

The National Stem Cell Foundation (NSCF) supports peer-reviewed research and clinical trials in the field of adult stem cell and regenerative medicine technologies in four primary focus areas: Neurodegenerative Disease, Autoimmune Disease, Regenerative Repair and Rare Childhood Disorders. Equally crucial to our efforts, our Program Track in Education funds scholarships for middle school science teachers inspiring the next generation of STEM (Science, Technology, Engineering and Math) pioneers and our Program Tracks in Patient Advocacy connect children with limited resources to cutting edge clinical trials accelerating access to scientific breakthroughs now.

### **RESEARCH PROJECTS**

We're sending research into space through a partnership with the Kentucky Science and Technology Corporation (KSTC) and Space Tango (a subsidiary of KSTC). The ExoMedicine Institute division of Space Tango will be coordinating the launch of an NSCF-funded research project to the International Space Station (ISS) this fall. Cells behave very differently in zero-gravity for reasons not yet completely understood - the need to understand is galvanizing research teams at academic centers worldwide. We have connected our funded researchers at the Scripps Research Institute in San Diego and the New York Stem Cell Research Institute in NYC for a project collaboration with meaningful consequences for neurodegenerative diseases like Parkinson's, MS and a spectrum of disabling inherited childhood disorders. The NSCF-funded project will launch from Cape Canaveral during in late fall 2017 or early 2018 and be monitored on the ISS for a minimum of 100 days. Like the research teams, Space Tango, CASIS (Center for the Advancement of Science in Space) and NASA are all excited by the potential for this project - and have contributed funds to help cover development and monitoring expenses. We all know collaborations like this are where "aha" moments happen.

A SpaceX shuttle slot has been made available to NSCF free of charge for ascent and descent, but development and coordination of the research project itself requires funding prior to launch - and for continued bi-coastal collaboration to move findings forward once the project returns to Earth. In a bridge to our Education track, NASA is investigating the potential for interviews/conversations between astronauts and the individual middle school classrooms of our STEM Scholars over that 100+ day period.

In a second significant partnership with the Orthopaedic Research and Education Foundation (OREF), we have committed to funding a highly translational or first-in-man clinical trial for the regenerative repair of shoulders, hips, knees, muscle and tendons. Regenerative repair therapies include the use of stem and support cells, scaffolding technology, 3-D bio-printing, bio-engineering and multiple other technologies currently in existence or in development. We are matching funds raised by orthopedic surgeons across the U.S. who have come together in honor of Dr. James Urbaniak, the Virginia Flowers Baker Professor of Orthopedic Surgery at Duke University. Dr. Urbaniak is internationally known for his pioneering approach to hip replacement in young adults and a highly respected mentor to orthopedic surgeons and researchers nationwide.

Our initial partnership with OREF began in 2015 and is ongoing with co-funded researchers at USCF (rotator cuff tears), UNC Chapel Hill (non-surgical cartilage regeneration for knees) and the University of Wisconsin (combination cell and gene therapy for tendon repair/regeneration).

### **PROGRAM PROJECTS**

The NSCF Patient Advocacy Program was formally established in late 2015 to help cover the research-related, out-of-pocket expenses that would otherwise be the responsibility of patients participating in

clinical trials sponsored by academic researchers - by far the most common type of clinical trial conducted in the U.S. While we learn more about costs not already covered by other grants and foundations, we've selected the Pediatric Blood and Bone Marrow Transplant (PBMT) program at Duke University - the largest such center in the country - as our beta site for need-based testing. Children looking for access to potentially life-changing clinical trials travel to PBMT from all over the U.S. and around the world. After careful consideration, NSCF has established a fund to help cover insurance deductibles and co-pays for families with a child (or children) medically eligible to participate in a PBMT clinical trial when those out-of-pocket expenses are beyond reach - and exclude them from trial participation. These are children who have no other treatment options. Based on research done prior to fund development, we are the only foundation in the U.S. helping families cover these specific costs.

Our Patient Advocacy Program continues to fund operations for Sharing America's Marrow (S.A.M) in their quest to significantly increase the donor pool for life-saving bone marrow transplants. During last year's cross-country journey to college campuses and events in all 50 states, the S.A.M. team of three young women enrolled 24,000 new donors on the National Marrow Donor Program registry and found nearly 400 matches for people on a waiting list. This year, they've conducted 75+ satellite events, started work on a documentary about their journey and received the *RARE Champions of Hope Advocacy Award* from Global Genes.

Through a five-year grant to the Carol Martin Gatton Academy of Mathematics and Science at Western Kentucky University (WKU), we fund 10 competitive scholarships each year for middle school science teachers we hope will inspire the next generation of STEM scientists and thought leaders nationwide. The 10 selected STEM Scholars receive advanced education and leadership training on WKU's campus the first week of June. They return to their home schools with a Chromebook to facilitate collaboration, a \$2,500 credit for technology and supplies to implement a challenge project - and sponsored attendance at the National Science Teacher Association (NSTA) Conference the following March. They are mentored throughout the school year by Gatton Academy faculty. The 2016 inaugural class was selected from 100+ applicants in 18 states; several Scholars have since received city and/or state recognition for sharing classroom projects developed at WKU last summer. In August, the 2016 STEM Scholar from Utah received the Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST), the most prestigious award granted to math and science teachers in the U.S.

Applications for the 10 available National STEM Scholarships in 2017 were received from 25 states:

2016 Scholar Class

Auburn, Alabama  
North Pole, Alaska  
Naperville, Illinois  
Owensboro, Kentucky  
Rockfield, Kentucky  
Sodus, New York  
Canton, South Dakota  
Richardson, Texas  
Hooper, Utah  
Seattle, Washington

2017 Scholar Class

Miami, Florida  
Bowling Green, Kentucky  
Harned, Kentucky  
Gorham, Maine  
Byron, Minnesota  
Brushton, New York  
Seattle, Washington  
East Windsor Township, New Jersey  
Cameron, Wisconsin  
Dousman, Wisconsin

2016, like 2015, was an exciting and rewarding year for NSCF. The approved 2017 research and program initiatives build on established success and expand constructive and productive relationships. Our newest research initiatives also achieve one of our overarching goals - to connect researchers across disciplines and institutions for collaborations we believe will solve the problems of today. Thank you for all you've done to make it possible.