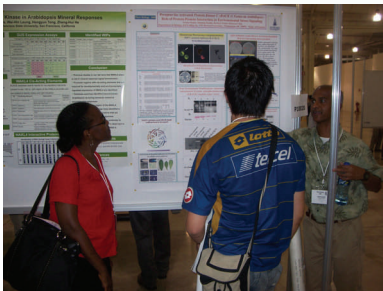


Labs Continued:

- Tissue culture (effect of hormones to develop shoot/root)

### Expectations from the workshop

The workshop will not only train students in the cutting edge plant biology research methodologies, but will also help students in undertaking short projects. The project results will be compiled for a poster presentation at the Fall Mid-Atlantic Section-American Society of Plant Biologists' annual conference at the University of Maryland, College Park. Campus. Participating students are expected to contribute in organizing the data for poster presentation. Students will maintain a lab notebook detailing daily lab activities. Students are expected to participate in a survey and to agree to take part in the yearly assessment of the program. In addition, it is expected that completion of the workshop will induce a positive attitude towards plant science based research activities. An appreciation for plants will certainly be instrumental in attracting students to start considering plant biology as science career.

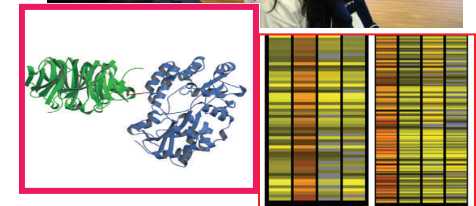
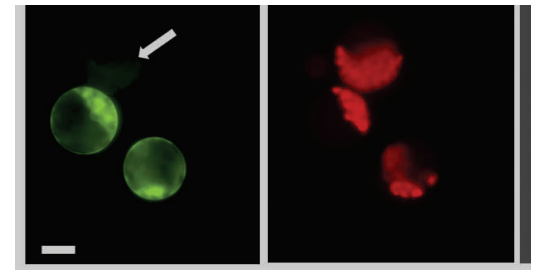


For more information contact  
**Dr. Hemayet Ullah**  
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Biology Dept  
415 College St., NW  
Washington, DC 20059  
202-806-6958  
hullah@howard.edu

<http://www.howard.edu>  
Howard University: Quality Education for any student, but with emphasis upon the provision of educational opportunities for those who may not otherwise have had an opportunity to acquire an education of the type provided at Howard



## Plant Science Matters: Summer PreFreshmen Program at Howard University



## Plant Science: Cutting edge research based knowledge in Biotechnology

### Program Overview:

Current environmental issues of Global Warming, Biofuel, Genetically Modified Plants, Biotechnological use of plants as bioreactor, phytoremediation of environmental contaminants etc. all bring the study of Plant biology to the forefront of research based science activities. It is imperative that biological science students have a greater appreciation and training in these issues through hands on lab based research activities. Howard University Biology Department in conjunction with the University Center for Preprofessional Education program and leading plant biology faculties at the University of Maryland, College Park, is offering a four week long plant biology based research activities to the incoming freshmen students of Howard University. The workshop will entail various plant biotechnological based research activities, field trip to leading Plant Biotechnology research labs at Industry/Universities and short term real research project.

The cost of the participants in the workshop will be fully borne by the program. In addition, the participants will be provided lodging as well.

### Eligibility:

This program is designed for students who are admitted to Howard University who would matriculate into the College of Arts and Sciences as they start their Freshmen year. **Transfer students are not eligible for the program.**

### Eligibility Continued:

The pre-college background of the prospective students must include:

- High School biology, chemistry, and physics
- High School mathematics (including algebra, geometry, and trigonometry)
- Admission to the College of Arts and Sciences does not automatically secure a place for the program

### Drought resistant plant developed using plant biotechnology at Howard University



### Application Procedure:

1. A copy of the letter of acceptance from the College of Arts and Sciences, Howard University.
2. An essay (one page) demonstrating the need to be research literate in plant science.
3. Official High School Transcript
4. Official ACT or SAT scores
5. Two letters of recommendation (one from a science instructor and one from a high school guidance counselor)

Send above materials to:

Dr. Hemayet Ullah  
Plant Science Program  
Biology Department  
Howard University  
Washington, DC

**Workshop Contents:** Lecture, labs, project work, and field trips will be the basis of the workshop.

Lectures: Plant Cells, Bioenergetics, Sunlight as energy and information, Photosynthesis, respiration, mineral nutrients, hormones, stress physiology, Plant as Biofuel source, biotechnology.

**Labs:** -

- Demonstration of biotechnological methodologies (Bio-Rad Biotechnology lab modules)
- Environmental Stress induced Reporter Gene expression assays.
- Effect of pollutants on net photosynthesis rate (in normal vs. mutant plants)
- Mode of herbicide action on plant growth (use of herbicide resistant plants)
- Isolation of protoplasts for transfection assays (Scaffold protein)
- Plant Protein isolation under different environment conditions: Follow fluorescence tagged proteins in isolated protoplasts (scaffold protein)
- Effect of plant hormones in environmental stress signaling (Guard cells isolation: normal and stress insensitive mutants)
- Genotyping mutant plants by Polymerase Chain Reaction.
- Hormone insensitive mutant Screen (efficiency)