

**F. M. KIRBY FOUNDATION SOLICITATION EVALUATION FORM**

**DATE:** November 12, 2024

**REQUEST DATE:** October 28, 2024

**Program Area:** Health

**Grant Type:** Board Grant

**APPLICANT:**

Kennedy Krieger Institute  
707 North Broadway  
Baltimore, MD 21205

**CONTACT:** Mr. Bradley Schlaggar, President and Chief Executive Officer

**AMOUNT REQUESTED:** \$125,000

**BUDGETED AMOUNT:** \$125,000

**NATURE OF REQUEST:** Support of Optical Motion Monitoring Equipment for MRI to Improve Scanning of Children

**GRANT HISTORY**

**SUPPORT:** 1996-2022

**# OF APPROVED GRANTS:** 22

**TOTAL DOLLARS:** \$14,105,000

**LAST GRANT DATE:** 12/12/2022

**LAST GRANT AMOUNT:** \$200,000

**FYE DATE:** 06/30

**AFS DATE:** 09/26/2024

<b>Year Approved</b>	<b>Approved Amount</b>	<b>Approval Date</b>	<b>Grant Purpose</b>
2022	\$200,000	12/12/2022	Support of high-density diffuse optical tomography (HD-DOT) into the F.M. Kirby Research Center for Functional Brain Imaging; this grant comprises total support through 2023
2021	\$125,000	12/20/2021	Support of the Magnetic Particle Imaging (MPI) scanner facility
2020	\$125,000	04/29/2020	Toward support of the F. M. Kirby Research Center for Functional Brain Imaging
2019	\$100,000	12/16/2019	Support to develop the infrastructure for tracking and organizing educational data and outcomes from the Kennedy Krieger School programs
2018	\$175,000	12/10/2018	Toward creating a pediatric interactive rehabilitation device

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**LAST SITE VISIT DATE:** N/A

**ENDORSEE:** N/A

**FINANCIAL ANALYSIS COMMENTS:** The FY25 operating budget for the institution is projecting a \$161K surplus, with both revenues and expenses increasing approximately 4% over the prior year. Outpatient revenue represents the single largest income stream and is expected to comprise 53% of total operating revenue in FY25. FY24 saw a \$630K operating surplus. The project budget for the purchase of a TCL3.2 Markerless Motion Tracking System is \$125K, meaning that our budgeted amount will cover the entire purchase price. The FY24 audit (FYE 6/30/24) shows \$365M in total assets, \$149M of which was property, and equipment and \$70M of which was endowment related. KKI has a cash position of \$12K. Net assets without donor restrictions totaled \$143M. KKI is carrying \$71K in long-term debt (bonds payable and bank loans) and has a \$175K working capital line of credit against which they owe \$0.

**ORGANIZATION DESCRIPTION:** Established in 1937, Kennedy Krieger Institute is dedicated to transforming the lives of children and young adults with, or at risk of developing, disorders of the nervous system through groundbreaking research, innovative treatments, and life-altering education. Originally founded in response to a dire need for treatment for children with cerebral palsy, Kennedy Krieger has maintained a major and historic interest in motor and physical impairments yet has greatly expanded in scope over the last 87 years — continuously growing and adapting to meet the changing needs of children with a wide range of physical, emotional, behavioral, and learning disabilities. Kennedy Krieger sees 27,000 patients each year and offers an interdisciplinary approach tailored to the individual needs of each child. The patients come from all 50 states and around the world and while the primary population is pediatric some services treat patients through adulthood including Kennedy Krieger's internationally recognized Spine Center. Services include over 80 outpatient clinics; neurobehavioral, rehabilitation, and pediatric feeding disorders inpatient units; special education programs; professional training; and several home and community programs providing services to assist children and families. The Institute has more than 3,000 employees located across its 13 campuses in Maryland. Training is a core component of the Institute's mission; and, each year, more than 1,000 individuals, on their way to becoming practicing professionals in the field, come to Kennedy Krieger to train with its renowned experts and go on to improve the lives of individuals with developmental disabilities worldwide.

**The F. M. Kirby Research Center for Functional Brain Imaging at Kennedy Krieger Institute is a research resource where imaging scientists, neuroscientists, and clinicians collaborate to study brain function.** We utilize unique state-of-the-art techniques in a safe, comfortable environment, seeking to further develop these innovative methodologies, and to provide training and education in their usage.

**GINA BEVIGLIA COMMENTS:** In 2022, FMKF awarded a grant of \$200,000 to Kennedy Krieger Institute (KKI) to support the establishment of a program for a high-density diffuse optical tomography (HD-DOT) machine. The HD-DOT is a wearable piece of technology that measures neuronal activity in a manner similar to an MRI, allowing for noninvasive optical mapping of the human brain without the need for the wearer to lie still. Through the use of an imaging cap, the

**APPLICANT:** Kennedy Krieger Institute

HD-DOT can sense the firing of neurons in a particular brain region and measure oxygen availability. This technology is particularly useful at an organization that primarily serves children with autism, cerebral palsy, and other genetic and developmental conditions, because it can collect information while the child is engaging in activities in a natural setting. Our grant supported the piloting, purchase, installation, and implementation of this novel brain imaging method. KKI worked closely with the manufacturer of this equipment to develop custom cap sizes to serve patients ranging in ages. Thus far, KKI has received one of four custom cap sizes and has begun its integration into regular clinical practice. Many of KKI's scientific investigators received the opportunity to pilot this technology, test its use in their specific research, and offer feedback that informed the customization of the model that KKI ultimately purchased.

