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Nathan Moon
Georgia Institute of Technology

Paul Baker
Georgia Institute of Technology

Braeden Benson
Georgia Institute of Technology

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STEM ENHANCEMENT PROGRAMS: THE NATIONAL CONTEXT

Dr. Nathan W. Moon

Center for Advanced Communications Policy, Georgia Institute of Technology
Atlanta, Georgia

Dr. Paul M.A. Baker

Center for 21st Century Universities, Georgia Institute of Technology
Atlanta, Georgia

Ms. Braeden Benson

Center for Advanced Communications Policy, Georgia Institute of Technology
Atlanta, Georgia

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Background Discussion

- Concerns over U.S. leadership in STEM
  - 2003 PISA study: 28th in mathematics literacy
    24th in science literacy
  - NSF (2008): 20th worldwide in STEM degrees
- Relevant Reports and Studies
  - *Rising above the Gathering Storm* (National Academy of Sciences)
  - *Keeping America Competitive* (Educational Commission of the States)
- "Leaky Pipeline" Thesis

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Federal STEM Programs, Policymaking

- Key Programs
  - NSF Mathematics and Science Partnerships (NSF-MSP)
  - NSF Research Experiences for Undergraduates (REU)
  - ED Mathematics and Science Partnerships (ED-MSP)
  - ED Science and Mathematics to Retain Talent (SMART) Grants

- Recent Legislation
  - America COMPETES Act (2007 and 2010)
  - ED Recovery Act (2009 ARRA, including Race to the Top)

State-Level Interest in STEM

- National Governors Association (NGA)
  - 2007 *Innovation America*
  - 2010 *Innovate + Educate*
  - 2011 Common Core State Standards Initiative

- Private-Sector Efforts
  - Bill & Melinda Gates Foundation
  - Lumina Foundation
  - HP-MESA, Other Public-Private Partnerships

Catalogue of State-Level STEM Initiatives

- State Efforts to Improve STEM Education
  - Initiative Objectives and Rationales
  - Demographics (Funding, Partnerships, Institutional Participation)
  - Programmatic Components
  - Outcomes
- Potential Best Practices
- Implications for State of Georgia

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Initiative Focuses

	Best Practices	Regional STEM Centers	Clearinghouse
Arkansas		N/A	
California	X	X	X
Colorado		X	X
Florida			X
Georgia	X		
Hawaii			X
Idaho			X
Illinois	X		
Indiana	X		X
Iowa	X		
Louisiana	X		
Maine	X		X
Maryland	X		
Massachusetts	X	X	
Michigan	X		X
Missouri	X		
Nebraska	X		
New Hampshire	X		
New York	X		
Ohio	X	X	X
Pennsylvania	X	X	
Rhode Island	X		
Tennessee	X		
Texas	X	X	X
Utah	X		
Vermont	X		
Virginia	X		
Washington	X		X
West Virginia			X
Wisconsin	X		X

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Origins of P-16 STEM Initiatives

	Depts. of Education 16.7%	Governor's Office 26.6%	Department of Higher Education 16.6%	Board of Regents 13.5%	Non Profit 13.3%	Other
Arkansas		X				
California					X	
Colorado		X				
Florida					X	
Georgia				X		
Hawaii		X				
Idaho	X					
Illinois						
Indiana	X					
Iowa (New)		X				
Louisiana				X		
Maine						
Maryland			X			
Massachusetts			X			
Michigan					X	
Missouri			X			Chamber of Commerce and Industry
Nebraska	X	X				
New Hampshire						
New York						
Ohio				X		Ohio Business Round Table
Pennsylvania	X	X				
Rhode Island		X				
Tennessee	X		X	X		
Texas						Texas Education Agency
Utah						
Vermont						
Virginia		X				
Washington					X	
West Virginia			X			
Wisconsin						

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Key Demographic Findings

- Funding Range between $500,000 to $10 Million, with Average Annual Budgets of $2-3 Million
- Collaborations Common:
  - Public-sector funding: U.S. Department of Education, National Science Foundation, NASA, State Depts. of Education, Labor, and Commerce
  - Non-profit funding: Corporation for National and Community Service, Bill & Melinda Gates Foundation, Lumina Foundation, Michael and Susan Dell Foundation
  - Private-sector funding: Texas Instruments, Boeing, National Instruments, JP Morgan Chase, AT&T

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Key Programmatic Components

State	Summer Bridge	Learning Communities	Peer Instruction/Tutoring	Mentoring	Undergraduate Research	Instructional Technology	Scholarships	Educator Prep
Arkansas				N/A				
California								X
Colorado			X					X
Florida				N/A				
Georgia	X	X	X	X	X	X	X	X
Hawaii	X	X	X		X		X	
Idaho				X	X	X	X	
Illinois					X		X	X
Indiana								X
Iowa	X							
Louisiana	X		X	X	X		X	
Maine					X			
Maryland	X	X	X	X	X		X	X
Massachusetts		X	X	X		X	X	X
Michigan					X			X
Missouri						X		X
Nebraska				N/A				
New Hampshire				N/A				
New York			X	X	X	X	X	
Ohio	X	X	X	X	X		X	X
Pennsylvania				N/A				
Rhode Island							X	X
Tennessee	X		X		X	X	X	X
Texas		X				X		X
Utah								X
Vermont				N/A				
Virginia				N/A				
Washington	X							X
West Virginia					X		X	
Wisconsin					X		X	X

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Notable STEM Programs, Pt. 1

- Summer Bridge Programs
  - Academic Investment in Math and Science (AIMS) (Bowling Green State University)
  - MemphiSTEP (University of Memphis)
  - Meyerhoff Scholars Program (University of Maryland at Baltimore County
  - Initial Phase of Programmatic Efforts to Decrease Attrition
  - Learning Communities and Mentoring Programs

Notable STEM Programs, Pt. 2

- Active Learning and Learning Communities
  - Increasing Diversity in Engineering Academics (IDEA) – University of Akron
  - Computer Science, Engineering, and Mathematics Scholarship (CEMS) – Wright State University

  - Many Programs with Emphasis on Minority groups and Other Historically Underrepresented Populations in STEM
  - Peer-learning and Upperclassman Mentoring Common

Initiatives of Note for Georgia

- Ohio (Ohio STEM Learning Network) and Texas (T-STEM) viewed as most comparable
- Initiatives in California, Maryland, Massachusetts, and Pennsylvania also notable
- Comparability Factors:
  - Link between Education and Workforce Needs and Goals
  - Postsecondary Emphasis with Multiple Institutions, with System-level Guidance and University Implementation
  - Extensive Array of Programs at Each

Challenges and Future Directions

- Distinct Lack of Outcomes or Evaluation Findings
- Due to Web Survey Method: Timeliness of Findings Unclear
- Potential Lack of Transparency about Funding, Actual Operations

- Subsequent Research to Involve Telephone Interviews
- Potential of “STEM Index”

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Conclusion

For more information, please see:

“A Review of State-Level Programs to Enhance Postsecondary STEM Education in the United States”

http://c21u.gatech.edu/resources

Questions?

nathan.moon@cacp.gatech.edu

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