

# South Carolina Spinal Cord Injury Research Fund Fiscal Year 2021 (FY21) Annual Report EXECUTIVE SUMMARY

Spinal cord injury (SCI) is a serious and usually irreversible cause of disability. The consequences of SCI are often severe and include paralysis, loss of sensation, loss of control over movement and bodily functions, chronic pain, metabolic disorders, and complications such as uncontrolled blood pressure and frequent infections. People with SCI may face extraordinary demands due to the costs of medical care and rehabilitation and the absence of environmental support. Family members of people with SCI are also affected.

The South Carolina Spinal Cord Injury Research Fund (SCIRF) was established by Amendment (Bill S54 44-38-510) of the SC Code ratified on July 20, 2000. The SCIRF is provided from a \$100 surcharge on each Driving Under the Influence (DUI) conviction throughout the state. The monies collected are used to finance SCI research in South Carolina as well as cover the basic operation costs. The SCIRF is governed by a seven member Board of Directors (BOD) appointed by the Governor upon recommendation of the President of the Medical University of South Carolina (MUSC) and is attached to MUSC for administrative purposes.



The long-term goal of the SCIRF is to minimize the risk and incidence of SCI, interrupt or reverse the process of such injuries, and improve the health and quality of life for residents of South Carolina who have an SCI.

The SCIRF BOD is charged with promoting research to develop better understanding of causes and effective treatment strategies for paralysis, sensory loss and other consequences of spinal cord injury and disease with the primary objective of advancing knowledge of SCI repair and regeneration within the South Carolina research community by encouraging physicians and scientists to apply expertise to the SCI field.

The BOD includes 2 medical doctors from MUSC, 2 medical doctors specializing or significantly engaged in the treatment of SCI, 2 people with an SCI or a family member with an SCI and 1 medical doctor at large who is a member of the South Carolina Medical Association. The SCIRF has a full time Executive Director, part time Scientific Director and part time Associate Scientific Director. Board meetings are held two times per year in various locations throughout South Carolina.

The SCIRF BOD had seven open Requests for Proposals (RFPs) in order to solicit proposals from physicians, scientists and researchers throughout the state related to Primary Research, Care/Access/Delivery, Career Development, Pilot Projects, Research Result Dissemination, Student Research Internship, Bridge Funding, Recruitment/Seed Funding, Postdoctoral Research, and Conference/Education/Training. All RFP details can be found on the [SCIRF Website](#).

The SCIRF made five awards in FY21 and 10 no cost extensions. Nine of our grantees concluded their work in FY21. As of the end of FY21 we had ten active grantees including our Administrative and Research Cores.

The SCIRF supports a variety of research activities that include basic science, clinical, epidemiologic, rehabilitative, and translational studies. Examples of the range of research include: 1) “bench science” to identify injury and recovery mechanisms 2) animal interventions that can be translated into 3) clinical trials in humans. Before clinical trials in humans 4) participant identification must occur as well as 5) a more complete understanding of health care access and health outcomes after SCI.

Excellent progress was made on SCI research throughout the year, despite the barriers imposed by the COVID-19 pandemic. The pandemic led to the closing of many laboratories, which are instrumental to conduct SCI research, and a general closing of offices made virtual work an ongoing reality. As restrictions were lifted, investigators were able to turn the corner and resume all aspects of their SCIRF funded research.

The SCIRF income derived from the DUI surcharge is collected on a monthly basis. The total collections for FY21 were \$363,133.56 with an average monthly collection of \$30,261.13 which is a 15% decrease from the previous fiscal year. We speculate that the decrease in DUI collections during the first three quarters of the FY21 fiscal year may be due to temporary closings of locations serving alcohol as well as many courtrooms and municipalities.

The SCIRF as well as several grantees were impacted by the pandemic. Many universities, medical institutions and research laboratories were closed to personnel for the first two quarters of the FY21 fiscal year. The SCIRF maintained close contact with grantees during this time and made multiple no cost extensions to provide additional time for grantees to complete their work.

We look forward to the upcoming year and are pleased to present this FY21 Annual Report.

*South Carolina Spinal Cord Injury Research Fund*  
*Catherine Leigh Graham, MEBME – Executive Director*  
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# LETTER FROM THE EXECUTIVE DIRECTOR AND BOARD CHAIR

Dear Friends and Supporters:

On behalf of the Board of Directors, Scientific Directors and Executive Director, it is our pleasure to present the FY21 Report. This report highlights the progress and accomplishments in implementing the legislative mandate of promoting SCI research throughout South Carolina from July 1, 2020-June 30, 2021, despite challenges presented by the COVID-19 pandemic.

The SCIRF continues to receive monthly DUI collections and saw an annual decrease of 15% from FY20. The monthly average and yearly collections for FY21 were \$30,261.13 and \$363,133.56, respectively. The SCIRF is typically encouraged when DUI collections decrease in the hopes that it correlates to a decrease in drunk driving in South Carolina. The drop in collection this past fiscal year may be due to the temporary closings of locations serving alcohol as well as courtrooms and municipalities. We continue to judiciously award grants as funds allow, while working to promote SCI research and its translation within the state of South Carolina.

The SCIRF is as a source of research funding for any South Carolina entity that responds to the public RFP announcements. In the past year, the SCIRF promoted and supported SCI research through seven RFPs. Applications were reviewed for both scientific merit, often involving outside scientific reviewers knowledgeable with the topic, and for relevance to the mission of SCIRF.

The SCIRF made five new awards in FY21 and 10 no cost extensions. Nine awardees concluded their research in FY21. As of the end of FY21, the SCIRF had ten active grantees including our Administrative and Research Cores.

The SCIRF and several grantees were impacted by the pandemic, yet continued to make progress on their SCI research. Many universities, medical institutions and research laboratories were temporarily closed for the first two quarters of FY21. The SCIRF maintained close contact with grantees during this time and made multiple no cost extensions to provide additional time for grantees to complete their work.

We are pleased to provide this annual report for FY21.

Respectfully submitted,



Heather W. Walker, MD  
Board Chair



Catherine Leigh Graham, MEBME  
Executive Director

## LETTER FROM THE SCIENTIFIC DIRECTORS

As scientific directors, we actively work to identify and promote cutting-edge research on SCI. We particularly support research that has the potential to directly impact the lives of those with SCI in the state of South Carolina. We fund a combination of mechanisms that maximize research dollars to address basic science, translational science, and applied research. In short, we support research from laboratory to community.

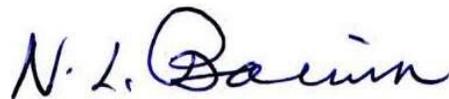
Supporting SCI research within the state requires diverse funding mechanisms to meet the individual needs of investigators ranging from those early in their career to those who have well-established careers. We fund several mechanisms that were designed to promote research of students, postdoctoral fellows, and those who are developing their ideas and foundation as investigators. This includes pilot studies and smaller individual studies.

It is essential that the SCIRF supports education for the translation of research and includes those with lived experience with SCI within that process. Therefore, we support conference grants and stakeholder activities that may help to facilitate research by identifying potential research participants and by creating opportunities for research findings to be shared with stakeholders with SCI.

We are proud of the success of the SCIRF and of our investigators within the state, particularly as we have all navigated the COVID-19 pandemic, which limited access to laboratory facilities. We look forward to another outstanding year and the continued success of SCI research in South Carolina.



James S. Krause, PhD  
Scientific Director



Naren L. Banik, PhD  
Associate Scientific Director

## **PART I: OVERVIEW**

### **PURPOSE/CHARGE**

Promoting research to develop better understanding of causes and effective treatment strategies for paralysis, sensory loss, and other consequences of SCI and disease.

### **NEED**

SCI is a serious and usually irreversible cause of disability. The consequences of SCI are often severe and include paralysis, loss of sensation, loss of control over movement and bodily functions, chronic pain, metabolic disorders, and complications such as uncontrolled blood pressure and frequent infections. People with SCI may face extraordinary demands due to the costs of medical care and rehabilitation and the absence of environmental support. Family members of people with SCI are also affected. The long-term goal of the SCIRF is to minimize the risk and incidence of SCI, interrupt or reverse the process of such injuries, and improve the health and quality of life for residents of South Carolina who have an SCI.

