The Women's Board of The Johns Hopkins Hospital Billings Administration Building, Room 221 600 North Wolfe Street · Baltimore, MD 21287-0221 Phone: (410) 955-9341 · Fax: (410) 614-9856 · Email: jhhwb@jhmi.edu

# **GRANT APPLICATION FOR FISCAL YEAR 2024**

<u>DIRECTIONS:</u> Please complete the <u>entire</u> form. If appropriate, indicate "Not Applicable" and justify. The original application plus an electronic version is due in The Women's Board office on or before <u>4:00 pm on Friday</u>, <u>January 6, 2023</u>. Only one (1) application from each department will be accepted. Late or incomplete applications will not be considered.

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DATE: January 6, 2023 CLINICAL DEPARTMENT: Neurosurgery CONTACT PERSON: Chetan Bettegowda, MD Phone: 410-955-8620 Email: cbettego@jhmi.edu

TITLE OF REQUEST: Improving patient safety through functional brain pathway integration in neurosurgery

#### PHYSICAL LOCATION OF PROJECT:

Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center's Department of Neurosurgery

#### ABSTRACT (Non-technical overview - 150 words or less):

Our current intraoperative image guidance software allows us to map anatomic regions of interest at or near areas of brain pathology. However, this current software fails to integrate critical, functional brain pathway datapoints. Such a novel integration would allow us to map out and subsequently avoid regions of the brain important to critical functions, including speech, sensation, motor function, vision, and cognitive pathways, during brain surgery.

The purchase of the Quicktome software package would allow us to interpolate known functional brain pathways atop standard of care pre-operative magnetic resonance imaging (MRI). Utilizing this automated process would allow us to identify and circumvent areas of critical brain function while performing meticulous neurosurgical interventions. Such insights will allow our neurosurgeons the unique ability to map out each operation in a personalized manner to optimize patient safety, post-surgical outcomes, and quality-of-life.

#### SIGNATURE OF CLINICAL DEPARTMENT CHAIRPERSON:

Cem.

Chairperson Name: Henry Brem, MD

Chairperson Title: Harvey Cushing Professor of Neurosurgery

Chairperson Email: hbrem@jhmi.edu

#### NOTE: Questions 1-6 must be answered. Please be thorough and concise.

#### 1. Impact on patient care:

Neurosurgical procedures are among the most delicate and nuanced surgical interventions in all of medicine, particularly given the critical, functional nature of brain tissue. Over the past decade, our Department has published data clearly demonstrating that patients who develop new post-operative deficits following cranial surgery have

notably worse survival and quality of life. By mapping out functional pathways of concern, we will be able to provide more personalized and safer patient care, with secondarily improved patient outcomes and healthcare utilization.

#### 2. Number and type of patient who will benefit annually from this award:

Each year at Johns Hopkins Medicine, the Department of Neurosurgery performs more than 1,200 intracranial surgical procedures for a variety of neurological conditions including resection of brain tumors, vascular malformations, and epilepsy in adults and children. Use of the proposed Quicktome software platform would be integrated into the operative workflow for each of these patients.

#### 3. Significance:

The potential significance of integrating functional pathway data into our operative planning workflow cannot be overstated. Each year, upwards of 1,200 operative patients with cranial pathology may be expected to have improved clinical outcomes, possibly reducing their operative complications, reducing their hospital length of stay, and improving their surgical outcomes. Given that Quicktome is only currently operational in a handful of high-volume neurosurgical centers worldwide, use of this novel software would additionally allow us to publish upon our experience with its use, emphasizing the predictive utility of this software and reinforcing Johns Hopkins' status as one of the world's leading brain tumor centers. These initiatives can open up opportunities for future, funded research collaborations, including with our colleagues in neuroradiology as well as likely widening our clinical referral base nationally and internally given our use of this cutting-edge peri-operative technology.

#### 4. Implications, if any, that this has to the Covid pandemic:

N/A

#### 5. Personnel (Please note that we cannot fund grants that incorporate any salaries.)

Neurosurgery faculty leaders toward this effort, Dr. Chetan Bettegowda at Johns Hopkins Hospital and Dr. Raj Mukherjee at Johns Hopkins Bayview Medical Center), will pilot and provide ongoing faculty support for use of this software; their support efforts will be provided in-kind. Long-time neuroradiology collaborators, Dr. Sachin Gujjar at Johns Hopkins Hospital and Dr. Haris Sair at Johns Hopkins Bayview Medical Center, will work closely with technical support staff at Quicktome to install and integrate this software package into our ongoing pre-operative imaging workflow, while also providing their ongoing support as needed in-kind. As such, there are no expected ongoing salary support costs associated with this proposed software purchase.

# 6. Budget: Total Request: <u>\$98,000.00</u>

A. Equipment - price per item and discount if applicable for multiples. Please add compelling justification if multiples are requested. (Itemize and justify):

\$98,000.00. The Quicktome software package has no need for the purchase of ancillary hardware or equipment. In-kind support from the company's personnel/staff will be provided for the duration of the software's use. The software will be integrated into our pre-operative workflow across the Department of Neurosurgery, and thus multiple purchases of this single software will not be necessary.

**B.** Supplies (Itemize and justify):

# C. What is the out-of-pocket cost to the patient? (Itemize and justify):

\$0. There is no expected out-of-pocket cost to the patient for use of the Quicktome software.

D. Other Expenses, Hidden Costs (Please consider whether your grant proposal contains other costs that would require hospital funding, such as structural modifications for equipment installation, operating costs such as additional FTEs, training costs, etc.)\*

\$0. The proposed software purchase does not require any structural modifications for equipment installation. Training and support for installation and optimization of this software into our current BrainLab-supported image guidance system will be provided in-kind by personnel/staff from Quicktome and BrainLab. Additionally, neurosurgery faculty leaders of this effort (Drs. Chetan Bettegowda and Raj Mukherjee) as well as long-time neuroradiology collaborators (Drs. Haris Sair and Sachin Gujjar) will pilot and support these efforts in-kind. Once installed, the software is automated and integrated into our pre-operative workflow. As such, there are no expected ongoing operating costs (FTE or training) associated with this proposed software purchase.

# 7. Have you requested funds from any other source?

☐ Yes (What was the result?)

Click or tap here to enter text.

# X No (Explain why)

No federal funding agency or foundation has within its scope capacity to fund technology of this sort. Therefore, we are grateful for consideration from the Women's Board.

\* If you have any concerns about additional costs of your grant to the hospital please feel free to contact the CFO Katina Williams @ kwill249@jhmi.edu. She is aware of our grant process. All grants selected for funding will eventually be submitted for final hospital approval by the Women's Board. It is not required for the departments to request approval from the hospital prior to submission on January 6, 2023.