

South Carolina Spinal Cord Injury Research Fund Fiscal Year 2022 (FY22) 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 two awards in FY22 (July 1, 2021-June 30, 2022) and 1 no cost extension. Five of our grantees concluded their work in FY22 . As of the end of FY22 we had six 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.

Although the COVID-19 pandemic continued to impact research nationwide over the past year, we have seen a great deal of progress in SCI research. Many investigators have been able to return to their laboratories and resume their projects in full.

The SCIRF income derived from the DUI surcharge is collected on a monthly basis. The total collections for FY22 were \$435,490.39 with an average monthly collection of \$39,590.04. After two years of decreased collections, this amount is an increase of approximately 20% from the previous fiscal year and is more aligned with pre-pandemic collections.

We look forward to the upcoming year and are pleased to present this FY22 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 fiscal year 2022 (FY22) Report. This report highlights the progress and accomplishments in implementing the legislative mandate of promoting spinal cord injury (SCI) research throughout South Carolina from July 1, 2021-June 30, 2022.

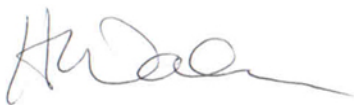
The South Carolina Spinal Cord Injury Research Fund (SCIRF) continues to receive monthly DUI (Driving Under the Influence) collections and saw an annual increase of approximately 20% from FY21 and is more aligned with pre-pandemic collections. The monthly average and yearly collections for FY22 were \$39,590.04 and \$435,490.39, respectively. 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 requests for proposal (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 two new awards in FY22 and one no cost extension. Five awardees concluded their research in FY22. As of the end of FY22, the SCIRF had six active grantees including our Administrative and Research Cores.

We are pleased to provide this annual report for FY22.

Respectfully submitted,



Heather W. Walker, MD
Board Chair



Catherine Leigh Graham, MEBME
Executive Director

LETTER FROM THE SCIENTIFIC DIRECTORS

It has continued to be our honor to serve as scientific directors over the past year and to bring our collective 7+ decades of experience with SCI research to the development and implementation of the scientific vision for the SCI Research Fund. Our goal is to promote the optimal research for SCI, including basic science, translational, and applied science by providing support to investigators conducting state-of-the-art research with SCI.

Our primary concern is with the well-being of individuals with SCI and their families, consistent with our mission. As a result of this commitment we have developed and supported a number of mechanisms by which investigators may conduct their valuable work, ranging from pilot work and support of early career investigators to support of statewide data collection and a basic science special initiative.

We know all too well that we cannot take away all of the issues for people with SCI to promote optimal health and well-being, but we are dedicated to the advancement of science and to ensuring that we address critical gaps in the literature. The work from SCIRF funded research has seeded many larger federal grants, bringing both added funds, resources, and recognition to SCI investigators in South Carolina.

We are exceedingly proud of the work done in South Carolina, particularly in light of the pandemic. Our mutual goal is to continue to advance the research initiative and to continue to take steps to improve outcomes for people with SCI in South Carolina, including improved function, well-being, and longevity.



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 may also be 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 FY22 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 FY22

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)

2022 P-01 Contrast Enhanced Ultrasound for the Evaluation of Intraoperative SCI following Surgical Decompression of a Chronically Compressed Spinal Cord (Starting in FY23)

Brian Saway, MD, Neurological Surgery – Medical University of South Carolina

Pilot Research Award

(8/1/2022-7/31/2023 for \$29,847)

No Cost Extensions in FY22

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, *extension 5/31/23, *terminated early 3/2/2022)

PART IV: AWARDS CLOSED in FY22

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)

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)

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, *extension 5/31/23, *terminated early 3/2/2022)

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)

PART V: ACTIVE AWARDS (as of the end of FY22)

Grant #	Title	PI	Institution
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 CET-01	SC SCI Association WIND Conference	Rodriguez	SCIA
2021 SI-01	SC Traumatic SCI Surveillance & Registry	Selassie	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 FY22. The total collected was \$435,490.39 with a monthly average of \$39,590.04. This amount is an increase of approximately 20% from the previous fiscal year and is more aligned with pre-pandemic collections.

Month	2021-2022
Jul	\$ 36,808.94
Aug	\$ 36,246.70
Sep	\$ 40,310.14
Oct	\$ 34,646.64
Nov	\$ 35,909.51
Dec	\$ 32,426.29
Jan	\$ 26,776.97
Feb	\$ 46,371.74
Mar	\$ 45,333.69
Apr	\$ 57,345.33
May	\$ 43,314.44
Jun	\$ 43,435.71
FY TOTAL	\$ 435,490.39
Monthly Average	\$ 39,590.04

PART VII: FINANCIAL OVERVIEW (March 2001 - June 2022)

Income (DUI Surcharges)	\$ 15,099,073.19
Expenditures	\$(12,463,471.39)
Committed Funds	<u>\$ (1,351,390.78)</u>
BALANCE	\$ 1,284,211.02

PART VIII: DIRECTORS (as of end of FY22)

Board of Directors



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



David J. Powell, III, MD

Mount Pleasant, SC

(Category B) – Medical Doctor specializing in treatment of people with SCI
Medical Director, Center for Spinal Cord Injury at Roper Rehabilitation Hospital/St.
Francis Health Care System



