

EXAMPLE 1:

RESULTS FROM PRIOR NSF SUPPORT:

PI Tuininga has been supported by NSF award # DRL-1421019, 9/1/2014-8/31/2019, \$1,150,285 on NSF-AISL Collaborative Research Project TRUE (Teens Researching Urban Ecology - a tiered mentoring model serving hundreds of teens underrepresented in STEM throughout NY City. She was PI for year 1 of the project.

- Intellectual Merit: This project tests a tiered mentoring model with near peer mentoring for teens who are URGs in STEM.
- Broader Impacts: In Year 1, a cohort of 50 teens from URGs in STEM were recruited and participated in a seven-week long program to gain exposure to urban ecology, STEM, hands-on research, and role models. 18 undergraduates and 5 graduate students also participated.
- Dissemination: Results from Year 1 were presented at the AZA Conference and Bronx Science Consortium Poster Symposium. No publications resulted in year 1.

PI Tuininga was also supported by NSF Award # 1744460, 11/1/2017-10/30/2019, \$300,000 on NSF INCLUDES DDLP: Sustainability Teams Empower and Amplify Membership in STEM (S-TEAMS): a transdisciplinary team-based internship program partnering teams of undergraduates with corporations and other organizations to help them address sustainability challenges, addressing inclusion in STEM through the cross-discipline teams.

- Intellectual Merit: This project examines how participation in diverse cross-disciplinary teams affects sense of belonging in STEM for undergraduates from URGs.
- Broader Impacts: 60 students from 18 universities and 32 majors participated in the 10-week summer internships in year 1 of the S-TEAMS program to gain knowledge in sustainability science, project management, scientific communication, and professional development.
- Dissemination: Projects from the program were presented at a public final presentations event, written reports were given to company representatives, some projects were presented in posters at the NSF-funded LSAMP conference (with one S-TEAM member winning a prize for his poster), Mid-Atlantic Association of Geographers meeting, and Association for Advancement of Sustainability in Higher Education annual conference. No publications have resulted specifically from 2018 teams funded in this current project for S-TEAMS.

Dr. Goodey was previously awarded an NSF TUES Type 1 grant (DUE-1245630) “Incorporation of Research Skills into the Undergraduate Biochemistry Curriculum to Create Extraordinary Scientists for the Modern Research Environment”. The funding (\$166,475 for 01/01/2013 - 12/31/2016) was used to investigate the effects of inquiry-based laboratory learning and a professional advisory board on students’ ability to design experiments and think critically.

- Intellectual merits: The PI completed interviews with the advisory council members

to identify the most important skills students need to be prepared for research positions after graduation.

- Broader Impacts: An advisory board consisting of nine professionals from local industry and academia was formed and interacted with the students in the advanced biochemistry laboratory course during student-advisory board research meetings. Students presented their semester long projects, which were evaluated by the advisory board members, who provided written feedback and practiced networking. These experiences provide first generation college students professional mentoring and a look to the outside professional world, helping students see their studies in a more practical light.
- Dissemination: The work has resulted in seven publications and presentations, including:
 1. Talgar, C. P., Goodey, N. M. 2015. Views from Academia and Industry on Skills needed for the Modern Research Environment. *Biochemistry and Molecular Biology Education (BAMBED)*, 43, 5, 324–332.
 2. Goodey, N. M., Talgar, C. P. 2016. Guided Inquiry in a Biochemistry Laboratory Course Improves Experimental Design Ability. *Chemistry Education Research and Practice*. 17.4, 1127-1144.
 3. Goodey, N. M., Patel, G., Talgar, C. P. Development and Assessment of Guided Inquiry Experiences in a Biochemistry Laboratory Course. 2017. *Chemistry Education Research & Practice Gordon Research Conference*. Lewiston, M.E. Poster presentation.
 4. Goodey, N. M. Design and Assessment of Inquiry Laboratory Experiences in Biochemistry Laboratory Courses. November 2016. AAC&U Transforming Undergraduate STEM Education Conference. Boston, M.A. Poster presentation.
 5. Goodey, N. M. Participation of a Professional Advisory Panel in a Biochemistry Laboratory Course. *Envisioning the Future of Undergraduate STEM Education: Research and Practice Symposium*. April 27-29, 2016, Hyatt Regency on Capitol Hill, Washington D.C, D.C. Poster presentation.
 6. Goodey, N. M., Dorff, M., Krishnamurthy, M., Mogk, D., Mourad, T., and Smith, C. Challenges in STEM Workforce Development. *Preparing Students for the 21:st Century STEM Workforce. Envisioning the Future of Undergraduate STEM Education: Research and Practice Symposium*. April 27-29, 2016. Hyatt Regency on Capitol Hill. Co-presented an invited workshop.
 7. N.M. Talgar, C. P. Participation of a professional advisory panel in a biochemistry laboratory course. 2016. 251:st American Chemical Society (ACS) National Meeting and Exposition. San Diego, CA. March 2016. Invited talk.

