**REQUEST FOR YOUR CHILD’S PARTICPATION IN RESEARCH**

Student Consent Form for Parents/Guardians

**TITLE OF THE STUDY**

Career Exploration Lab: 3D Printing and STEM Engagement for High School Students with Visual Impairments and their Educators, 2021

**NAME OF THE RESEARCHERS**

Thomas Madura, Ph.D., Principal Investigator (PI)

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You are invited to permit your child to participate in a research study aimed at understanding how to better assist high school students with blindness/visual impairments (B/VI), and their educators, as they learn Science, Technology, Engineering, and Mathematics (STEM) subjects and potentially pursue a STEM career. We realize that your time is valuable, but ask that you please carefully read and consider the following information before deciding whether you would like your child to participate. If you have any questions, please do not hesitate to ask. In order to qualify for participation, your child must meet all of the following eligibility requirements:

* Be a student at the high school (grades 9 – 12) level who speaks and understands English.
* Have a visual impairment.
* Have unrestricted movement and full (or close to full) sensation in at least one hand.

**PURPOSE**The purpose of this research is to investigate how student ‘Career Exploration Labs’ (CELs), 3D printing, and hands-on astronomy instruction can help alleviate several key barriers to success in STEM that high school students with blindness/visual impairments (B/VI) typically face. A component of this research involves working with STEM teachers of students with B/VI and TVIs to further develop teaching strategies, resources, and remedies to address the difficulties faced by both students with B/VI and their teachers during STEM lessons.

**PROCEDURES**If you permit your child to participate, your child will take part in a ‘Career Exploration Lab’ (CEL). This CEL will be implemented by the researchers named at the top of this consent form with the assistance of science teachers of the visually impaired. The CEL will take place over a consecutive 5 day period. Each day will last approximately 5 – 6 hours. About 10 – 20 other high school students, about half or more with B/VI, from the state will also be participating. Professional staff members will be present during the CEL to assist the students, making sure that their physical needs are met. Breaks lasting about 15 minutes will take place approximately every 1.5 hours of activity time, and a one hour lunch break will be provided midday.

The first day of the CEL, prior to any activities, your child will be asked to complete surveys of their attitudes towards astronomy and science; a survey of their career plans, previous STEM class experiences, and knowledge and use of technologies such as 3D printing; an assessment of astronomy knowledge and understanding; and an assessment of spatial thinking abilities. These surveys and assessments are expected to take a total of approximately 3 hours to complete and are for gathering research data that will be used to help determine the overall effectiveness of the CEL approach. These surveys and assessments will not be used to determine grades or academic standing in any of your child’s normal school classes and they are completely voluntary. Your child has the right to skip any question or survey item that they do not wish to answer. Your child’s individual results will also not be published or reported to anyone; they will only be analyzed by the researchers as a part of a larger body of research data collected from all participating students.

During the rest of the CEL, your child will be asked to complete a series of hands-on astronomy activities that use various 3D-printed models. Activities consist of handling the 3D models and verbally answering questions about the models and current astronomy topic. The activities are designed to high-light your child’s spatial thinking skills and teach them about a wide variety of basic astronomy topics, such as constellations, gravity, the solar system, the Sun and stars, galaxies, and the structure of the Universe. Your child will work alone or with another student on these activities, which will each last between 20 minutes and one hour, depending on the topic. All activities are voluntary and your child can decide to not participate in any activity or any part of an activity at any time.

Your child will also be asked to participate in several 3D printing activities. During these activities, your child will build a 3D printer, learn about the key parts and basic operation of 3D printers, and how to find and print 3D models. Your child will also have an opportunity to explore STEM businesses and industries via local field trips during the week, introducing them to possible STEM jobs. Additionally, your child will receive STEM education and career advice from STEM professionals with B/VI. At the end of all CEL activities, your child will be asked to again complete surveys of their attitudes towards astronomy and science; a survey of their career plans and knowledge and use of technologies such as 3D printing; an assessment of astronomy knowledge and understanding; and an assessment of spatial thinking abilities. As before, data collected from these surveys and assessments will only be used for research purposes and to help determine the effectiveness of the CEL. The total estimated time commitment for your child’s participation in this study is approximately 36 hours, spread over the five days of the CEL.

