



# Achieving Proficiency in Engineering Research and STEM Education Through NASA Initiatives

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# INTRODUCTION

## Abstract

**This project will initiate strong partnership and collaboration between New York City College of Technology (CITY TECH) and Hostos Community College (HCC). CITYTECH is one of the largest minority serving institutions located in the heart of New York City, the most diverse cities in the world. The students population is over 15,000 students (Fall 2009) with more than 60% African American and Hispanics (Fall 2009).**

# CONT.

**HCC has more than 6500 students of which 69% are females and 76% are African American and Hispanics. The enrollment at CITYTECH from 2006 to 2009 has increased 14% and is still rising, while it has increased 24% at HCC for the same period.**

# OBJECTIVES

- (1) Strengthening students research skills (computational and analytical) by exposing them to different research areas in STEM that are relevant to NASA and related industry,**
- (2) Helping students to get NASA research experience thru training and internships,**
- (3) increase the transfer rate of minority students to 4-yrs colleges and graduate schools as well as increasing the number of minority students in STEM.**

# ACHIEVING THE GOALS

- (i) Collaboration with NASA centers so that students can get research opportunities (Marshall and Goddard),**
- (ii) Introducing two new multidisciplinary courses in both campuses where students can learn and share research experiences and communicate thru an advanced communication system. The courses will be Project Management, and Environmental Remote Sensing, that will help students gain research experience and interact with different scientists and researchers from different disciplines with a focus on NASA related disciplines**

# CONT.

- (iii) Adding research components to existing courses including Eng. Siml. and Prsnt. (IND2420 ), Materials Testing Lab (MECH2426), Comp. Appl. in Mech. Eng. (MECH1240) , Differential Equations (MAT360), and Linear Algebra (MAT320).**

## Cont.

**(iv) Linking the project with existing industries and organizations whose mission is closely related to STEM research and education and NASA missions, including NASA's New York City Research Initiative (NYCRI), Alliance for Minority Participation (AMP) in CUNY, Proeyecto Access in HCC, NOAA CREST at CCNY which will result in more opportunities for the project to grow,**

## Cont.

- (v) Designing a webpage within CITYTECH website to show the activities and programs of the CIPAIR project, the website will reflect also students research projects and accomplishments**
- (iv) motivate collaboration between students and faculty from HCC and CITYTECH through classes, research projects, and training.**