### **LEGISLATIVE BACKGROUND**

The South Carolina SCIRF was established by the South Carolina General Assembly in 2000 by amendment (Bill S54 44-38-510) to Section 2, Chapter 38, Title 44 of the 1976 S.C. Code as signed by the Governor on July 20, 2000. The legislation calls for a \$100 surcharge to be levied on every South Carolina "Driving Under the Influence" conviction. The proceeds from this surcharge go to the SCIRF and are used to finance SCI research in South Carolina as well as cover basic operation and administrative costs for the SCIRF.

### **GOVERNANCE**

The SCIRF is governed by a seven-member Board of Directors (BOD) appointed by the Governor upon the recommendation of the President of the Medical University of South Carolina (MUSC). It is comprised of two medical doctors from MUSC; two medical doctors specializing or significantly engaged in the treatment of people with SCI in South Carolina; two members who have an SCI or have a family member with an SCI; and one at large medical doctor who is a member of the South Carolina Medical Association.

### **ADMINISTRATION/SCIENTIFIC DIRECTORS**

The SCIRF is attached to MUSC for administrative purposes. The SCIRF has a full time Executive Director, Catherine Leigh Graham, MEBME, a part time Scientific Director, James S. Krause, PhD, and a part time Associate Scientific Director, Naren L. Banik, PhD.

The Scientific Directors are involved in all aspects of all research development and implementation including setting goals, developing project invitations to meet goals, and making recommendations based on their reviews to the SCIRF BOD of all such projects received.

### **PRIMARY OBJECTIVES**

Advance knowledge of SCI repair and regeneration within the South Carolina research community by encouraging physicians and scientists to apply expertise to the SCI field.

Foster collaborative interdisciplinary approaches to SCI research among South Carolina hospitals, rehabilitative centers, research universities, and interested organizations.

Nurture next generation of SCI researchers through support of young scientists and post-doctoral fellows.

Improve the well-being and quality of life of individuals with SCI by research programs that prevent or treat the secondary conditions and consequences of SCI.

Set budgets and administer funds for SCI research as mandated by the South Carolina Legislative Act and assure highest quality of research and commitment by investigators.

## **PART II: REQUESTS FOR PROPOSALS (RFP)**

The SCIRF has maintained a focus on building research infrastructure, expertise and capacity throughout South Carolina. In order to accomplish this task, the SCIRF posted seven RFP's throughout FY21 which can be found on the SCIRF website under [Request for Proposals](#).

### **RFP P (Pilot)**

Pilot Research grants are to support investigators who need to collect pilot data to position themselves for extramural grants.

### **RFP S (Student Research Internship)**

Student Research Internship grants support the mentor of a student in medicine, nursing, health professions, epidemiology, neuroscience or other related fields that apply to basic, clinical or translational research with spinal cord injury or spinal cord disease.

### **RFP I (Investigator Initiated Research)**

Investigator Initiated Research grants support clinicians, therapists, educators, and scientists in South Carolina researching aspects of spinal cord injury in an effort to develop a better understanding and ultimately treatment for paralysis and other consequences of spinal cord injury and spinal cord disease.

### **RFP B (Bridge Funding)**

Bridge Funding grants provide an investigator, with a research program in spinal cord injury with a research grant whose federal competing continuation application was not funded, an opportunity to obtain one year of bridge support.

### **RFP R (Recruitment/Seed Funding)**

Recruitment/Seed Funding grants promote the recruitment/seed funding for scientists and clinician scientists, who specialize in the area of spinal cord injury, to the state of South Carolina.

### **RFP CET (Conference/Education/Training)**

Conference/Education/Training grants support entities that will improve the knowledge of people with SCI in South Carolina and/or health care professionals that provide care for people with spinal cord injuries in South Carolina.

### **RFP PD (Postdoctoral Research)**

Postdoctoral Research grants increase the number of individuals with doctorates who seek postdoctoral training in SCI, working with a mentor who has an independent program of research in SCI.