We would like to photograph and audio and video record the CEL activities for research purposes. We plan to use standard digital cameras, audio recorders, and a digital camcorder. The research team will also take written research notes. However, no personally identifiable information (names, faces, etc.) will ever be shared or published, and such recording is completely voluntary (request for consent to conduct photographic, audio, and video recording is located at the end of this consent form). We would like to use these recordings and notes to re-observe the CEL activities, looking for any details we might have missed. We also plan to use the notes and recordings to collect data on how the students and teachers used the 3D models during the activities, and to assist with the writing of journal articles, conference presentations, funding agency reports, and future grant proposals on this work.

**POTENTIAL RISKS**There are minimal risks involved with your child’s participation in this research study, which means that the probability and magnitude of any harm or discomfort anticipated in the study are not any greater than that ordinarily encountered in daily life, during the performance of routine tests, or in a typical classroom setting. There is also minimal risk of any potential study-related injury. However, as your child will be asked to evaluate their experiences at the end of the study, if they happened to have a negative or difficult experience, answering questions about the study may cause negative thoughts or feelings to resurface, leading to some emotional discomfort. There is also the risk that if your child has a negative or difficult experience during the study, they may become discouraged from pursuing a higher education or career in a STEM field. If at any time a member of the research team notices, or your child suggests, that participation in the study is becoming difficult or is causing a negative emotional or physical reaction, your child will be asked if they would like to take a break from the study. If your child chooses to take a break from the study for any reason, they will be allowed to re-join and continue participating in the study at a time of their choosing. Your child is also able to stop participating in the study at any time, for any duration and for any reason, without any negative sanctions applied. If there is any need for your child’s discomfort to be further addressed, this will be done so by professionally trained staff members who can assist your child and direct them to further counseling resources if needed.

**POTENTIAL BENEFITS**Potential direct benefits your child will receive as a result of participating in this study include a series of lessons in astronomy, astrophysics, and 3D printing that they might otherwise not receive; an opportunity to improve their spatial thinking skills; advice and mentoring on a possible higher education and career in a STEM field; opportunities to tour local STEM businesses and learn about possible STEM career paths directly from such businesses; and access to STEM professionals that are blind/visually impaired, who can act as mentors/role models.

Indirect benefits of this research study include greater benefits to the wider educational community, for both students with B/VI and their educators. This study may provide teachers with insights into the teaching and learning of STEM to high school students with B/VI, helping better motivate such students to pursue a higher education and career in a STEM field. This study may also help researchers better understand how the CEL model can be adapted and targeted towards other groups currently underrepresented in STEM (e.g. women, persons with disabilities, minority groups). Investigating the roles of touch and 3D printing in STEM learning could lead to the development of new best practices for implementing these forms of instruction, which in turn could lead to better understanding of the role that touch plays in concept formation for all students. This work will help answer the question, “How do we know that visual representations are the most effective way to represent science?” This study will have additional broader impacts for astronomy education research, specifically, how 3D hands-on models and instruction can be used to enhance students’ spatial thinking skills and help students’ understand the multidimensionality of physical phenomena in the universe. Finally, this study will result in a selection of freely available and tested 3D astronomy models and activities that educators can use and adapt when teaching astronomy. This could potentially lead to other educators developing and making available their own 3D models and activities to the STEM education community.

**COMPENSATION**If you agree to permit your child to participate in this study, they may receive a series of 3D printed tactile astronomy education models as a direct result of participating in the activities of the study.

**CONFIDENTIALITY**Your and your child’s privacy are important to us. The research team will do everything it can to maintain confidentiality. We are required to keep a copy of this consent document, but it will be kept separate from the study results. The researchers will limit or avoid recording of faces and other Personally Identifiable Information (PII). Video, audio, and photo editing software will be used to mask faces and other PII immediately following collection. Recording is completely voluntary and your child can decide to not be recorded at any time. Original materials containing PII will be destroyed once audiovisual processing is complete.