# Partnership with NASA

Partnership with

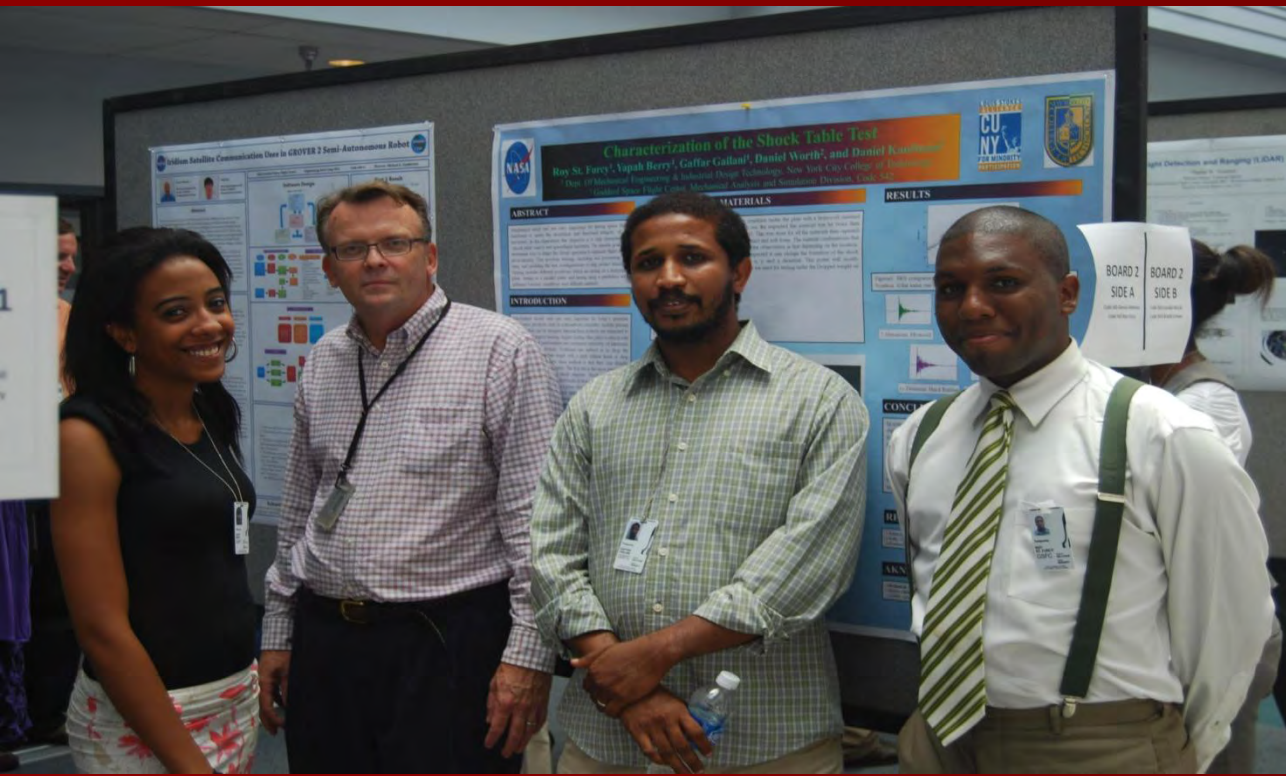
1- Goddard Space Flight Center in MD

2- Marshall Flight Center, AL

3- New York City Research Initiative sponsored by Goddard Institute for Space Studies.

Two professors and 10 students participated in summer research experience, 2 months, in the three centers above.

# Students & Professors at NASA



Professor Gailani with Roy and Yajah (NYCCT students) and Daniel Worth (NASA Goddard scientist) in a poster presentation in NASA, summer 2011

# Research Summit

## 7/28/2011

An opportunity for students to meet, share, and present their summer research experience at the end of the summer. By collaboration with other programs the event attracted over 150 students from the City University of New York. The event hosted a keynote speaker from NASA and director of NASA education office.



# 2011 Summer Intern Research Summit

New York City College of Technology Amphitheater  
300 Jay Street, Brooklyn, NY 11201

**Thursday, 7/28/2011**



## Program Agenda

**9:00 – 9:45 AM**

Poster set up and preparation

**9:45 – 11:20 AM (Amphitheater)**

Opening remarks, President of City Tech Russell K. Hotzler, Provost Bonne August, Dr. Frank Scalzo (NASA NYCRI), Dr. Gaffar Gailani (NASA CIPAIR), Dr. Reza Khanbilvardi (NOAA-CREST) Dr. Reginald Blake (NSF-REU), Dr. Leon Johnson (CUNY/GSFC HEC), and Dr. Neville Parker (NSF-LSAMP)

Comments from Dr. Ming-Ying Wei, NASA HQ Manager of Earth Science Education Programs

Keynote Speaker Dr. Charles Camarda, NASA Management Astronaut

**11:25 – 12:25 PM (Amphitheater)**

Oral Presentations

**12:25 – 1:30 PM (Cafeteria, 1<sup>st</sup> and Ground Floors)**

Lunch



July/2011





# Collaboration

Collaboration with programs that share close mission to NASA CIPAIR is important



# Pre-internship Workshop

To prepare students psychologically before starting the internship. All participating students were already accepted in an internship

Topics in this workshop included but not limited to:

- 1- *writing research papers*
- 2- *how to communicate with mentors*
- 3- *how to make the internship a career success*
- 4- *after the internship*






# The Internship Seminar

Is held once every semester

The purpose is to guide students to internet applications and how and where to look for internship.

NASA CIPAIR collaborates with many programs to held this seminar



 **ENERGY.GOV**  
National Laboratories and  
Technology Centers

 National Science Foundation  
WHERE KNOWLEDGE BEGINS



# **Dynamics Woman leadership in Forum in HCC**



## **Dynamic Women in Leadership Forum**

**In Celebration of Women's History Month**

**Distinguished Guest Speaker:  
Monserrate C. Román, Chief Microbiologist  
NASA/Marshall Space Flight Center**

**Thursday, March 24, 2011  
3:30-6:00pm  
Savoy Multipurpose Room**

**Panelists will include  
Dynamic Women with Careers in  
Business, Health, Education,  
Government, and Politics.**

**Class  
participation  
encouraged.**



**Refreshments  
will be served.**



# DISSIMINATION OF THE PROJECT

A website that enables students to apply to NASA internships is important. Also it helps students to communicate with NASA CIPAIR Co-PIs.



The screenshot shows a Mozilla Firefox browser window displaying the NASA CIPAIR website. The browser's address bar shows the URL `cpairnasa.com/index.php?id=`. The website's header includes the date "Friday 28th of October 2011" and the CIPAIR logo with the text "Curriculum Improvements Partnership Award for the Integration of Research". Logos for NASA, New York City College of Technology, and Hostos Community College are also present. A navigation menu lists: Home, About Us, Activities, Summer Internship, Upcoming Events, News/Updates, Showcase, Photo Album, and Contact Us. The main content area features a large image of an astronaut in space with the text "Achieving Proficiency in Engineering Research and STEM Education Through NASA Initiatives". Below this, there are sections for "Recent Updates" (including "New CIPAIR program opens now" and "New website launching soon") and "NASA CIPAIR - An Introduction". A table lists "The Three Main Goals of CIPAIR NASA": "Develop the analytical and research skills of undergraduate students.", "Attract more under-represented minority students to STEM fields and increase the rate of transfer to 4-year colleges and graduate schools.", and "Expand research opportunities for faculty and students at NASA, providing them a better understanding of NASA." The footer contains "About CIPAIR", "Links/Resources" (with a link to the "Official NASA Website"), and "Navigation" (with a link to "Home"). The Windows taskbar at the bottom shows several open applications, including "start", "CIPAIR WORK 2010", "NASA CIPAIR PRESE...", "Adobe Acrobat Profe...", "NASA CIPAIR - An In...", and "Library". The system clock shows "10:50 AM".



# In the News

Press Releases

Printable Version

## HOSTOS COMMUNITY COLLEGE STUDENTS HEADED TO NASA

**Monday, June 6, 2011 (New York)** –Three accomplished students from Eugenio María de Hostos Community College will participate in a ten-week summer program at NASA's Goddard Space Flight Center in New York City and Greenbelt, Maryland, and the Marshall Space Flight Center in Huntsville, Alabama. The selection of Nicolas De Jesús, Aridia Pelanco, and Adrián Posada came about as a result of the *Achieving Proficiency in Engineering Research and STEM Education NASA Initiative*, a three-year collaborative project between the New York City College

**NEW YORK CITY COLLEGE OF TECHNOLOGY**  
*the senior-level college of technology of The City University of New York*

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**Nucleus**  
 A Faculty Commons Quarterly  
 Volume 2 - Issue 2  
 December 2010  
 Faculty Commons  
 CITY TECH IS CUNY

## City Tech Receives NASA Grant: The Sky Is Not the Limit

By Patty Berry-Gorbizhar



will give HCC students an opportunity to attend City Tech engineering technology programs as well by this alignment of curriculum.

The grant also includes a well-designed research component that will support ten summer internships per year. Partnerships will be built with NASA centers including Goddard Space Flight Center, Marshall Space Flight Center and National Biomedical Space Research Institute at Morehouse School of Medicine. "Students are excited" states Dr. Gallani, "but don't know exactly what NASA is doing these opportunities are a big move in the right direction for students to be the future workforce of NASA and NASA-related industries."

A local partnership is also planned with the New York City Research Initiative (NYCRI). Sponsored by the NASA Education Office, NYCRI has a summer research institute where teams of high school students, undergraduate students and faculty work with graduate students to provide leadership to NASA-funded

The National Aeronautics and Space Administration (NASA) Office of Education Integration Division of Minority University Research and development of analytical and research skills of undergraduate students, attract minority students to STEM fields, increase student transfer rates into

Archive  
 Picture This  
 City Tech Experts  
 Home

### News & Events

#### City Tech Wins Its First Grant to Build Partnership with NASA to Prepare Students for Aerospace Careers

City Tech was recently awarded its first funding from the National Aeronautics and Space Administration (NASA). The three-year, \$442,000 grant is earmarked for the College's project, "Achieving Proficiency in Engineering Research and STEM Education Through NASA Initiatives."

As a result, City Tech students majoring in science, technology, engineering and mathematics (STEM) fields are working as full-time interns for eight to ten weeks this summer on research projects with NASA and Goddard Institute for Space Studies (GISS)

City Tech students Roy St. Furoy (far left) and Yapha Berry flank Professor Galfar Gallani.

# Brooklyn Daily Eagle

# Project Evaluation

An external evaluator, Quill Associates Inc., is hired to evaluate the project.

## Quantitative

Demographic data, numbers of student participants, limited outcomes data

Sources: Numerical data collected by PI and Co-PIs; numerical data from student surveys

## Qualitative

Pre and post-surveys of students

Interviews with PI, Co-PIs, partners, others

Project documents (course materials, meeting notes, website)

