

Project Summary
Full-Scale Development: FOSSIL—Fostering Opportunities for
Synergistic STEM with Informal Learners

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Throughout the U.S., about 50 fossil clubs in 24 states are engaged in learning about the science of paleontology. Unlike some other hobbyist groups, such as birdwatchers or stargazers, these fossil clubs are not networked nationally. Thus, there is limited exchange of knowledge or development of joint activities that would enhance learning. Likewise, many fossil clubs only have limited interactions with professional paleontologists and natural history museum research collections. The FOSSIL project will develop a cyberenabled Community of Inquiry in which our primary target audience, i.e., U.S. fossil club members, are networked with each other as well as with professional paleontologists, receive training and development, attend meetings and workshops, and have on-line access to 100 million digitized fossils in U.S. natural history museums. FOSSIL has a research component to better understand how and what fossil club members are learning and interacting within the Community of Inquiry. FOSSIL will build upon ongoing national “Big Data” initiatives that over the next decade will place digitized natural history specimens into a Cloud, thus enabling access by diverse stakeholders, including the fossil clubs. We also plan to engage the fossil clubs via crowdsourcing to assist in this national initiative to digitize fossil specimens for the Cloud. The knowledge gained from our research with FOSSIL will inform future cyberlearning projects how to better engage the public with scientific data in the Cloud.

FOSSIL is envisioned to be a decade-long project, of which we have spent the past year in the planning phase. We are therefore requesting funds from NSF for the next four years to implement a Full-Scale Development project. After the end of the NSF funding period, we expect to sustain FOSSIL as it continues to develop. Our research so far has yielded an enthusiastic response from 20 fossil clubs, and we expect for this engagement to grow as FOSSIL develops. Evaluation will be conducted by an external firm, Audience Viewpoints, which has extensive experience evaluating informal learning projects.

Intellectual Merit. Fossils are the tangible objects that represent the science of paleontology. Paleontology is an interdisciplinary field of STEM that includes geology, biology, anthropology, and related disciplines. It also provides unique evidence for two topics of societal importance today, i.e., evolution and climate change as recorded in the fossil record over the past 4 billion years. In addition to STEM content, the fossil clubs will also learn about the nature of science, i.e., how paleontology is done, as well as learn about how paleontologists curate their fossils into research collections. Part of our front-end evaluation so far confirms that among fossil club members, there is high interest, but limited knowledge about how to curate their own collections. There likewise is high interest in access to museum collections, but currently limited opportunity. FOSSIL has several innovative components, including research on the Community of Inquiry (virtual “Third Space”) and the ability for the public to engage with, and learn from, fossil specimens in U.S. natural history museums. The FOSSIL project team includes paleontologists and learning professionals with ~100 years of combined relevant experience, as well as access to one of the largest paleontology collections in the U.S. at UF. Three of the PIs are also involved in the Big Data initiative (*iDigBio*) to digitize U.S. natural history museum specimens. Our external advisory committee will periodically provide additional input on the progress of FOSSIL.

Broader Impacts. In addition to the primary target audience, K12 STEM teachers and university students and will also be engaged in FOSSIL. We will develop innovative strategies to broaden representation within the clubs, particularly for urban and rural underserved groups. FOSSIL builds upon the national research infrastructure of digitized fossil specimens (*iDigBio*) and therefore adds value with additional stakeholders and active participants from the fossil clubs. We will disseminate the outputs of FOSSIL via a project web site, other relevant web sites, listserves, e-newsletter, presentations at national meetings, talks to civic organizations, and research results published in peer-reviewed professional journals. Public participation in FOSSIL will provide a heightened appreciation of the societal relevance of natural history museums and their collections and therefore promote STEM in the 21st century.