

Matthew McGoldrick

**Graduation Year:** Sophomore

**College:** Arts & Letters, Science

**Major(s):** Biological Sciences and English

**Minors(s):** n/a

**Scholar Group Membership:** Sorin Scholars

**Did you received other funding for this project?:** Yes: COS and FYS

**Could you have completed this project without CUSE funding?** No

**More details on CUSE funding assistance?**

**Project Title:** 3D Printing Model Brain Tumors

**Project Location:** Lab of Dr. W.M. Leevy, University of Notre Dame, Notre Dame, IN 46556, USA

**ND Faculty Mentor:** Dr. W. Matthew Leevy

**Project Type:** Research

**Why did you undertake this project/experience?** Deepen your knowledge of a topic or issue, Research/experience necessary for senior thesis or capstone project, Prepare for graduate school (MA or PhD), Prepare for professional school (MD, MBA, JD), Prepare for national fellowships

**Did your funded experience help you:**

**[Deepen your understanding of your coursework or field of study]:** Very Much

**[Discern your interests and post-bac goals]:** Very Much

**[Become confident in your ability to set and achieve your goals]:** Very Much

**[Gain a more nuanced view of local, national, or global communities]:** Very Much

**[Improve your written and verbal communications skills]:**Very Much

**Tell us about your experience.**

In my primary lab work, I was able to successfully print models of the human brain, brain and vasculature, brain tumor, and brain and tumor. I used datasets from both CT/PET and the more clinically relevant STEALTH MRI imaging modalities to produce these models. Printed models accurately represented the anatomical aspects of the brain, vasculature, and tumor; the question of whether these models could be produced was answered in the affirmative, and future work hopes to ascertain the clinical relevance of this process.

I was not only able to complete work on my main project, but also finish a manuscript on the process of 3D printing in multiple materials which was used in this work. I also gained experience in CT imaging of skeletons, multimodal imaging of tumors, and data processing with complex computer programs.

**Describe the impact this project had, both on you as a student-scholar and on the people you worked with.**

The work that I conducted with the help of CUSE funding allowed me to explore my interest and develop my skills in independent research. I learned how to work independently on a project, collaborate with others to solve problems, share and interpret my results with my peers, and pursue and adapt my thesis according to the progress of my work; this was all thanks to the funding provided by CUSE. I learned important skills in data processing, computer aided design, rapid prototyping, 3D printing, and tomographic imaging. I also confirmed my interest in research and the M.D./Ph.D. path. I believe that my fellow undergraduate research benefitted from my presence in lab, both thanks to the aid I was able to provide them and the projects we were able to work on together.

**Describe how this experience is connected to your plans as a student or future professional.**

This experience confirmed my interest in scientific research. Because of this, I am now sure that I would like to pursue an M.D./Ph.D. rather than an M.D. alone. I have gained valuable experience which will be useful in all future research endeavors, both undergraduate and graduate. As a student, I have learned important skills related to the research process which will only augment my academic studies.

**What advice would you give other students who are planning to pursue similar projects?**

Take the initiative in pursuing your interests and conducting research in the areas that truly impassion you. CUSE may provide you with the guidance and funding necessary to support your work and realize your plans for research.

I acknowledge that this form has been filled out truthfully and to the best of my ability. I understand that this information will be shared with many different CUSE constituencies. As such, I have provided as much useful information as I was able. I understand that CUSE will not complete my award disbursement until this form is successfully completed. If I have any questions or concerns, I will contact CUSE before submitting this form. To illustrate that you understand all of these points, please enter your Notre Dame email in the box below.

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