health care costs.