

CCMC As A Resource For Space Weather Program At CUNY/QCC



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The City University of New York (CUNY)



CUNY, located in New York City, is USA's largest urban public university. It provides high-quality, accessible education for more than **269,000 degree-credit students** and **247,000 adult, continuing and professional education students** at 24 campuses across New York City.

- ❖ 11 Senior Colleges
- ❖ 7 Community Colleges
- ❖ The Graduate School and University Center
- ❖ Macaulay Honors College
- ❖ CUNY Graduate School of Journalism
- ❖ CUNY School of Law at Queens College
- ❖ CUNY School of Professional Studies
- ❖ CUNY School of Public Health
- ❖ CUNY Medical School

The City University of New York (CUNY)



Partners



- ❖ NASA Goddard Space Flight Center—CCMC
(MashaKuznetsova , Yihua Zheng, Chigomezyo Ngwira, Leila Mays, Antti Pulkkinen)
- ❖ CUNY/QCC- Physics Department (Tak Cheung)
- ❖ CUNY/City College of New York– Electrical Engineering Department and NOAA CREST (Ahmed Mohamed, Roger Dorsinville, Fred Moshary)
- ❖ University of Colorado at Boulder-- (Delores Knipp, Liam Kilcommons)

Funding Sources:

- ❖ Main funding: NSF EAGER* (GEO), NASA MUREP Community College Program
- ❖ CUNY/Medgar Evers College NSF Research Experience for Undergraduates (REU) Program
- ❖ CUNY/QCC REU Program
- ❖ NASA New York Space Grant for Community Partnership program

*Early Concept Grants for Exploratory Research

QCC Research Program in Solar and Atmospheric Physics



Main Goal

Design and implement a high-impact practice integrated research and education program in solar, geospace and atmospheric physics under the umbrella discipline of space weather for Community College (CC) Students.

Specific Objectives



1. Provide QCC students with research opportunities in solar and atmospheric physics (space weather) as early as their first year.
2. Develop educational materials in solar and atmospheric physics (space weather).
3. Increase the number of students, especially underrepresented minorities, that transfer to 4-year STEM programs.
4. Incorporate evidenced-based practices that ensure project's success.

QCC Research Program in Solar and Atmospheric Physics



A year-long research experience with two experiential learning opportunities:

1. During academic year, students are enrolled in a modified course-based introductory research experience (**CURE**) where they learn the basics of space weather (1st semester) and gain research skills (2nd semester).
2. During the summer, students are placed in research internships at partner institutions

Course Undergraduate Research Experience (CURE)



Three modules are currently being developed (online materials, textbooks, lecture-tutorials, graphical user interface, journal articles, videos, etc.):

- ❖ Basic –intro to materials (can be used by non-science majors)
- ❖ Intermediate (include data analysis & intro to research)
- ❖ Advanced (covers material more in-depth, students choose research projects)

CURE



Course format:

- ❖ Students meet 2 to 3-hours/week as a class
- ❖ Students work independently and in groups
- ❖ Students meet individually with faculty mentors
- ❖ Lab rotation at City College of NY

Students receive a stipend (~\$500-750/semester; \$5000/summer plus travel & lodging)

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[https://qcc-cuny.digication.com/
solar_and_atmospheric_physics_research_group/
Home1/preview](https://qcc-cuny.digication.com/solar_and_atmospheric_physics_research_group/Home1/preview)

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Collaboration with CCMC

Research Opportunities (undergraduate):

1. Summer 2015: 1 QCC student interned at CCMC & 2 visits by other QCC interns.
2. Summer 2016: 4 students will be at CCMC for forecasting and research internships

CCMC as a Resource for QCC Space Weather Program



Future Projects with CCMC

- ❖ Curriculum Development: Space Weather Course (use of CCMC Models to teach undergraduates??); CUNY BA in Space science (support major or minor)
- ❖ Workshops at CUNY—Traveling bootcamp (3 days)
- ❖ CUNY-NASA Research collaboration- CUNY faculty & CCMC research scientists
- ❖ IREDI

CCMC Impact



QCC Collaboration with CCMC results:

1. Funding-Two grants (NSF & NASA)- over \$1 Million to CUNY
2. Engaging community college students with little to no research experience in project-based learning.
3. Increasing student interest & motivation
4. Fostering/Increasing collaboration with scientists & institutions
5. impacting fields other than physics and the geosciences, such as engineering.

CCMC Impact at CUNY

Student Research Projects Abstracts



1. Characterizing interplanetary structures of long-lasting ionospheric storm events (**AGU**)

Authors: **Christopher Tandoi**^{*,1}, **Ying Dong**^{*,1}, **San Peng**^{*,1}, **Zhenkang Yang**^{*,1}, Chigomyezo Ngwira², M. Chantale Damas¹, Tak Cheung¹

2. Modeling the Impacts of Geomagnetic Disturbances on the New York State Power Transmission System (**AGU**)

Authors: **Djibrina Ouedraogo**^{*,1}, **Orlando Castillo**^{*,1}, Ahmed Mohamed³, M. Chantale Damas¹

3. Dst Profile Investigation with Gamma Distribution and Diffusion-Like Distribution (**AMS**)

Authors: **Ying Dong**^{*,1}, **San Peng**^{*,1}, **Zhenkang Yang**^{*,1}, **Christopher Tandoi**^{*,1}, M. Chantale Damas¹, Chigomyezo Ngwira², Tak Cheung¹

* students, 1: CUNY/QCC; 2: NASA Goddard; 3: CUNY/City College of NY

Challenges



- ❖ Space weather course for undergraduate students at the community college level
- ❖ How best to use CCMC Resources (e.g., models) to teach CC undergraduates (CISM lab models?)
- ❖ Research projects that are manageable & at proper level, yet challenging for CC students
- ❖ Faculty Training (time??)

QCC Summer interns visit to NASA with Dr. Ngwira



Prof. Mohamed's SmartGrid Lab



Prof. Mohamed's SmartGrid Lab



Acknowledgment



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- ❖ NASA New York Space Grant Community College Partnership Program (NYSG CCPP)

Thank You CCMC!