# Undergraduate Research at CUNY Queensborough


## Paris Svoronos, Professor-Chemistry Department, CUNY Queensborough Community College


Our NSF grant proposal awarded in 2007 aimed at increases in enrollment of both Chemistry and Biology courses as well as graduation of STEM students. This was envisioned as a result of expanding research opportunities and internships, group tutoring, student conference participation and regular holding of seminars given by outside speakers.

Two Queensborough faculty started undergraduate research in 2000 with one student. That number has expanded to an average of 50 student projects per year with several students involved in multiple presentations. These involve research conducted at Queens College (a four-year institution of CUNY), the Food and Drug Administration (FDA in Jamaica Queens), the NY City Division of Environmental Protection (DEP) as well as the Brookhaven National Laboratory in addition to research projects conducted in our Queensborough Community College campus. The departments involved are mainly chemistry and biology with the occasional contribution of a few physics and engineering students.
The process, capped by the joined trips to conferences, has enhanced the formation of a strong cohort of students that leads to a unique display of mutual respect and support of each other. Despite the incredible diversity of cultures and ethnic backgrounds, communication in English has improved their language skills, self confidence and ability to explain their findings in meetings. In addition, a dozen peer-reviewed publications bearing our own students' names have legitimatized the belief that community college students are able to start conducting research at the freshman level.

The establishment of an Honors Program at Queensborough in 2001 has provided the initial platform for providing the needed challenge to committed students. Since 2005 the college holds an annual CUNY-wide community college conference at the end of the spring semester. The students get their first chance to make a presentation in front of a "less hostile" environment that increases their ability to control the attention of the audience while they present their own power point.

Group tutoring has also improved the tutors' ability to handle and explain concepts they learned in the classroom to fellow students, who may be classmates in other non-STEM classes. The tutors' confidence improves because they understand that if they can explain something, then this proves they know it. In addition the tutees feel more comfortable asking a question from a fellow classmate than the professor while taking advantage of working individual problems on the board in front of friends disregarding the possibility of mistakes and shameful display of ignorance.

Enrollment in the STEM fields has increased by almost 70% in the last five years, but graduation level sfrom Queensborough have not improved, as many of our students elect to transfer once they are done with their remedial. Nevertheless, in 95% of the Chemistry courses offered since 2001 the students, on an average, score higher than the average national score of every ACS exam they take at the end of the semester and during lab checkout.

Students in most cases go through a discontinuation of their STEM knowledge for more than three months (June-August) which leads to a minimal retention of what they have learned in the classroom with a subsequent slow start once the fall semester starts. Engaging the students in the sciences during the summer course through a STEM related activity or an internship would certainly be beneficial. The number of internships however is low and the maximum number of students a faculty can take in conducting research is no more than 2,3 or 4. In addition the availability of a lab space is rather limited since the number of lab sections offered during the summer is too high to allow such an opportunity. Moreover full time faculty prefer to teach in the summer and get compensated in a satisfactory manner. Thus the creation of more internships with national laboratories and government-run agencies will greatly help this cause.