In 2024, KKI is requesting \$125,000 to support the purchase of a new MRI imaging technology to be used in the F. M. Kirby Center for Functional Brain Imaging. The Tracoline TCL3.2 system is used in tandem with a traditional MRI machine to offer non-intrusive optical detection of head motion during a scan. This motion detection technology provides MRI technicians with real-time feedback on motion trend curves, allowing the operator to decide if a scan sequence needs to be stopped and repeated due to excessive head motion. Like the HD-DOT, the Tracoline TCL3.2 is effective for use with young children and other populations served by KKI for whom it might be difficult to remain motionless throughout the duration of an MRI scan. With this equipment, clinicians can ensure that the scanned field is accurate and thorough during the MRI, as opposed to risking inaccurate results due to excessive movement or requiring the scan to be repeated.

Movement during an MRI can significantly compromise the accuracy of the imaging, as evidenced by the figure to the right; the brain lesion was only detectable because the scan was corrected for motion. KKI plans to implement this technology on one of their two Tesla 3.0 MRI scanners, the purchase of which was supported by FMKF in 2001 with a grant of \$1.6M. Once integrated with this MRI scanner, the Tracoline TCL3.2 can be used in pediatric research projects. An example of one such project is the NIH-funded National HEALTHy Brain and Child Development Consortium, a longitudinal study of 7,500 U.S. families. The goal of this study is to understand how various environmental factors, like exposure to substances, during pregnancy and early childhood impact brain development. This requires the ability to easily and accurately perform MRI scans on young children, which will be made possible with this technology. The total cost of the Tracoline equipment, the necessary software subscriptions, training, and installation is \$190,000. KKI has negotiated a deal with the manufacturer; in return for sharing use cases and anonymous motion tracking data from scan sessions, the manufacturer is

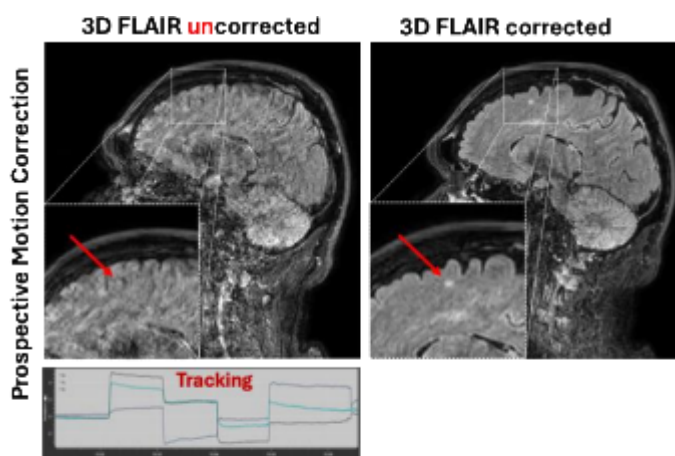


Fig. 2: Example of image improvement using Tracoline TCL3 system at Boston Children's Hospital. Notice that the lesion can only be detected after motion correction

**APPLICANT:** Kennedy Krieger Institute

giving KKI a “collaboration value” discount. This brings the cost of the purchase and implementation to \$125,000, meaning that the FMKF grant will cover the cost in its entirety.

Between 1996 and 1998, FMKF supported the establishment of the F. M. Kirby Center for Functional Brain Imaging at KKI with a grant of \$6M. In its 25 years of operation, the Center has driven critical breakthroughs in understanding the human brain, both in health and in disease. The interdisciplinary research staff at KKI and the cutting-edge technology in the Center have contributed to more effective diagnoses and interventions for conditions such as autism, ADHD, cerebral palsy, stroke, epilepsy, neurodegenerative diseases, and others. The Center is one of the only facilities in the world to utilize both Tesla 3.0 and 7.0 MRI machines, providing access to best-in-class technology for both patients and physicians-in-training at Johns Hopkins University School of Medicine. In total, FMKF has supported KKI with over \$14M since 1996 — the majority of these grants have supported the purchase of equipment for the Kirby Brain Center, allowing KKI to maintain its high quality of research. In particular, I am struck by how KKI ensures that they not only have the latest-and-greatest machines, but that these new technologies will be effective and useful for the care of their unique client population as well. Both the HD-DOT and Tracoline TCL3.2 were designed with very young patients in mind. In addition to providing more accurate results, these technologies also increase patient comfort and reduce some of the intimidation these children may experience while undergoing frequent testing. I am happy to recommend support for the purchase of another piece of novel technology for the Kirby Brain Center.

**RECOMMENDATION:** I recommend a grant of \$125,000, payable over 1 year designated for support of the purchase of optical motion monitoring equipment.

**JUSTIN J. KICZEK COMMENTS:** How unusual to hear that a piece of equipment purchased in 2001 with the help of FMKF funds is still in use! Good to know that our grant more than two decades ago is still allowing KKI to do their groundbreaking research and better understand child brain development. While FMKF has a defined interest in neuroscience, our grants lately to KKI have enabled them to better observe children’s brains, which certainly requires this specialized equipment. I concur with the recommendation made. Hoping to see KKI on the list for 2025 site visits, as we have not visited since 2016!

**RECOMMENDATION:** I recommend a grant of \$125,000, payable over 1 year designated for support of the purchase of optical motion monitoring equipment for MRI scans.

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**DISPOSITION:**

- Declination
- Hold for review on/about:
- Approval for: **\$125,000**
- Recommended Grant Payment(s):  
**2024:**  
**2025:**  
**2026:**
- Hold for Board Review: **December 13, 2024**
- Payee Other Than Addressee:
- Other:

Initials:   **JJK**  

Date:   October 28, 2024  

Check #                     

Date: