Connecting GT Industrial Engineering with Atlanta HBCU Math and Comp Sci to Increase Grad School Opportunities for Minority Students

Dr. Natasha Boland and Dr. Ira Wheaton Jr.
H. Milton Stewart School of Industrial & Systems Engineering
Georgia Institute of Technology

Demographics of Atlanta, GA

- Estimated 52.4% Black or African American in 2017, according to U.S. Census Bureau
- Estimated 26% of African Americans in Atlanta are college graduates

Atlanta University Center (AUC)
Consists of Clark Atlanta University, Morehouse College, Morehouse School of Medicine, and Spelman College

AUC Statistics
- Approximately 1,700 graduates per year
- Over 200 enrolled in Dual-Degree Engineering per year

Student Feedback
- “I thoroughly enjoyed this course because of the applications with cases of the problems.”
- “The material is very useful for future students.”
- “It is a great way to see what it is like to take OR and IE courses as an undergrad.”
- “This material is very useful for future students.”

What is Operations Research/Industrial Engineering?

- OR/IE is very difficult to define!
- It uses mathematical, statistical and computational models, theory and algorithms to solve problems in all areas of human endeavor
- It has major impacts in: Supply chain and logistics, Transportation, Energy, Medicine and healthcare
- Manufacturing and automation

Kidney Exchange Program
OR/IE models help determine kidney exchanges to maximize the number of patients who benefit and ensure the best possible donor matches

E-commerce Fulfillment
OR/IE models help companies like Amazon and UPS deliver products ordered online to the customer fast and at minimal cost

What is Operations Research/Industrial Engineering?

- OR/IE overlaps with heavily with important areas of data science
- It uses methodologies such as: Forecasting, Regression, Classification, Simulation, Queueing theory, Optimization

OR/IE at Georgia Tech: Highlights and a Problem

- H. Milton Stewart School of Industrial & Systems Engineering
  - Largest school of its kind in the world
  - Around 60 faculty
  - Award per year about: 340 Bachelor of IE degrees, 170 Masters degrees, 30 Ph.Ds.
  - Strengths in Supply Chain & Logistics, Machine Learning, Healthcare, Energy

Co-teaching OR/IE Course at Morehouse College

Background
- Introduced in Morehouse Math, Spring 2017 by Dr. Wheaton
- Co-taught in Spring 2018
- Students learned basic concepts in Linear Programming

Our Lessons Learned
- Advertise to more 3rd-year students
- Run the course a semester or two earlier in their program
- Encourage follow-up course at GT ISyE

OR/IE is #1

- #1 Undergraduate Program
  - 24th consecutive No. 1 ranking from USNews’ America’s Best Colleges
- #1 Graduate Program
  - 28th consecutive No. 1 ranking in industrial/manufacturing/systems (USNews’ Best Grad Programs)

Diversity: Black and African Americans

- About 4-5% of Bachelors degrees awarded
  - 0 or 1 PhD graduates per year
  - 0 to 0.5 faculty

Strategies to Expand the Pipeline to Grad School

Atlanta Math & CS HBCUs

- Co-teaching OR/IE courses at HBCU Math & Comp Sci
- Information events:
  - GT FOCUS Program: preparing for grad school
  - OR/IE and ISyE dual degree and grad programs
- Build faculty-faculty relationships
- Encourage two-way cross registration via the ARCHIE program

Information Events – Morehouse College 10/29/18

- Invited Math, CS, and Dual-Degree Engineering students of all classifications
- Five ISyE faculty members presented
- Ten students attended and showed strong interest
- Next Event: Spelman College Nov. 14

Next Steps

- Keep in touch
- Continue genuine outreach
- Improve information sessions
- ISyE Focus Program session
- Frequent faculty communication/interaction

ISyE Grad Programs

- Master of Science in Analytics
- Master of Science in Computational Science Engineering
- Master of Science in Health Systems Engineering
- Master of Science in Industrial Engineering
- Master of Science in Operations Research
- Master of Science in Quantum and Computation
- Master of Science in Statistics
- Master of Science in Supply Chain Engineering
- Ph.D. in Industrial Engineering
- Ph.D. in Algorithms, Combinatorics & Optimization
- Ph.D. in Bioinformatics
- Ph.D. in Computational Science Engineering
- Ph.D. in Machine Learning
- Ph.D. in Operations Research

Inspiration is doing research for Georgia Tech in the future

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April 26, 2018 – Students in MTH 885T: Topics: Operations Research course, along with Dr. Boland and Dr. Wheaton. Seven of the eight students have graduated. The remaining student is considering ISyE graduate program.