EXAMPLE 2:

Results from Prior NSF Support

Robert W. Meredith, (a): NSF 1556701, \$136,451, 05/01/16 - 04/30/19. (b): Collaborative Research: Advancing Bayesian Phylogenetic Methods for Synthesizing Paleontological and Neontological Data. (c) *Intellectual Merit*: New phylogenetic inference methods allow for the simultaneous estimation of divergence times and phylogenetic relationships of both fossil and extant taxa. These approaches have the potential to make full use of the biological data (e.g. stratigraphy, sampling, biogeography). New statistical models (extensions of the stochastic birth-death processes) have been integrated: morphological/paleontological information, biogeography, and molecular data. Simulated and empirical data sets will be used to test the performance and adequacy of our new and previously described models. Lastly, Sphenisciformes (penguins) and Crocodyliformes macroevolutionary patterns (phylogenetic relationships, lineage diversification, and biogeography) will be investigated. *Broader Impacts*: Training of 1 PhD student, 2 master's students, 1-2 undergraduates, high school students, hosting applied workshops on phylogenetic inference and macroevolution (Workshop: Society of Systematic Biologists Standalone Meeting 2017 workshops: Jan. 7-8, 2017), museum exhibit development. (d) Two publications [1-2] and 3 talks (Evolution2016, B10K Workshop: The progress and future perspective of the B10K project) have so far resulted. A postdoc and multiple graduate students are currently being mentored through the grant (e) Newly developed models have been/will be integrated into the program RevBayes ([3], <https://revbayes.github.io/intro.html>) and empirical data is being deposited into existing databases and curation sites (e.g. NCBI, Dryad, Treebase).

Chunguang Du, (a) NSF: MRI 1625636, \$497,057, 9/15/16 – 8/31/19. (b): MRI: Acquisition of a High Performance Computing Environment for Advancement of Computational Science Research and Education (c) *Intellectual merit*: The university wide available high performance computing cluster (HPC) aims to support a wide range of current and emerging investigations and educational activities that include: 1. Development and testing of novel approaches for spectral image processing; 2. Realistic simulation of magnetic fluid flows to model magnetic drug targeting and other biomedical applications; 3. Functional genomics analysis of DNA sequence data; 4. Computational identification of ligands bind to proteins; 5. Simulation of chemical reaction pathways important in the chemistry of air pollution; 6. Development of simulated censorship systems as a test bed for censorship circumvention; 7. Automatic machine recognition of idiomatic and deceptive language; 8. Inference of subsurface ocean waves from seismic data; 9. Modeling and simulation shoreline evolution; and 10. Modeling, simulation and control of stochastic dynamics. The cluster has been purchased from the vendor and should be ready for usage by the end of January 2017. *Broader Impacts*: HPC equipment stimulates the coalescence of a cross-cutting, multidisciplinary, and integrated Computational Research Group, composed of researchers from various disciplines (including computer science, mathematical sciences, biological sciences,

chemistry, earth and environmental sciences, linguistics, and social sciences) as well as the creation of a computational science learning environment that includes undergraduate and graduate students. As a consequence, several graduate, undergraduate, and postdoctoral students will benefit through research and class projects. (d): As of now: “No publications were produced under this award.” (e) All publishable information generated from this project will be deposited into its proper data base or made accessible to the community at large.

Sandra Adams, (a): NSF: DUE-1339956, \$1,447,272, 9/1/13 – 8/31/18. (b) Montclair State University Noyce Teacher Scholarship Program. (c) *Intellectual merit*: Scholarships awarded to increase the number of science teachers committed to teach in high need schools. *Broader impacts*: Cohort 1: 8 (7 biology and 1 earth science); Cohort 2: 7 (2 physics and 5 biology). Cohort 3: 8 (3 biology, 2 chemistry, 2 chemistry, 1 physics).