

Integration of Laboratory and Social Science Skills as a Means for Engaging STEM Majors in Research on an Urban HBCU Campus

Yolanda Banks Anderson, Ph.D., *Sandra F. DeLauder, Ph.D., John J. Bang, M.D., Ph.D.

Jerray Battle, Aquin Yu, Kai Ngegba, Janaye Jones, Alicia Eley, Algernon Finley, III, and Lauren Lawrence

Department of Environmental, Earth and Geospatial Sciences and *College of Science and Technology, North Carolina Central University, Durham, NC

Abstract

In 2001, North Carolina Central University and The National Exposure Research Laboratory of the US Environmental Protection Agency entered into a cooperative agreement to assess environmental exposure and impact in low socioeconomic status communities of color. The project entitled, The Environmental Risk and Impact in Communities of Color and Economically Disadvantaged Communities of Color (ERICC) was supported with five cycles of funding that resulted in a six-year project and budget period, ending in August 2007. A primary goal of the cooperative agreement was development of the research capacity within the Environmental Science Program enabling the department to address environmental justice issues through integration of laboratory techniques common in this discipline with aspects of the Community Based Participatory Research Model (CBPR). The project allowed students to obtain experience in real world applications by participating in field sampling and the curriculum was modified to include modules developed through this project. Several student participants have completed undergraduate and graduate programs at NCCU and have matriculated into doctoral programs or careers utilizing skills obtained through the ERICC Project. Additional aspects of this project pertinent to the engagement of STEM faculty and students will be presented along with the implications for involvement in community based research.

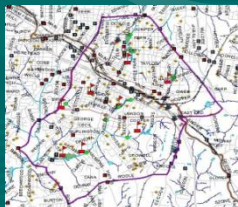
Primary Goals

- To assess environmental exposures in Environmental Justice (EJ) communities impacted by environmental hazards.
- To develop the research infrastructure of the NCCU Environmental Science Program for long term sustainability to better serve local communities.
- To develop community-level tools that can be adapted for use in other communities to better understand environmental exposures and their impacts in the context of EJ.

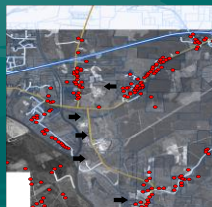
Objectives

- Develop faculty proficiency/expertise in exposure analysis studies.
- To engage students in environmental research from selected communities utilizing the community participatory research approach.

Project Study Area



Northeast Central Durham, NC. GIS Mapping with Various Attributes: UST, Gas Stations, Chemical Plants, Cement Plants, Roads/Highways, Railroad Tracks, Schools



Aerial view of Moncure Community
Red dots represent individual residences;
arrows represent commercial plants.

Outcomes

The laboratory infrastructure was greatly enhanced through purchase of equipment for use in sample collection and laboratory analysis and development of laboratory protocols and procedures for use in training students and in research projects.



Congressman David Price and former Chancellor James H. Ammons tour the environmental risk laboratory at North Carolina Central University that was established through federal funding. Pictured L to R, standing: Price, Mohamed Othman, Research Scientist, and Ammons. Seated: Samuel Singh, III, a sophomore environmental science student.

Outcomes

- Faculty Hired: 1
- Students Involved in Research: 8
- Students to Graduate School: 3
- Courses Developed: 5
- New Environmental Health Concentration
- Presentations and Publications

New Courses Developed

- ENSC 3600 Air Quality and Control
- ENSC 3700 Water Quality and Control
- ENSC 3900 Environmental Sampling and Analysis
- ENSC 4700 Independent Study
- ENSC 4800 Introduction to Research

Student Involvement in Research



Faculty Publications and Presentations

- Publications in Peer-Reviewed Journals: 4
Faculty Presentations
- American Public Health Association Annual Mtg.: 1
 - National Environmental Health Association: 1
 - International Society of Exposure Analysis: 1
 - Chemical Sciences Symposium, NC A&T SU: 1
 - 2006 USEPA Community Conference and Training: 2
 - ESRI Educational & International User Conf. 1
 - National Conf. on Environmental Science & Technology: 3
 - Soil Science of America International Meeting: 1

Student Presentations at Professional Conferences

- NC OPT-ED Alliance Day: 3
- Southeast Collegiate Environmental Science and Health Symposium: 4
- National Environmental Health Association: 1
- Annual Meeting of the Association of Environmental Health Academic Programs (AEHAP): 1



Pictured above - Jerray Battle, Top Right Algernon Finley, III, Right: Battle, Dr. John J. Bang, Dr. Yolanda Banks Anderson, Aquin Yu, Alicia Eley, Finley.



Pictured above: Lauren Lawrence, AEHAP Student Research Award Winner, Dale Stephenson, AEHAP Student Research Chair, Right: Lawrence.

Success Stories



Lauren Lawrence
- B.S., Environmental Science, NCCU, 2007
- LS AMP BD Cohort III, NCCU
- Enrolled in MS Degree program, Earth Science, NCCU
- Career Goal: Matriculation to PhD program



Candice Morrison
- B.S. Environmental Science, NCCU, 2005
- MS, Earth Sciences, 2008
- LS AMP BD Cohort III, NCCU
- Currently in PhD program at Arizona State University



Peter Muriuki
- BS, Environmental Science, NCCU, 2004
- LSAMP BD Cohort III, NCCU, 2004
- MS Degree, Earth Sciences, NCCU, 2007
- Career Goal: Geography, Earth Sciences