ACCT Leadership Congress
October 23, 2014
The Power of Undergraduate Research at the Community College

James Smith, Chair of the Gaston College (GC) Board of Trustees
Dr. Patricia Skinner, GC President
Dr. Don Ammons, GC Vice President of Academic Affairs
Heather Woodson, GC Dean of Arts and Sciences
Session Objectives

- Define **the role of trustees and executive leadership** in cultivating an atmosphere of innovation

- Define **undergraduate research**

- **Share the benefits** of undergraduate research

- **Share successes and lessons learned** at Gaston College

- Share **resources**
Our Story

- Comprehensive, open-door community college
- Part of the 58 institution North Carolina Community College System
- Located in Gaston and Lincoln counties in West-Central North Carolina
- Celebrating 50 years in 2014
- The college serves approximately 23,000 students each year through its degree, diploma, certificate, and continuing education programs
Our Vision and Mission

**Vision:** Gaston College will be viewed as the premier post-secondary educational resource in the region, consistently recognized as an exceptional community college and known in the state and nation for successful and innovative programs.

**Mission:** Gaston College is an open-door public community college, located in Gaston and Lincoln counties, that promotes student success and lifelong learning through high caliber, affordable, and comprehensive educational programs and services responding to economic and workforce development needs.
Role of the Board

- Establish policy
- Support excellence in programming
- Review relevant data and support data-driven decision making
- Support culture of innovation
- Support student success
- Relevant professional development
Role of the President

- Take advantage of one-time opportunities
- Reallocation of resources
- Pursue external resources
- Be involved in changes at state, regional, and national levels
- Keep the board up-to-date on changes
- Stay positive, lead by example

Photo Credit: Josh Steinke
Our Culture: Data, Completion, Innovation

- Title III
- TRiO
- Completion by Design
- Achieving the Dream
- NC Student Success Learning Institute
- High Impact Practices Institute
- Reverse Transfer Initiative
Our Culture: Data, Completion, Innovation

- Dedicated Persistence and Retention staff
- Enhanced advising services
- Strengthening Academic Internet Learning (SAIL)
- Learning Center, Writing Center, Smarthinking
- Learn 4 Life
- Student Academic Emergency Program
Role of the Chief Academic Officer

- Vision and forecasting
- Establish an educational philosophy
- Hire the right people for the job and the organization
- Fan the sparks (SPARC³)

Photo Credit: Josh Steinke
Our Educational Philosophy

Educational Philosophy: Gaston College students, faculty, and staff share a committed responsibility to nurture a mentoring, collaborative, and diverse culture of skilled lifelong learners who are empowered to succeed in a constantly changing world. Self-growth and empowerment are realized through many innovative processes, including an effective balance of assessment and evaluation. Empowered people set and achieve high standards of quality, create challenges for themselves and others, and support an active learner-centered environment offering real-life educational experiences.
Invest in Your Faculty and Students

$24,000 ➔ $700,000+
Defining Undergraduate Research

Council for Undergraduate Research Definition –

“Undergraduate Research is an inquiry or investigation conducted by an undergraduate in collaboration with a faculty mentor that makes an original intellectual or creative contribution to the discipline.”

Source: http://www.cur.org/factsheet.html
Responding to the National Call for Change

“Like research in the life sciences, undergraduate education must be **transformed** to prepare students effectively for the biology that lies ahead.”

“(One) Action Item from **Vision and Change**: -ensure that undergraduate biology courses are **active**, outcome-oriented, **inquiry-driven**, and relevant.”
Why Did We Make a Decision to Pursue Undergraduate Research?

Community College Survey of Student Engagement (CCSSE) Data:
- 68% of students plan to complete degree
- 42% of students plan to transfer

Fall-to-Fall Retention Rates –
- Non-STEM – 67%
- STEM – 51%

Success rates in Individual STEM Courses – 71-83%
- STEM Graduation Rate – 21%
Why Did We Make a Decision to Pursue Undergraduate Research?

- AAS Programs typically have practical application of skills
- Contextual learning
- Work-based learning experiences and externships
- "Practice as a professional"
- College transfer students at community colleges do not normally engage in this type of creative activity
SPARC³

Igniting student curiosity and preparing future STEM professionals for success in an evolving work environment.

- Professional Development
- Community Outreach
- Student Scholarships
- Inquiry Based Learning Curriculum
- Mentoring
- Undergraduate Research Experiences
- Learning Communities
- Centralized Student Support
Small World Initiative
(Microbiology)
Crowdsourcing Antibiotic Discovery

The Small World Initiative, created by the Center for Scientific Teaching at Yale and funded by the Leona M. and Harry B. Helmsley Charitable Trust, is a lab course with a unique approach. It allows students to crowd-source for the discovery of new antibiotics. The project exposes undergraduates to authentic research.
Metagenomics of Bacteria from Local Soil (Genetics)
Student Driven Independent Research
(Research and Methods)
Success Rates in Core STEM Courses

![Bar chart showing success rates in General Biology, General Chemistry, and Statistical Analysis from 2008 to 2013.](chart.png)
Importance of Collaborations

Regional
- Fellow NCCCS colleges (Wake Tech, Durham Tech, Craven Community College)
- Gaston County Wastewater Treatment Services

National
- Council for Undergraduate Research
- Community College Undergraduate Research Initiative Partnership for Undergraduate Life Science Education
- National Science Foundation
- Yale University
- Univ. of California – Santa Barbara

www.gaston.edu
NSF#1118679
Partnership for Undergraduate Life Science Education (PULSE) Certification

- Purpose of PULSE to transform undergraduate education in life sciences
- National project initiated by the National Science Foundation, National Institute of General Medical Sciences, and Howard Hughes Medical Institute.
- Gaston College was one of eight institutions chosen, out of 70 that were considered, to participate in the pilot program for PULSE certification.
National Science Foundation S-STEM Grant

Awarded in July 2014 for $611,000
Funds for:
- Scholarships (up to $5600 yr. per student)
- Mentoring
- Field Trips
- Workshops
- Conferences
Resources

• www.pogil.org
  - POGIL uses guided inquiry – a learning cycle of exploration, concept invention and application is the basis for many of the carefully designed materials that students use to guide them to construct new knowledge.

• www.ccuri.org
  - CCURI uses an inquiry-based teaching model where students are exposed to real world science through a case study in an introductory course followed by a hands-on research experience resulting from questions about or related to the case.

• www.cur.org
  - The Council on Undergraduate Research (CUR) and its affiliated colleges, universities, and individuals share a focus on providing undergraduate research opportunities for faculty and students at all institutions serving undergraduate students.

• http://sciencecases.lib.buffalo.edu/cs/
  - The mission of the National Center for Case Study Teaching in Science (NCCSTS) is to promote the nationwide application of active learning techniques to the teaching of science, with a particular emphasis on case studies and problem-based learning.
Take Home Messages

• Visionary leadership is critical to creating a culture of innovation and creativity
• The Board of Trustees must support the president in hiring the very best people
• Reallocation of resources in an intentional way, especially when resources are in decline, may be required to support important initiatives
• Our vision has moved us forward into new areas that have not typically been utilized by community colleges to promote student success