Your child’s answers to all surveys, questions, and assessments, and any notes, photographs, audio, and video recordings will be kept confidential to the extent allowed by law and your child’s name will not appear on any of the results. A unique, randomized identification code will be used for data entry and analysis purposes. The key linking coded data to participants will be retained only by the PI as an encrypted file on a password-protected computer in a locked office. The results of this research may be published in journal papers, conference posters, conference talks, funding agency reports, and future grant proposals, but your child’s name and identity will not be revealed. Your child’s individual responses will only be analyzed as a part of a wider body of research data; names will not be reported. Data, with all identifiers removed, may also be shared for use in future research. All documents, images, audio and video files, and research data will be stored as encrypted files on a password protected computer in a locked office and destroyed five years after the completion of this study (2029).

As with any study, there are potential limits to confidentiality, especially in regards to a study that involves participants under the age of 18. The PI of this study is a mandated reporter – someone who is legally required to report abuse, neglect, or a person’s intent to harm self or others to the appropriate authority – if a situation warrants. As such, by signing this consent form, you understand that this mandated reporting requirement places a limitation to any confidentiality. Secondly, as this study involves groups of students and teachers working together, we cannot guarantee that a student or other teacher will not disclose what is discussed during the study. Students and teachers are encouraged to keep any comments or responses by other study participants confidential and to not discuss the study outside of the group or study environment.

**PARTICIPANT RIGHTS**Your child’s participation in this study is completely voluntary. You may refuse to allow their participation in the entire study or any part of the study at any time without any negative effect on their or your relations with San José State University, your child’s school, and the research team. Your child also has the right to skip any question or survey item that they do not wish to answer. This consent form is not a contract. It is a written explanation of what will happen during the study if you allow your child to participate. You will not waive any rights if you choose not to allow your child to participate and there is no penalty for stopping your child’s participation in the study. Your child may also decide to stop at any time.

**QUESTIONS OR PROBLEMS**You are encouraged to ask questions and to have your child ask questions at any time during this study.

* For further information about the study, please contact Thomas Madura, Ph.D.: [thomas.madura@sjsu.edu](mailto:thomas.madura@sjsu.edu) or (408) 924-5268.
* Complaints about the research may be presented to Ramen Bahuguna, Ph.D., Chair of the Department of Physics and Astronomy: ramendra.bahuguna@sjsu.edu or (408) 924-5210.
* For questions about participants’ rights or if you feel your child has been harmed in any way by participating in this study, please contact Dr. Richard Mocarski, Associate Vice President of Research, San José State University, at (408) 924-2479 or [irb@sjsu.edu](mailto:irb@sjsu.edu).

**CONSENT FOR PHOTOGRAPHIC, AUDIO, AND VIDEO RECORDING**

Yes, I give permission for my child to be photographed and audio and video recorded as part of

this study.

No, I do not give permission for my child to be photographed or audio/video recorded as part of

this study.

**SIGNATURES**

**Parent/Guardian Signature**Your signature indicates that you voluntarily agree to allow your child to be part of the study, that the details of the study have been explained to you and your child, that you have been given time to read this document, and that your questions have been answered. You will be given a copy of this consent form, signed and dated by the researcher, to keep for your records.  
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Name of Child or Minor Parent or Guardian Name (Printed)   
  
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Relationship to Child or Minor Parent or Guardian Signature Date

**Researcher Statement**I certify that the minor’s parent/guardian has been given adequate time to learn about the study and ask questions. It is my opinion that the parent/guardian understands their child’s rights and the purpose, risks, benefits, and procedures of the research and has voluntarily agreed to allow their child to participate. I have also explained the study to the minor in language appropriate to their age and have received assent from the minor.

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Signature of Person Obtaining Informed Consent and Assent Date