

## ACS Mellon Foundation Faculty Renewal Grants

### Final Report for “A Digital Resource Database for the Earth and Environmental Sciences”

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**Institution:** Furman University

**Title of Project:** A Digital Resource Database for the Earth and Environmental Sciences

**Date(s) of Project:** 5/2010 – 5/2011

**Amount Awarded:** \$3,256

As laid out in the original proposal, the primary goals and objectives of the project were to create a centralized, searchable digital earth and environmental sciences database for use by faculty and students primarily in the earth and environmental sciences (EES) at Furman and eventually by other ACS faculty. The database is intended to provide a means for the EES faculty to share digital resources for, primarily, introductory courses although if this pilot project is successful, the database could be expanded to include topics covered in our upper level courses as well. The goals and objectives during the project remained essentially the same. We focused primarily on developing the image database component given the campus wide availability of the image collection through the LUNA platform at the University Digicenter.

The project was a collaborative joint venture between myself, two students, and the university's recently created Digicenter, a center in the university library whose mission is to enhance the effective integration of digital technologies for innovative learning and teaching on campus. For the project I hired two undergraduate students (Amber Ciravolo and Sarah Caldwell), both Earth and Environmental sciences (EES) majors to assist me with the collection, compilation, and annotation of the digital database. We started by compiling the syllabi from all four of the introductory EES courses my department currently offers (EES 110 Earth Systems, EES 111 Earth Science and the Silver Screen, EES 112 Environmental Science, and EES 113 Natural Hazards) and identified the various topical subcategories for which we wanted to provide imagery. We ranked the topics based on extent of coverage overlap across the introductory courses. Some topics (like the scientific method or plate tectonics) were covered in all four courses while other topics were only covered in a single course. We started with the topics with the highest degree of overlap and methodically worked our way through all of the topics covered in all four classes. A naming scheme was developed in order to provide unique identifiers for each image to be included in the database. The identifier was used to link the image to an excel spreadsheet that contained the metadata associated with each image. The metadata included information about the source of the image, a description of the image, and keywords that could be used to search for the image. I met weekly with the two students to go through the images they had amassed for each category, removing those I felt unnecessary or of inadequate quality and then supplemented the list with additional images that I provided. In all 1,137 images were carefully selected for the completed database.

The images were transferred to the Library's Digicenter, established as a collection, and uploaded to LUNA Insight, a commercial digital asset image and video management and archiving software that has built in search capabilities and means to attach extensive metadata (e.g., captions, keywords, source information) to any digital resource. The keywords associated with each image allow for easy access and navigability using the Luna search engine. The Digicenter is currently in the process of finalizing some of the formatting, checking the image resolution, and mainstreaming the image descriptions as well as noting copyright information for

those images where necessary. I talked with the director of the Digicenter today and she expects the final completed database to be publically available to the entire Furman campus within the next week or so. Once posted, I will contact other ACS EES faculty to make them aware of the database and offer them password access to the database for those interested. I intend for the database to be used by and available to my fellow EES colleagues this summer for preparation for our fall introductory courses. My hope is for the design and development of this project to serve as a model and template for other departments to compile, organize, and share digital resources.

It remains to be seen how much use the new database will receive so it is difficult for me to evaluate the project's success at this point given it won't be publically available for another couple weeks. From a project development standpoint, the selection of the 1,137 images was in line with my original expectations. I had targeted a benchmark of ~1,000 images when I first conceived of the idea for the project, so was able to meet and actually exceed that mark.

Once the database is finalized and publically posted, I will then begin the second phase of this project which would be to market its availability, encourage my fellow Furman colleagues to use the database, and then promote its use among other ACS faculty. My colleagues in my department are aware of the database and have contributed some images to its creation. I will be contacting fellow ACS EES faculty to let them know of the database's existence in the weeks to come. They will then be able to contact the Digicenter to receive password access to the database. I will be tracking with the Digicenter both internal (on campus) and external (off campus) access to the database so that we have a quantitative measure of its use in the years to come.

The project went more or less as designed, and there is little that I might change if I were to do it again. At times I had wished the students had been a bit more responsible about meeting our pre-assigned deadlines for compiling imagery for the different sub-categories, but in the end we were able to get it all done more or less on time.

The full impact of this project on other Furman faculty has yet to be realized and won't be until the database becomes publically available in the next few weeks. So at this point it is difficult to know how widely utilized the image database will be. Although the database will primarily be used by faculty in Earth and Environmental Sciences there may be faculty in the other sciences that might have some interest as well. I will be contacting them in the weeks to come. Given that no readily available, comprehensive, centralized, searchable digital database exists for the earth and environmental sciences that provides a pre-screened annotated selection of only the best, most useful digital resources for teaching introductory earth and environmental science courses exists, I expect it to be popular with the five other faculty in my department for their introductory classes.

As to the campus wide impact, the Digicenter was created in 2007 as a joint venture by the Library, The Center for Teaching and Learning, and Computing and Information Services; it is staffed and financially supported by the university with a full time director (Pongracz Senney) and data manager (Jen Haldaman). The Digicenter's collections currently contain more than 28,000 digital objects available to the Furman community with several thousand more currently being processed. The center is still in its early formative years and is looking to significantly expand its collections, use, and availability to the campus as a whole. This project is one of the first more general image collections from the sciences. Most of the image collections at the Digicenter are art or history collections and so this science collection helps provide some diversity and breadth to the Digicenter's collections. The hope is also that if this collection

becomes widely used, it can be used as a model and template for other departments to compile, organize, and share digital resources.

For the two students directly involved with the project, I know they learned a lot about database organization as well as a new found appreciation for the importance of good images / diagrams for teaching earth and environmental concepts. For all of the good images / diagrams we ended up selecting, they also had to wade through a whole lot of subpar ones as well. Conceptually it forced them to grapple with what constitutes a good diagram / image for undergraduate teaching. In many cases there might be 20+ good images showing a specific concept, but I tasked them with only selecting the top few for the database; so decisions had to be made, which led us to numerous conversations about how students learn visually.

I have yet to present this project at a professional meeting or publish the results, but will once I have a better sense of the database use and I receive some initial feedback from users on its utility. I am on sabbatical this year and will be living in Sweden so won't be attending the usual geoscience meetings and teaching pedagogy meetings I normally do here in the states, but plan to continue to track the database use through this year and then present upon my return (so likely Fall 2012 or Spring 2013 at a Teaching Conference like the Lilly Teaching Conference in Greensboro, NC and/or a Geoscience Education Session at the Regional or National Geological Society of America Conference). I will also present this project internally at Furman's Annual Center for Teaching and Learning Expo next year. The next steps are to await the public release of the database through the Digicenter and then contact and market the database to my colleagues here and at other ACS schools. I will work with the Digicenter to track use of the database and then begin work on presentation of the project at the meetings and forums.

## **Budget**

<b><u>Line Item</u></b>	<b><u>Original Budget</u></b>	<b><u>Budget Spent</u></b>
Stipend for Student Workers	\$2,756	\$1,800
Software	\$500	\$519.58
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<b>Totals</b>	<b>\$3,256</b>	<b>\$2,319.58</b>

As stipulated in the grant guidelines, I will be returning to ACS all unspent funds from the project and am currently waiting for the student accounts and purchasing to clear as the university closes out all of its 2010- 2011 academic year accounts before having the university cut the check for the remainder and send on to ACS.

I apparently overestimated the number of student hours needed to complete the image database in the original proposal, although the shortfall was more a combination of the students having less time available to work on the project compared to what they had thought they would be able to spend and the fact that I personally spent large quantities of my own time (in total tens and tens of hours) on my project doing all of the QC, database organization, and image selection. My time was not included in the budget.

## **Project Summary for Posting**

This project created a comprehensive, centralized, searchable digital image database for the earth and environmental sciences. The database currently contains over 1,100 individually selected digital images for use in teaching introductory earth and environmental science courses. The project was a collaborative joint venture between the Earth and Environmental Science department and the university's recently created Digicenter, a center in the university library

whose mission is to enhance the effective integration of digital technologies for innovative learning and teaching on campus. The database is housed by the Digicenter on a LUNA platform and is accessible to all Furman faculty and students and available to interested faculty at other institutions with permission. We intend for the design and development of this project to serve as a model and template for other departments to compile, organize, and share digital resources.