## **PART III: NEW AWARDS/EXTENSIONS**

### **New Awards in FY21**

#### **2020 P-01 The roles of cortico-spinal tract in the functional recovery following spinal cord injury in mice**

Takashi Sato, PhD, Assistant Professor – Medical University of South Carolina  
Pilot Research Award  
(10/1/2020-9/30/2021 for \$30,000)

#### **2020 SI-01 SC Spinal Cord Injury Association Cooperative Agreement**

Angela Rodriguez, MSW, Executive Director – SC Spinal Cord Injury Association  
Special Initiative Award  
(1/1/2021-12/31/2021 for \$15,121)

#### **2021 PD-01 Investigation of corticospinal and spinal plasticity that drives motor function recovery in people with chronic incomplete SCI**

Aiko K. Thompson, PhD, Associate Professor – Medical University of South Carolina  
Post Doc Award  
(5/1/2021-4/30/2022 for \$67,495)

#### **2020 PD-01 Inhibition of BMP signaling for neuroprotection in spinal cord injury in vitro and in vivo**

Swapan K. Ray, PhD, Professor – University of South Carolina  
Post Doc Award  
(6/1/2021-5/31/2022 for \$67,500)

#### **2021 SI-01 The SC Traumatic SCI Surveillance and Registry**

Anbesaw Selassie, DrPH, Professor Emeritus – Medical University of South Carolina  
Special Initiative Award  
(7/1/2021-6/30/2026 for \$250,415)

### **No Cost Extensions in FY21**

#### **2016 I-04 The Indirect costs of SCI in SC due to lost earnings: Relationships with secondary conditions and medical expenses**

Yue Cao, PhD, Assistant Professor – Medical University of South Carolina  
Investigator Initiated Research Award  
(10/1/2017-9/30/2019 for \$142,973, \*extension 9/30/2020, \*extension 6/30/2021 due to COVID)

#### **2017 B-01 Multifunctional nanotherapeutics for Spinal Cord Injury Repair**

Jeoung Soo Lee, PhD, Assistant Professor – Clemson University  
Bridge Funding Award  
(4/1/2018-3/31/2019 for \$66,000, \*extension 3/31/2020, \*extension 9/30/2020 due to COVID)

**2017 I-01 Targeting neuronal NOS/peroxynitrite/calpain system as a therapeutic strategy for the treatment of spinal cord injury**

Investigator Initiated Research Award

Mushfiquddin Khan, PhD, Associate Professor – Medical University of South Carolina  
(7/1/2018-6/30/2020 for \$150,000, \*extension 5/31/2021 due to COVID)

**2018 I-01 Nanoparticle Delivery of ENOblock and Recovery of Function in SCI**

Azizul Haque, PhD, Associate Professor of Microbiology and Immunology - Medical University of South Carolina

Investigator Initiated Research Award

(1/1/2019-12/31/2020 for \$150,000, \*extension 6/21/2021 due to COVID)

**2019 P-01 Regulation of retrograde transport in adult neurons a role in nerve regeneration**

Deanna Smith, PhD, Associate Professor - Department of Biological Sciences, University of South Carolina

Pilot Research Award

(6/1/2019-5/31/2020 for \$26,843, \*extension 8/15/2020, \*extensions 2/15/2021, 8/15/2021 due to COVID)

**2019 CET-01 Spinal Cord Injury Association WIND Conference**

Angela Rodriguez, MSW, Executive Director - SC Spinal Cord Injury Association

Conference/Education/Training Award

(8/1/2019-7/31/2020 for \$24,801, \*extensions 1/31/2021, 7/31/2021, 12/31/2022 due to COVID)

**2019 PD-01 Investigation of corticospinal and spinal plasticity that drivees motor function recovery in people with chronic incomplete SCI**

Aiko K. Thompson, PhD, Associate Professor - Department of Health Science and Research, Medical University of South Carolina

Post Doc Award

(11/1/2019-10/31/2020 for \$67,205, \*extension 4/30/2021 due to COVID)

## **PART IV: AWARDS CLOSED in FY21**

### **2016 SI-02 SC Traumatic SCI Surveillance & Registry**

Anbesaw Selassie, Dr. PH, Professor Emeritus – Medical University of South Carolina  
Special Initiative Award  
(7/1/2016-6/30/2021 for \$249,125)

### **2016 I-04 The Indirect costs of SCI in SC due to lost earnings: Relationships with secondary conditions and medical expenses**

Yue Cao, PhD, Assistant Professor – Medical University of South Carolina  
Investigator Initiated Research Award  
(10/1/2017-9/30/2019 for \$142,973, \*extension 9/30/2020, \*extension 6/30/2021 due to COVID)

### **2017 B-01 Multifunctional nanotherapeutics for Spinal Cord Injury Repair**

Jeoung Soo Lee, PhD, Assistant Professor – Clemson University  
Bridge Funding Award  
(4/1/2018-3/31/2019 for \$66,000, \*extension 3/31/2020, \*extension 9/30/2020 due to COVID)

### **2017 I-01 Targeting neuronal NOS/peroxynitrite/calpain system as a therapeutic strategy for the treatment of spinal cord injury**

Investigator Initiated Research Award  
Mushfiquddin Khan, PhD, Associate Professor – Medical University of South Carolina  
(7/1/2018-6/30/2020 for \$150,000, \*extension 5/31/2021 due to COVID)

### **2018 I-01 Nanoparticle Delivery of ENOblock and Recovery of Function in SCI**

Azizul Haque, PhD, Associate Professor of Microbiology and Immunology - Medical University of South Carolina  
Investigator Initiated Research Award  
(1/1/2019-12/31/2020 for \$150,000, \*extension 6/21/2021 due to COVID)

### **2018 I-05 Harnessing the Teseenchymal Stem Cell Secretome for the Treatment of SCI**

Ehsan Jabbarzadeh, PhD, Associate Professor of Chemical and Biomedical Engineering - University of South Carolina  
Investigator Initiated Research Award  
(1/1/2019-12/31/2020 for \$150,000)

### **2019 PD-01 Investigation of corticospinal and spinal plasticity that drivees motor function recovery in people with chronic incomplete SCI**

Aiko K. Thompson, PhD, Associate Professor - Department of Health Science and Research, Medical University of South Carolina  
Post Doc Award  
(11/1/2019-10/31/2020 for \$67,205, \*extension 4/30/2021 due to COVID)

### **2019 PD-02 Targeting Axonal Stress Granules to Improve Axon Regeneration**

Jeffery L. Twiss, MD, PhD, Professor - University of South Carolina  
Post Doc Award  
(2/1/2020-1/31/2021 for \$67,500)

**2020 S-01 Examine whether calpain-2 activity inhibition attenuates inflammation and improves function in SCI**

Naren L. Banik, PhD, Professor - Medical University of South Carolina

Student Research Award

(7/1/2020-6/30/2021 for \$10,000) – Not utilized due to COVID restrictions

## PART V: ACTIVE AWARDS (as of the end of FY21)

Grant #	Title	PI	Insti- tution
Admin. Core	SCIRF Administrative Core Services	Graham	N/A
Research Core	SCIRF Research Core Services	Krause	N/A
2016 SI-03	Basic Science Research Initiative	Banik	MUSC
2017 SI-02	Measuring Outcomes after SCI throughout South Carolina: Statewide Outcomes Database	Krause	MUSC
2019 P-01	Regulation of retrograde transport in adult neurons a role in nerve regeneration	Smith	USC
2019 CET-01	SC SCI Association WIND Conference	Rodriguez	SCIA
2020 P-01	Roles of Cortico-spinal tract in functional recovery following SCI in mice	Sato	MUSC
2020 SI-01	SC SCI Association Cooperative Agreement	Rodriguez	SCIA
2020 PD-01	Inhibition of BMP signaling for neuroprotection in SCI in vitro and in vivo	Ray	USC
2021 PD-01	Corticospinal & spinal plasticity driving motor function recovery in chronic incomplete SCI	Thompson	MUSC

## PART VI: INCOME

The income to the SCIRF comes exclusively from revenue attributed to a \$100 fee levied on every “Driving Under the Influence” (DUI) conviction in South Carolina. MUSC is the legislated administrator of these collected funds and is the state agency responsible for their oversight.

The \$100 per DUI surcharges are received monthly throughout each fiscal year. Below is the table of monthly collections for FY21. The total collected was \$366,133.56 with a monthly average of \$30,261.13. This amount is a decrease of 15% from the previous fiscal year.

<b>Month</b>	<b>2020-2021</b>
Jul	\$ 21,879.37
Aug	\$ 27,386.21
Sep	\$ 31,086.42
Oct	\$ 21,435.36
Nov	\$ 29,156.93
Dec	\$ 29,113.59
Jan	\$ 28,676.99
Feb	\$ 26,598.07
Mar	\$ 18,599.41
Apr	\$ 32,650.72
May	\$ 53,646.41
Jun	\$ 42,904.08
<b>FY TOTAL</b>	<b>\$ 363,133.56</b>
<b>Monthly Average</b>	<b>\$ 30,261.13</b>

## **PART VII: FINANCIAL OVERVIEW (March 2001 - June 2021)**

Income (DUI Surcharges)	\$ 14,616,277.30
Expenditures	\$(11,848,122.39)
Committed Funds	<u>\$ (1,789,383.96)</u>
BALANCE	\$ 978,770.95

## PART VIII: DIRECTORS (as of end of FY21)

### Board of Directors



**M. Noreen Herring, MD**

Charleston, SC

(Category A) – Medical Doctor from MUSC

Specialist in Physical Medicine & Rehabilitation, Assistant Professor at MUSC  
Neuroscience Department



**Jeffrey M. Derbas, MD**

Greenville, SC

(Category B) – Medical Doctor specializing in treatment of people with SCI  
Board Certified in Physical Medicine and Rehabilitation. SCI Medical Director at  
Prisma Health - Greenville



**Stephen E. Rawe, MD, PhD**

Charleston, SC

(Category D) – At large medical doctor, member of the SC Medical Association  
Board Certified Neurosurgeon - Retired



**Sherwood L. Toatley**

Chapin, SC

(Category C) – Person with an SCI  
911 Telecommunicator with the City of Columbia



**Victoria L. Turgeon, PhD**

Greenville, SC

(Category C) – Family member with an SCI  
Professor, Furman University



**Abhay K. Varma, MD, MBBS**  
Mt. Pleasant, SC  
(Category A) – Medical doctor from MUSC  
Associate Professor of Neurosurgery at MUSC



**Heather W. Walker, MD - CHAIR**  
Mount Pleasant, SC  
(Category B) – Medical Doctor specializing in treatment of people with SCI  
PM& R, SCI Medicine, Program Director of Neuroscience Services  
Encompass Health Rehabilitation Hospital of Charleston

### **Executive Director**



**Catherine Leigh Graham, MEBME**  
*Executive Director*  
W: 843-614-1756  
Email: grahacat@musc.edu

### **Scientific Directors**



**James S. Krause, PhD**  
*Scientific Director*  
Associate Dean for Clinical Research College of Health Professions, MUSC  
W: 843-792-1337  
Email: krause@musc.edu



**Naren L. Banik, PhD**  
*Associate Scientific Director*  
Professor, Department of Neurology and Neurosurgery, MUSC  
W: 843-792-7594  
Email: baniknl@musc.edu

## Terms

**Category A.** Two medical doctors from MUSC

**M. Noreen Herring, MD** – (2022)  
**Abhay K. Varma, MD** – (2023)

**Category B.** Two medical doctors at large specializing or significantly engaged in the treatment of people with an SCI

**Heather W. Walker, MD** – (2025)  
**Jeffrey M. Derbas, MD** – (2025)

**Category C.** Two members who have an SCI or a family member with an SCI

**Victoria L. Turgeon, PhD** – (2022)  
**Sherwood L. Toatley** – (2023)

**Category D.** One at large medical doctor who is a member of the SC Medical Association

**Stephen E. Rawe, MD** – (2024)

## Passing of the Gavel

The SCIRF Board of Directors elected Dr. Heather W. Walker as the Board Chair at the fall Board meeting in 2020 and she began serving her first year as Chair in March of 2021.

## Meetings

The Board of Directors holds in-person meetings, usually two per year, to address the organization of the SCIRF as well as directional goals. Meeting dates and locations are listed below. The Board is responsible for approving all grants awarded as well as budgets for Administrative and Research Core functions.