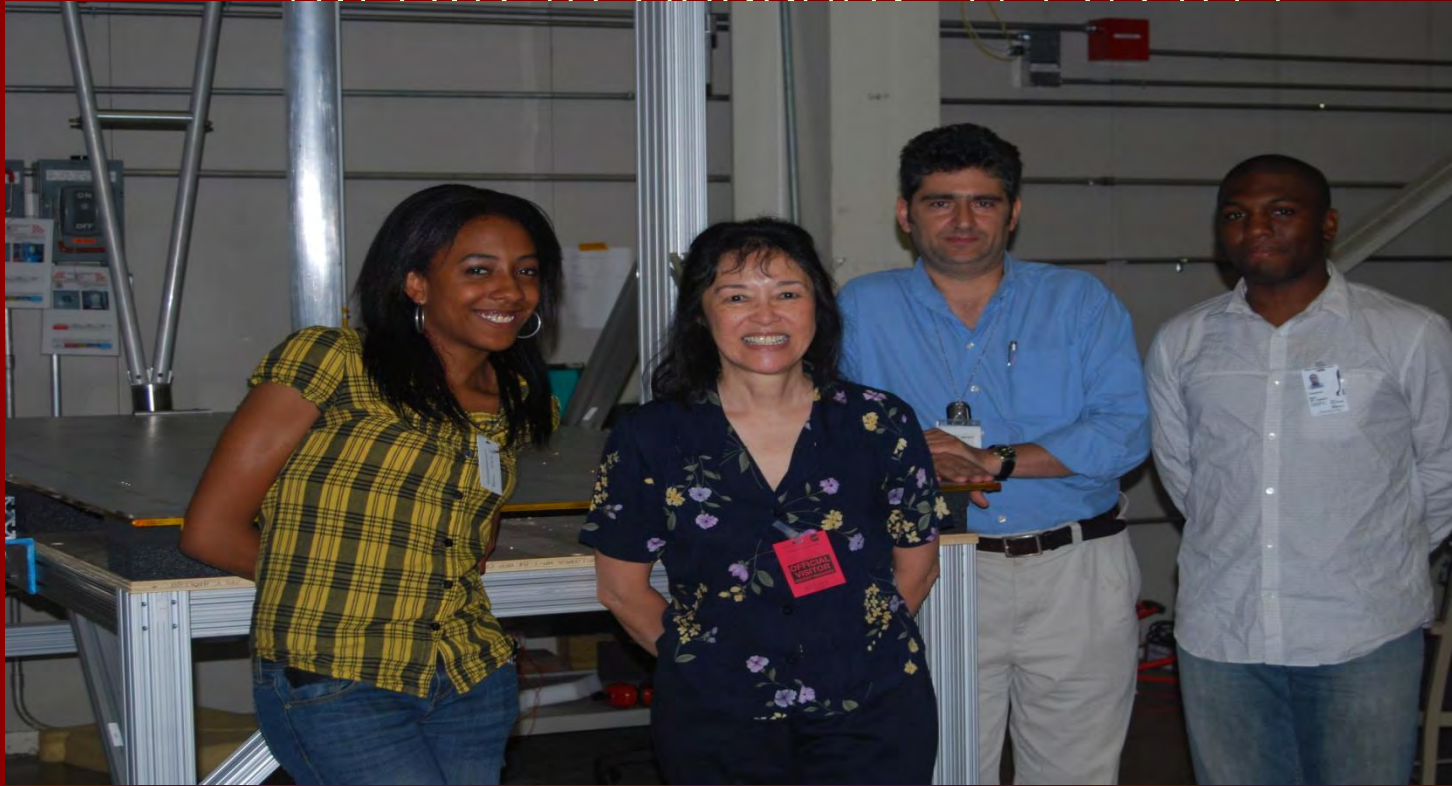
Student focus groups



# Lines of Inquiry

- New Curriculum, Research Opportunities
- Building Partnerships
- Fostering Student Interest & Participation
- Quality of Student Experience
- Effect on Educational & Career Choices
- Outcomes

# City Tech students interns at Goddard Space Flight Center, a visit by our external evaluator of NASA CIPAIR to Goddard 7/19/2011



This photo is taken where students are conducting the experimental part of their research.

Left to right:

Yapah Berri, student intern from City Tech

Joy Quill, External evaluator, Quill Assoc. Inc, for NASA CIPAIR at City Tech

Dan Kaufman, NASA Mentor, Mechanical Analysis and Simulation Division, NASA Goddard.

Roy ST. Furcy, student intern from City Tech



# SURVEYS

## Extent of student agreement with statements about NASA and Aerospace Careers

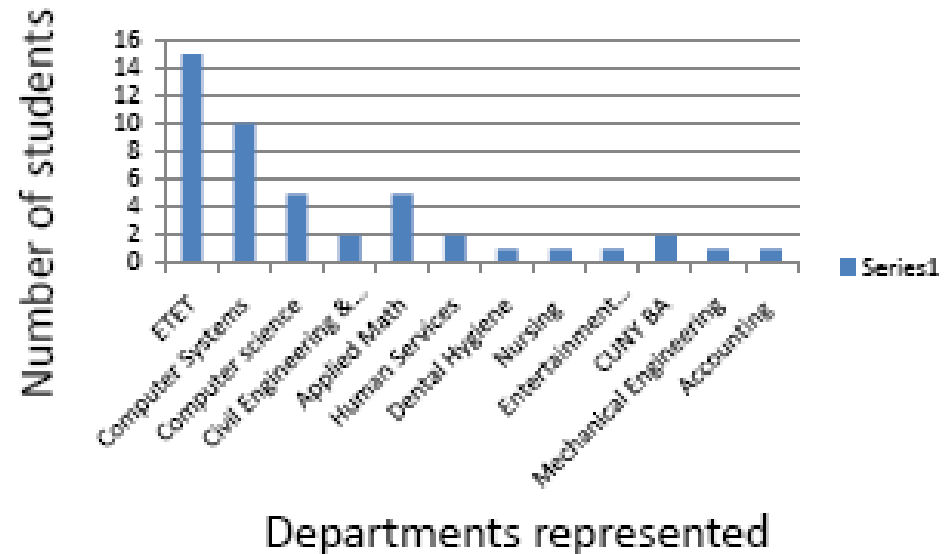
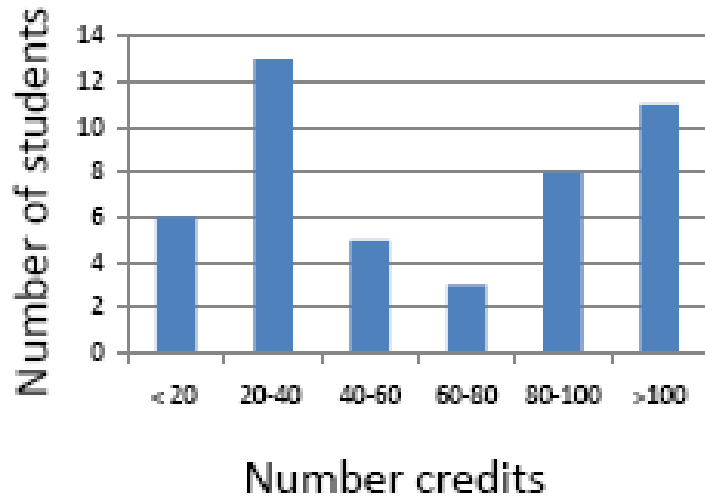
Table 18. Extent of Student Agreement with Statements about NASA and aerospace careers.

Statement	Strongly or Somewhat Agree	Neither Agree nor Disagree	Somewhat or Strongly Disagree	Mean	N
1. I would like to know more about NASA.	89% (96)	8% (9)	3% (3)	4.56	108
2. I would like to know more about student research internships at NASA.	94% (101)	4% (4)	2% (2)	4.65	107
3. I would like to know more about student research internships in the aerospace industry.	91% (98)	6% (6)	4% (4)	4.50	108
4. I would seriously consider a research internship with NASA or an aerospace company.	88% (93)	9% (9)	4% (4)	4.48	106
5. I would be interested in an internship at a NASA center in another state.	69% (74)	17% (18)	14% (15)	3.90	107
6. I would be interested in an internship, but only in New York City.	65% (68)	19% (20)	16% (17)	3.82	105
7. I would seriously consider an engineering career at NASA or in the aerospace industry.	87% (92)	9% (9)	5% (5)	4.38	106
8. My family and friends would encourage me to pursue a career at NASA or in the aerospace industry.	79% (85)	16% (17)	5% (5)	4.34	107

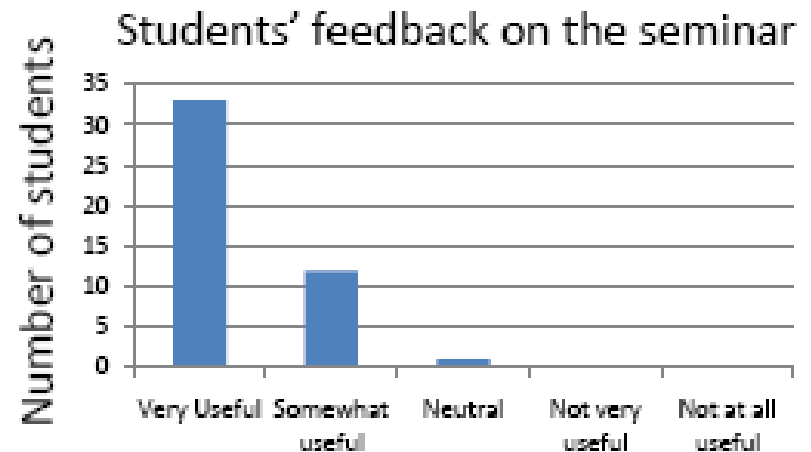
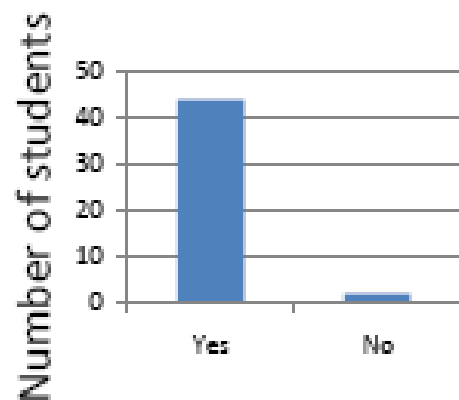
# Students comments

- NASA has been inspiring me for the last decade or so. Due to family involvement and financial crisis, I was unable to continue my education but now I am glad I have reached this far and have one year left for my BA. One day I dream of working with NASA.
- NASA rocks!
- It has been my dream to work for NASA on a large team. I love aerospace.
- I've trying for a summer internship at NASA for over a year. I am really interested in everything about engineering and physics. It would be one of the highlights of my engineering career. By the way I am really good in math.
- One of my dreams is to participate in a NASA research internship!
- I love engineering and if I had the chance to do an internship here in New York I would.

# Survey of Internship Seminar

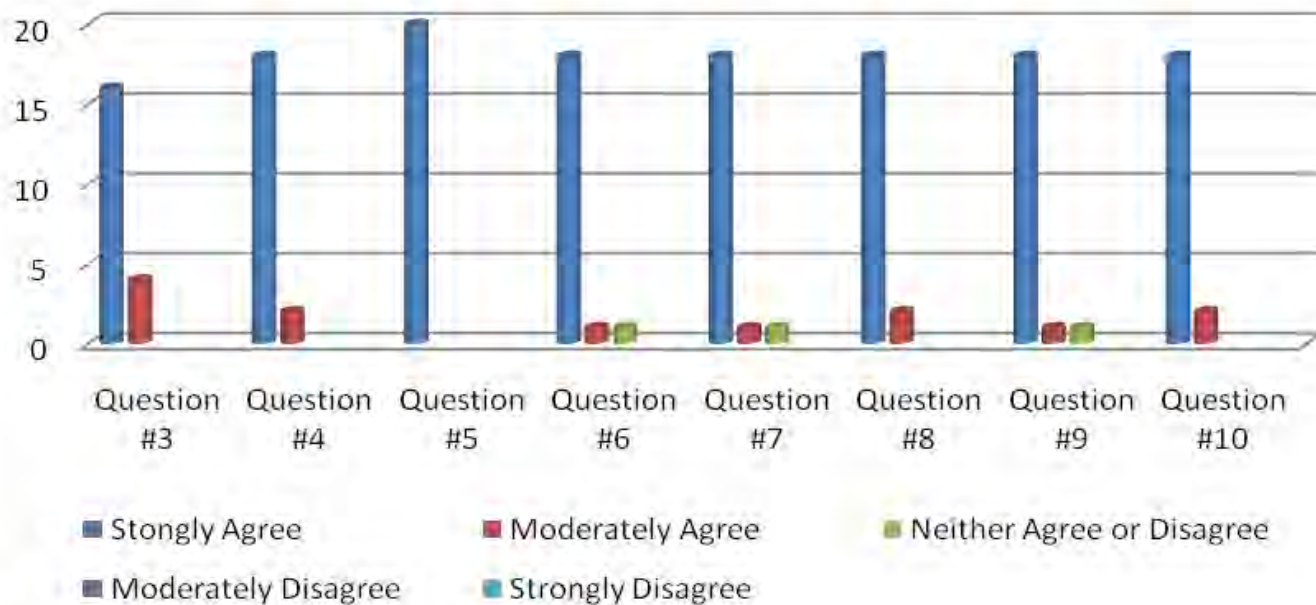


Students interested in participating in the second session of the internship Seminar scheduled for November 17<sup>th</sup>, 2011



# Survey of Preinternship Workshop

## Student's Agreement Level



# Cont.

## **What you liked least about the program/workshop?**

Repetitive

A lot of information to take in on one day

A record of the session's speakers for later listening

Room was too cold

Program/workshop was short

PowerPoint presentations were very short

People arriving late and probably disrupted the flow of the workshop

## **Suggestions that would enhance the program/workshop**

Smaller group discussions/smaller venue /make it more intimate

Expand the program/workshop not only for interns but for others as well

Schedule the program/workshop on days it does not interfere with CUNY graduations

Less presenters, most of them reference the same thing

Industry professional speakers

# cont

## ***Any other comments***

Very well put together /organized

Information was very useful /encouraging

## **-Topics of interest for future program/workshops**

Resume workshop with internships

Different careers you can get with a PHD

Understanding different types of internships

Consider students that have difficult home environments

Dress codes

**Thank you for your  
attention**