

Assessing the Long Term Impact of a Statewide Nanoscience Education Program

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Program evaluation for funded projects is typically undertaken during the award lifetime, and immediately afterward, but only rarely is the enduring impact assessed after an extended period of time has lapsed and project funds have ended. Our ongoing research aims to assess the long term impact of the New Mexico Nanoscience Education Network (NMNEN; 2007-2011).

The NMNEN was established with NSF CCLI Phase 1 support as a pilot program with the goal of building faculty expertise in the field of nanoscience in community college and 4-year university settings. The project was conceived collaboratively between NMSU biology and physics faculty. Project leaders adopted a “train-the-trainers” approach in order to maximize impact in the undergraduate classroom. Faculty, students, and staff from institutions of higher education throughout the State of New Mexico partnered with personnel at government labs and the New Mexico Consortium (NMC) to offer workshops and develop and disseminate educational materials. The project focused on nanoscience because this relatively new and important interdisciplinary field is not well represented in undergraduate courses at New Mexico institutions. The workshops emphasized three thematic areas: (1) Measurement at the Nanoscale: Exploring the Invisible; (2) Nanoscience and Energy Technology, and (3) Nanostructures and Biological Systems.

An end of project assessment in 2011 captured successful elements of the program. For example, participants reported that an extended nanoscience education network had been forged in the state through collaborative ties between New Mexico postsecondary institutions and national laboratories (LANL, CINT, and Sandia) as well as non-academic research organizations (NMC). By bringing faculty, staff and students together from different institutions, the network had furthered new research collaborations and facilitated partnerships on other educational projects. Moreover faculty exchanged information about the teaching challenges they faced working in urban and rural settings in different kinds of institutions of higher education with high numbers of students who belong to minority groups underrepresented in STEM fields (Hispanic; Native-American; African-American). The majority of participants reported this was the first time

they had engaged in face-to-face discussion of pedagogical philosophies and practices in a setting that included faculty working in CC and 4-year institutions. Student participants informed the faculty of practices that sparked their interest and expressed the value added to career progression by workshop and network participation.

We are currently developing an assessment plan for 2016 that will evaluate program impact 5 years after project termination. We aim to assess whether network

participation influenced faculty and student research and career progression in the long term, and whether statewide partnerships and curriculum reform efforts were sustained after a five year period has lapsed. We hope that in so doing, we can uncover practices that can enhance persistence of programmatic impact when external funds expire, as they inevitably do.

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Dr. Boris Kiefer, Professor of Physics, engages in research that is at the crossroads of basic and applied science. He uses computational models to capture relevant materials behavior and to advance our understanding how materials may assist in addressing and mastering societal challenges. Nano (bio) science is expected to play an integral role in this process. Dr. Kiefer integrates relevant nanoscience concepts as modules in his courses. The goal is to increase participation in STEM related careers as well as to educate non-science majors about scientific topics and developments. After all: together we shape our future and the world we live in.



Dr. Elba Serrano, a Regents Professor of Biology at New Mexico State University, received her undergraduate degree in physics with distinction from the University of Rochester and her Ph.D. in biological sciences from Stanford University with an emphasis in neuroscience and biophysics. Her current research focuses on mechanosensory systems, tissue engineering, and neurogenetics. Dr. Serrano is an advocate of interdisciplinary research and education and she collaborates with scientists, engineers, and educators at UCSD, the Center for Integrated Nanotechnologies (CINT), UC Denver, MIT, and NMSU. In 2015 Serrano was selected as the recipient of the SACNAS Distinguished Research Mentor Award. She has a special interest in communicating scientific concepts to non-majors and the general public through courses and informal workshops.

