

# The Georgia Tech Student and Teacher Enhancement Partnership (STEP) Program

**Donna Llewellyn**, Center for the Enhancement of Teaching and Learning (CETL)

**Marion Usselman**, Center for Education Integrating Science, Mathematics and Computing (CEISMC)

Sponsored by the National Science Foundation through the  
GK-12 program

# Primary Goals

- **To broaden the education of science, technology, engineering, and mathematics (STEM) graduate students to include intensive experiences in educational pedagogy and process;**
- **To encourage the participation of STEM faculty and students in the difficult issues facing K-12 educators through the nurturing of university-school partnerships;**
- **To assist K-12 teachers in their endeavor to improve classroom instruction;**
- **To help schools improve K-12 student achievement in STEM.**

# Important Program Components

- **10-week Summer Training Program for Fellows**
- **School year spent paired with Metro-Atlanta area high school.**
- **Time Commitment--10 hours per week in school, 5 hours per week preparation.**
- **Compensation--\$26.5 K for students who are post Ph.D. qualifying exams, \$21.5K for students who are pre-qualifying exams, plus tuition.**

# STEP Fellows - Cedar Grove High School, DeKalb County



**Pamela Reid**--Ph.D. student in  
Chemical Engineering.



**Sundiata Jangha**--Ph.D student in  
Mechanical Engineering

# STEP Fellows at Dunwoody High School, DeKalb County



**Frank Pyrtle**--Ph.D. student in  
Mechanical Engineering



**Kendra Taylor**—Ph.D. student in  
Industrial and Systems Engineering

# STEP Fellows at Westlake High School, Fulton County



**David Woessner**--Masters student  
in Mechanical Engineering and  
Management



**Scott Cowan**—Ph.D student in  
Mechanical Engineering

# STEP Fellows at Tri-Cities High School, Fulton County



**Christal Gordon**--Ph.D. student in  
Electrical and Computer Engineering



**Rick Peltier**--Ph.D. student in Earth  
and Atmospheric Science

# STEP Fellows at Marietta High School, Cobb County



**Adam Austin**--Ph.D. student in Electrical  
and Computer Engineering



**Demetris Geddis**--Ph.D. student in  
Electrical and Computer Engineering



# STEP Fellows at Rockdale Magnet School for Science and Technology, Rockdale County



**Yolanda Alexander**--Ph.D. student in  
Industrial Engineering



**Kacy Cullen**--Ph.D. student in  
Bioengineering

# STEP Philosophy of Partnerships

- **Partnerships must be based on common goals.**
- **All partners must experience benefits from the partnership.**
- **School-University partnerships that flourish are based on genuine mutual respect by all parties.**
- **Team-building and proactive communication are crucial to a successful partnership.**

# **K-12 Benefits from STEP Program**

- **Fellows serve as content experts for both high school students and teachers, and challenge students to improve critical thinking skills**
- **Fellows can help increase level of academic bar**
- **Fellows serve as mentors who can relate to students**
- **Program provides some funding to initiate new activities at the high schools**
- **Schools can take advantage of Georgia Tech resources**
- **Fellows provide fresh energy and enthusiasm to schools**

# University Benefits from STEP Program

## Valuable Graduate Student Experience

- **Increases leadership and communication skills**
- **Improves teaching skills**
- **Increases confidence working with students**
- **Helps broaden or sharpen perspective on career paths**
- **Provides avenue for graduate students to “give back” to community**

# Mutual Benefits from STEP Program

## Strengthens K-12/University Connections

- **Positively influences the pipeline of students entering the university.**
- **Increases SMET career expectations of minority students.**
- **Facilitates developing mutually rewarding professional opportunities for both K-12 and university faculty.**

# Margaret Tarver

- Tri-Cities High School
  - DeKalb County
- Science Teacher and
- Department Chair



# Christal Gordon



- Tri-Cities High School
  - DeKalb County
- 4<sup>th</sup> year Ph.D. student in Electrical and Computer Engineering
- Current Career Goal:

Work in industry for a few years, and then teach engineering as an industry professor.

# Benefits of Graduate Students & Teacher Interactions



**GA Tech**

+



**Tri-Cities High School**



# Teacher Benefits



- Current Research
- New Challenges for Students and Teachers
- Developing New Strategies
- Establishing New Links

# Graduate Students Benefits



- Back to Basics
- Hands-On Engineering Skills
- Appreciating the Big Picture

# Different Models of Tutoring and Mentoring

- A stand-alone academic tutoring program
- Mentoring within NSBE
- Mentoring at-risk students for high school success
- Mentoring in classrooms

# Kwaku Eason



- Will be a STEP fellow  
next year at Marietta High School
- 2<sup>nd</sup> year Ph.D. student in Mechanical Engineering
- Current Career Goal:  
Teach on the college level and then later  
at a lower level.

# BGSA – South Atlanta Tutoring Program

A tutoring program established in January 2001 partnering with SAH to provide after-school tutoring in Physics, Chemistry, and Math.

## K-12 Gains

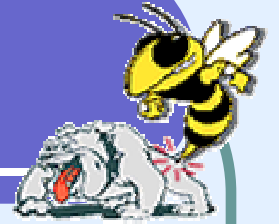
- Connect to collegiate resources.
- Integrate Engineering Methodology - Problem Definition, Hypothesis, Prediction, Test/Experiment, Revision/Adjustment/Development, Implementation of final solution.
- Provide extra teaching resources – needed since number of students is increasing faster than number of teachers.
- Assist K-12 in implementing tests/experiments for improving educational systems.
- Link the numbers to the classroom.

## Graduate Gains

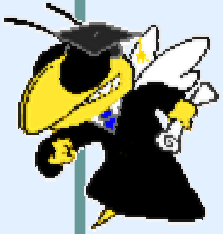
- Practice communication skills.
- Develop patience (a true virtue!).
- Gain Personal/Institutional exposure.
- Have a refreshing experience of revisiting high school lessons from a new plane. Better bind your own knowledge of the world and make links.
- More and more programs support this kind of activity (Student Teacher Enhancement Program). Personally benefited in this way.



# NSBE Jr.



- National Society of **Black Engineers**
- College Admissions
- Competitions
- Professional Development
- Links to the Community



# Kendra Taylor



- Dunwoody High School
  - DeKalb County

- 4<sup>th</sup> year Ph.D. student in Industrial and Systems Engineering

- Current Career Goal:

Work as a strategic consultant, then be an entrepreneur, and then be a professor.

# Young Ladies Initiative

- Goal: Guide young ladies toward success
  - 17 young ladies
  - 5 professional women
  - 9<sup>th</sup>-12<sup>th</sup> grades
  - 8 weekly sessions covering goal setting on social, academic and personal levels important to young ladies



# Pamela Reid



- Cedar Grove High School
  - DeKalb County

- 3<sup>rd</sup> year Ph.D. Student in Chemical Engineering

- Current Career Goal:

Work in industry while doing outreach and then maybe teach high school much later.

# Mentoring in the Classroom

- Opportunities to share college experiences with classes
- Affords an opportunity to evaluate classroom performance
- Work one-on-one with several students with regards to academic and social challenges

# Yolanda Alexander



- Rockdale Magnet H.S.
  - Rockdale County
- 1<sup>st</sup> year M.S. student in Industrial and Systems Engineering
- Current Career Goal:  
Work in business first then maybe teach one day

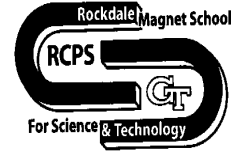
# Kacy Cullen



- Rockdale Magnet H.S.
  - Rockdale County
- 2<sup>nd</sup> year Ph.D. student in Biomedical Engineering
- Current Career Goal:  
Faculty member.



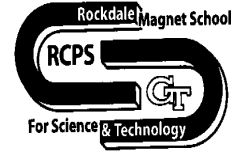
# Georgia Tech – Rockdale Magnet School Partnership



- Rockdale Magnet School for Science and Technology (RMSST)
  - initiated in January 2000
  - first classes began in Fall of 2000
- Georgia Tech Program Goals
  - increase quality of high school graduates
  - increase number of students seeking college-level education



# Georgia Tech – Rockdale Magnet School Partnership

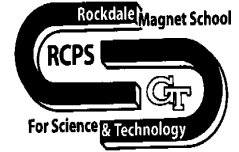


## Georgia Tech College of Engineering Contributions

- Funding
- Equipment
- Curriculum guidance
- Research mentors
- Science and technology-related activities
- Access to Georgia Tech
  - Libraries
  - Laboratories
  - Research tools
  - On-line interactive learning tools
  - Database information



# Georgia Tech – Rockdale Magnet School Partnership



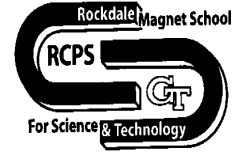
## Benefits to High School Students

- Classroom Skills
  - Exposure to advanced (collegiate) curriculum
  - Learn time management skills
  - Develop positive study habits
- Research
  - Independence in acquiring information
  - Availability of research expertise
  - Exposure to advanced technology

*RMSST students working with STEP Fellows are more comfortable in independent, research-based learning than magnet students who did not work with STEP Fellows.*



# Georgia Tech – Rockdale Magnet School Partnership



## Benefits to High School Students

- Educational Options
  - Interaction with persons of varying educational levels
  - Exposure to graduate environment through field trips, class visits, and mentoring

*Long-term educational aspirations less likely to decrease for RMSST students versus advanced, non-magnet students at RCHS.*

- Career Development
  - Interaction with instructors who have chosen careers in science, mathematics, or engineering

*Career goals are more likely to change from “non-science” or “non-engineering” to “science” or “engineering” for RMSST students.*



# Contact Information

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