November 6, 2020 – Virtual via WebEx due to the COVID-19 pandemic

March 12, 2021 – Virtual via Zoom due to the COVID-19 pandemic

## PART IX: RESEARCH OVERVIEW

Excellent progress was made on SCI research throughout the year, despite the barriers imposed by the COVID-19 pandemic. The pandemic led to the closing of many laboratories, which are instrumental to conduct SCI research, and a general closing of offices made virtual work an ongoing reality. As restrictions were lifted, investigators were able to turn the corner and resume all aspects of their SCIRF funded research.

Most projects that were in progress at the time of the beginning of the pandemic required no cost extensions (NCE) that allowed work to continue without additional cost, although on an extended timeline. Projects most impacted were those with strong laboratory components, including basic science projects, as well as those related to rehabilitative interventions designed to improve gait.

Despite interruption from the pandemic, work on the basic science projects continued in the laboratories of several SCIRF supported investigators. These included Dr. Jefferey Twiss at USC (Targeting Axonal Stress Granules to Improve Axon Regeneration), Dr. Mushfiquddin Khan at MUSC (Targeting Neuronal NOS/Peroxynitrite/Calpain System as a Therapeutic Strategy for the Treatment of SCI), and Dr. Jeoung Soo Lee at Clemson (Multifunctional Nanoparticles for SCI Repair). In addition, Dr. Azizul Haque at MUSC expanded the use EnoBlock for the treatment of SCI using site directed delivery with Eb-embedded nanoparticle (NP) gel patch for treatment of SCI animals, which has significant translational potential for treatment in human SCI. An application, based on this research, has been submitted to NIH. Also, Dr. Sato at MUSC is currently investigating on the improvement of sensory nerve function following SCI.

Work in the Basic Science Research Initiative (Banik) continued with the first two students, Ms. Kelsey Drasites and Ms. Ramsha Shams, who began working in the laboratory at MUSC in October 2019, presenting their work at the March 12, 2021 SCIRF Board meeting. Both have completed their degrees from The Citadel. Ms. Shams has been accepted into medical school at MUSC. Ms. Drasites will be applying to medical school next year after completing additional basic science research work in Dr. Banik's lab. Two more Masters students from the Citadel, Ms. Giovanna Leone and Ms. Alexandra Myatich, joined the laboratory at the end of last year. They received training in laboratory techniques and began their own projects, thus ensuring continuation of SCI basic research in South Carolina. All four student projects include bone loss and muscle atrophy following SCI and amelioration with NP-estrogen treatment.

Several studies have been ongoing in applied research, including the epidemiological work of Dr. Anbesaw Selassie, who is responsible for the SC Traumatic SCI Surveillance and Registry, which identifies new incident cases of SCI that occur within the state of South Carolina. This has served as an outstanding resource that has subsequently been used by Dr. James Krause in the conduct of outcomes research geared to identify the scope of problems among those with existing SCI. Additional research underway by Dr. Yue Cao at MUSC is investigating indirect costs of SCI, which are identified by lost revenue from employment. Outcomes research has been conducted by Dr. Aiko Thompson at MUSC, who is investigating plasticity among those with incomplete injuries. In terms of education, the statewide SCI Association planned to hold a conference for those with SCI entitled "Wheeling in New Directions" in 2020 but it was postponed multiple times due to the pandemic. It is tentatively planned for some time in 2022.

There have been a limited number of new proposals that have been funded over the last year, due to a combination of the number of existing funded projects that were in No Cost Extensions, and due to the pandemic related difficulties in the development, submission, review, and initiation of new

projects. Drs. Aiko Thompson (MUSC) and Swapan Ray (USC) were both funded with Post Doc awards. Dr. Ray began his project on SCI axonal regeneration.

In summary, the SCIRF continues to find an outstanding cadre of research projects that span the range of basic, translational, and outcomes research. The pandemic has delayed the progress in some studies, but ultimately the investigators are completing their work and the projects are being funded, as older projects closeout. The ultimate benefits of this work are apparent in the quality of research, amount of federal funding to the state of South Carolina for projects seeded by grants from the SCIRF, and the use of the research in the training of new investigators in the state of South Carolina.

**South Carolina Spinal Cord Injury Research Fund**  
**Executive Director: Catherine Leigh Graham, MEBME**  
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