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 A) – Medical Doctor from MUSC

PM& R, SCI Medicine, Program Director of Neuroscience Services

Encompass Health Rehabilitation Hospital of Charleston

Executive Director



Catherine Leigh Graham, MEBME

Executive Director

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Scientific Directors



James S. Krause, PhD

Scientific Director

Associate Dean for Clinical Research College of Health Professions, MUSC

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Naren L. Banik, PhD

Associate Scientific Director

Professor, Department of Neurology and Neurosurgery, MUSC

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Terms

Category A. Two medical doctors from MUSC

Heather W. Walker, MD – (2025)
Abhay K. Varma, MD – (2023)

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

Jeffrey M. Derbas, MD – (2025)
David J. Powell, III, MD – (2026)

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

Victoria L. Turgeon, PhD – (2026)
Sherwood L. Toatley – (2023)

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

Stephen E. Rawe, MD, PhD – (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 2021 and she began serving her second year as Chair in March of 2022.

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.

We continued our virtual meeting protocols due to the pandemic for our Fall 2021 meeting. The Board was thrilled to be able to meet in person, with a virtual option, for our Spring 2022 meeting. A virtual option will be available for all meetings in the future.

October 22, 2021 – Virtual via Zoom due to the Covid pandemic

April 29, 2022 – Roper Rehabilitation Hospital, Charleston (Included a tour of Roper Rehabilitation as well as discussion/demonstration with staff and a user regarding the benefits and limitations of exoskeletons in rehabilitation.)

PART IX: RESEARCH OVERVIEW

Despite challenges due to COVID-19 and fewer new applications, significant progress continued on funded projects. This year was witness to resumption of several studies as investigators were able to return to their laboratories. There were several successfully completed projects. Although some investigators were able to benefit directly from virtual work, other studies required being on-site for completion, particularly basic science projects.

There was a great deal of activity in the basic sciences. For Dr. Naren L. Banik's Basic Sciences Research Initiative, Ms. Kelsey Drasites, previously a Masters student from the Citadel, continued as a research assistant working on muscle atrophy in estrogen treated and untreated SCI animals. Ms. Ramsha Shams, a Masters student at MUSC, worked on the bone loss in SCI in rats treated with and without Estrogen finding amelioration of bone loss. Ms. Ali Myatich, a Masters student, investigated the effects of E2 on amelioration of pain in SCI rats. Dr. Nadia al-Sammarraie, Dr. Swapan Ray's postdoctoral fellow, who departed early due to a visa expiration, successfully conducted experiments on neuro-protection, leading to 4 publications in scientific journals. The findings suggested that Noggin (the natural inhibitor of BMP signaling) could be useful for enhancement of neuronal survival, axon remyelination, synaptic plasticity, and functional recovery. Another investigator, Dr. Takashi Sato, found promising preliminary findings with his Pilot grant that imply that the left motor cortex undergoes plastic changes following the relatively small SCI. The findings suggest that recrossing of axon terminals in the spinal cord may not play a critical role in functional recovery in this type of injury. Dr. Deanna Smith, with her Pilot grant, found some support for the hypothesis that blocking retrograde transport is sufficient to induce an elongation competent transcriptional state in DRG neurons.

There was also significant progress in the applied sciences. The SCIRF continues to support Dr. Anbesaw Selassie's SCI Surveillance and Registry special initiative in which all new instances of SCI treated in non-military South Carolina hospitals is identified. This data assists the SCIRF and SCI researchers to understand the population and establishes the foundation for research. The Statewide Health Outcomes Database special initiative also continues under the leadership of Dr. James S Krause. It follows up on surveillance cases, conducting more in-depth research which is used to identify the needs of people with SCI in South Carolina, and has led to new federal funding. This information is important to guide service delivery.

Two projects were completed within the applied sciences. The first was a cooperative agreement with the SC Spinal Cord Injury Association (SCIA). The SCIA disseminated information from studies to stakeholders and identified new participants for research studies. Dr. Alan Phipps, Dr. Aiko Thompson's postdoctoral fellow, completed his work on corticospinal and signal plasticity driving motor function recovery among those with neurologically incomplete SCI. This work assisted successful applications for follow-up studies from the Nielsen Foundation and Department of Defense.

There have also been many training efforts. This area has been particularly hit hard by the pandemic. There are options for virtual conferences, but virtual conferences simply do not provide the needed interactions to promote work between investigators or to link people with SCI with services. This is particularly true for stakeholders with SCI. Therefore, the statewide conference by the SCIA was delayed until the pandemic is no longer a significant threat to people with SCI who would wish to attend the conference in person.

Lastly, planning is underway to hold a scientific conference among current and former grantees. It is our intention to hold scientific conferences at regular intervals, but we had not been able to do so since the beginning of the pandemic.

Taken together, it has been a challenging year, yet there continues to be outstanding progress among SCIRF supported researchers within the state of South Carolina, both in terms of basic and applied sciences. Training efforts also continue to translate findings from research into practical solutions for people.

South Carolina Spinal Cord Injury Research Fund
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