Mare Nostrum Caribbean: Workforce Development through STEM Education Research and Practice

I. STEM workforce development through higher education

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II. STEM workforce development at the K12 level

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Research and Practice

• to improve the quantitative and scientific skills in the USVI workforce to strengthen economic competitiveness in STEM fields

• improve STEM education in the Territory, at both the K12 and the University levels
The Leaky STEM Pipeline

Source: NCES Digest of Education Statistics; Science & Engineering Indicators 2008
The STEM Pipeline

• <40% of students who enter college as STEM majors complete a STEM degree
• Need 1 million more STEM graduates over the next decade
• Increasing retention by 50% would produce about 750,000 more STEM graduates
• Nationally the wider STEM enterprise includes <8% URM whereas minorities represent almost 30% of US population

President’s Council of Advisors on Science and Technology 2012
The STEM Pipeline in the USVI

- <50% of math and science teachers are highly qualified in territorial public schools
- ~50% of 11th grade students proficient or advanced in mathematics
- ~50% of students in public schools go on to college immediately
- SAT scores lower than the national average

2013-2014 No Child Left Behind Report Card
The STEM Pipeline at UVI

• ~70% of incoming freshmen are not college ready for mathematics
• 90 STEM graduates/year
• 14% of our Biology and Chemistry majors go on to PhD programs
• 89% of alumni complete PhD programs compared to about 50% nationally
Comprehensive Economic Development Strategy for the USVI 2012

- Education, energy, and STEM a priority area
- Need to develop a diverse, highly qualified scientific workforce
- Requires improving the quantitative and scientific skills as well as the educational levels of the territorial workforce
Virgin Islands Institute for STEM Education Research and Practice

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- Collaborative infrastructure for STEM education research
- Grant writing center for STEM education research
Increase the competitiveness of the USVI workforce in STEM-related jobs through improved teaching & better student preparation in STEM

• Implement an effective program of STEM Education research
  – Initial work from our NSF Noyce project
  – Research on distance learning
  – Hiring a new faculty member to focus on STEM Education research
  – Collaborative work between UVI and territorial public schools
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• Develop undergraduate certification paths for STEM teaching
  – STEM Education minor in CSM
  – Early exposure to STEM teaching at the K12 level
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• Evaluate the greatest need for post-graduate training
  – MMES & MMAT program review
  – Other pathways for post-graduate training
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• Research integration in the undergraduate curriculum
  – Including VI-EPSCoR related research on coral reef demography, disease, and diversity
  – Develop more engaging classrooms and laboratory experiences to increase retention of STEM majors
Increase the competitiveness of the USVI workforce in STEM-related jobs through improved teaching & better student preparation in STEM

• Mentoring training for all faculty, post-docs, and graduate students involved in *Mare Nostrum* projects
  – Annual workshop
  – Ongoing monitoring and assistance
Increase the competitiveness of the USVI workforce in STEM-related jobs through improved teaching & better student preparation in STEM

• Inquiry and project-based learning practices, infused with VI-EPSCoR research, aligned with NGSS and CCSSM, established as the model for STEM instruction in all ten middle and high schools in the Territory