

**An Implementation Plan for a Voyage Scale Model Solar System in
Memphis, TN**

SECTION 1

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Lead Organization

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Partner Organizations: None at this time except within the University of Memphis



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Date

SECTION 2 – The Community

Memphis -Located on the banks of the Mississippi River in the Southwest corner of TN, Memphis borders Mississippi and Arkansas. The largest city in the Mid-South, it is a hub for international cargo and trade. Fedex has its global headquarters in Memphis and is the largest employer. Memphis marked its 200th anniversary in 2019 and is a regional center for medicine, education, and the arts. The metro area is home to a diverse population of over a million people. School systems in the Memphis community include Shelby County Schools, municipal schools, private schools, and school systems in neighboring counties. Shelby County Schools is one of the largest 25 public school districts in the U. S. and serves 100,000 students in 200 schools. Memphis is home to a number of colleges and universities, some public and some private. The University of Memphis and Southwest Tennessee Community College are public and welcome all visitors to their open campuses.

University of Memphis - Located in a quiet residential neighborhood of Memphis, the University of Memphis is a major research institution and is in the top tier among public universities in the 2020 U.S. News and World Report rankings. Founded in 1912 as West Tennessee State Normal School, we welcome more than 21,000 students to campus every year and offer over 250 degree programs. Diversity is one of our strengths. Students and faculty come from all over the world to be a part of the UM experience. A focus on STEM education can be found on the Main Campus in the College of Arts and Sciences, The College of Engineering, and the College of Education.

There is rich opportunity to impact STEM education for K-12. The Campus School is located on our Main Campus and currently serves grades K-5. There are plans to add a junior high and a high school. The campus school aims to provide excellent elementary school instruction, serve as a lab for new educational designs, and provide teaching experiences for students in the College of Education.

There is also a preschool on the UM Main Campus that encourages children to explore their own active learning abilities. Tiger LIFE is a program in the College of Education for intellectually or developmentally disabled adults that includes a concentration on learning to assist teachers in early childhood classes, including classes at the preschool on campus.

UM Department of Physics and Materials Science – Our department is part of the STEM community in the UM College of Arts and Sciences and is the leader in bringing the Voyage Solar System Model to the UM Main Campus. With a concentration in astronomy, we see special value in having the Voyage on our campus.

SECTION 3 –Strategic Objectives In STEM

In the Department of Physics and Materials Science our main goal is to advance scientific knowledge and innovation while at the same time educating the next generation of talented scientists.

Our dedicated faculty support this mission with cutting-edge research, unique programs, and a supportive learning environment. Our undergraduate students are encouraged to participate in research as early as their freshman year. We welcome school groups to visit our department, to see our labs and talk with our faculty.

We aim to spark interest and excitement about science in K-12 students in order to have more students remain interested in science in college. Outreach that attracts school groups to campus is key. The Voyage would enable us to more effectively get the attention of student visitors and teach them about the scientific process.

We support raising the science literacy of the general population and look forward to using the Voyage Solar System Model to do so. An educated public that understands and appreciates the value of science is a public that can use critical thinking to make informed choices and support a scientific approach to problem solving. An astronomy course is often of interest to people whether they are scientists or not. In contrast, a gen ed physics course often evokes a different response. Using astronomical examples to teach physics is ideal.

SECTION 4 – Proposed Community Engagement

The *Voyage* Solar System Model will be located on our main campus along a North-South primary walkway and will allow UM students of all majors and campus visitors the rare opportunity to experience Earth's place within our Solar System from new perspectives that inspire wonder and awe. It will help students comprehend how small and fragile Earth is within the tremendous breadth of our Solar System, and also how unique Earth is in its ability to provide the resources needed to sustain life as we know it. This awareness can help students see themselves as active participants in the Universe, making choices that matter for the future of life on Earth. Such a perspective can motivate students to seek more collaborative and sustainable solutions to environmental and social challenges.

The astronomy/space sciences faculty in the Department of Physics and Materials Science include faculty who work in astrophysics, space materials science, and gen ed teaching. They and other department faculty will relish being able to use the *Voyage* Solar System Model to inspire student curiosity and interest in physics and astronomy. Dr. Francisco Muller-Sanchez studies active galactic nuclei, and two of his projects will be implemented in the first run of the James Webb Space Telescope. His PhD advisor and a colleague won the 2020 Nobel Prize in Physics. Department Chair, Dr. Firouzeh Sabri, is a materials scientist whose materials have gone to Mars on rovers, and she currently has an experiment on the International Space Station. In 2020 she received a grant from NASA's office of STEM Engagement to convert content from her space sciences research into curriculum content for K-12. Joanne Rhodes teaches gen ed physics and astronomy and is a recipient of the Briggs Excellence in Teaching Award. She focuses on teaching students what scientific thinking is and finds that examples in astronomy are often the most engaging and fun. She was inspired to lead the effort to obtain a *Voyage* Solar System Model for the UM Main Campus because of her amazing experience upon seeing the *Voyage* Mark I model in Washington D. C.

The *Voyage* will be a focal point for STEM education and careers for our college students as well as for the K-12 community. School groups from around the Mid-South can visit our campus when they study the Solar System and gain the amazing perspective that the *Voyage* experience provides. Follow-up tours, activities and discussions with UM faculty can focus student energy on addressing the challenges that we have here on Earth and provide a foundation for the continued exploration of our solar system.

Future space related exhibits at the Memphis Pink Palace and the Children's Museum of Memphis can include suggested follow-up activities such as field trips to our campus to experience the *Voyage* model. Connection to our *Voyage* exhibit in the future might include a *Voyage* stanchion with a comet or other Kuiper belt object located at those sites.

Schools are invited to campus for a variety of outreach events, such as open houses hosted by different departments or colleges. With the *Voyage* Solar System Model in such a central location and with its 2000 ft.

extent, its inclusion on field trip visits will be easy. The Sun will be located near the Math building and in view of the College of Engineering. A walk along the model will lead visitors past the library, the physics building, the College of Arts and Sciences, the central fountain and the University Center, and will finally take them to Pluto by the Chemistry building. This proximity to STEM educational centers on campus will make Voyage field trip follow-up connections flow naturally.

The College of Education can include the Voyage in education classes, student teaching at the Campus school(s), and training for those enrolled in Tiger LIFE. The Journey Through the Universe curriculum that NCSSE offers may be considered for use in the Campus School and/or teacher training courses. With its versions designed for different grade levels, it is clear that it would be a perfect tool for use with the Voyage.