



### ***Introduction***

- Questar III has implemented the **Summer Research Program for Science Teachers** which was originally founded by Dr. Samuel Silverstein, the John C. Dalton Professor of Physiology and Cellular Biophysics and Professor of Medicine, at the Columbia University College of Physicians and Surgeons.\*
- During the winter of 2014, Dr. Silverstein visited the Questar III BOCES to discuss the program, its impact, and ways it can be expanded into our region.
- Since being founded in 1990, the program has helped to train science teachers in how to do research science and it has translated to improved practice in the classroom and increased student achievement rates on Regents Exams in science.

### ***Program Overview***

- Secondary school science teachers work in Capitol District labs four days a week, for two consecutive summers, conducting experiments and research under the mentorship of a research professor or professional scientist. Along with intensive instruction and the opportunity to attend lectures and a professional conference, the teachers receive a stipend and funding for classroom materials and equipment.
- In addition to the summer lab work, teachers also: participate in a seminar on a topic of broad general interest led by university faculty; describe their research to one another at regularly scheduled oral presentations or poster sessions during the academic year; and they discuss common problems and exchange ideas on what works in the classroom. Finally, second year teachers are trained to mentor first year teachers.

### ***Program's Results (Reference Science Magazine Article: Oct 2009)***

- Research shows that the program has significantly enhanced the interest and proficiency of students in the classrooms of participating teachers.
- Students whose teachers have participated in the program have increased interest and proficiency in science, as indicated by greater participation in science competitions and after-school science programs, and a higher success rate on the Regents Exams in science.
- Teachers' instructional practice improves and they are excited with what they are doing in class with their students.
- Clear cost savings since fewer students are repeating mandated science courses and assessments to graduate (e.g. Living Environment).

***Why is this program worth implementing in the Questar III Region?***

- Demonstrated/documentated improvement in student achievement and in meeting NYS graduation requirements.
- Demonstrated effective professional development for teachers given its in-depth summer work and use of study groups throughout the academic year.
- Practicing scientists working with teachers has helped to increase our science teachers' knowledge of **how to do science research** which results in new and improved lessons in the classroom. Teachers who attend attest to the fact that their practice has changed: "Before I entered this program I taught **about** chemistry. Now I teach chemistry."
- Demonstrated Cost Benefit Analysis: program has researched its positive economic impact on schools given lower HS retention rates for graduation requirements.

***\*Additional Bio Info for Dr. Silverstein: Dr. Silverstein is:***

- A member of the Institute of Medicine of the National Academy of Sciences, and of the American Academy of Arts and Sciences;
- President of Funding First, the medical and health research policy program of the Mary Lasker Trust;
- A member of the Boards of Directors of the Cancer Research Fund of the Damon Runyon Foundation and of Research America;
- A former President of the Federation of American Societies for Experimental Biology (1994-95);
- A former member of the Council of the National Institute of Allergy and Infectious Diseases;
- On advisory committees at Albert Einstein College of Medicine, Harvard University, the University of Colorado, and the New York Blood Center; and
- A recipient of the Mayor's (Bloomberg) Award for Public Understanding of Science (2003); and
- A recipient of the John Oliver LaGorce medal of the National Geographic Society for exploration in Antarctica (1967).



### ***Introduction***

- Questar III is piloting the Summer Professional Internship for Teachers of Engineering, Mathematics, and Technology.
- During the summer of 2013, Questar III piloted the Summer Research Institute for Science Teachers. The Research Institute is now entering its third year. This new pilot is an expansion of the science program.
- The Summer Research Institute for Science Teachers is modeled after a highly successful, twenty-five year program founded by Dr. Sam Silverstein at Columbia University.

### ***Program Overview***

- Secondary school teachers will be partnered with engineering, technology or mathematics professionals working in Capitol District firms/businesses for two consecutive summers. For 7 weeks, the teachers work four days a week, participating in projects and/or research under the mentorship of a professional mentor in their field.
- The 5<sup>th</sup> day of the week teachers attend professional development workshops at Questar III writing lessons and developing curriculum to be used in their classrooms.
- The teachers receive a generous stipend (\$5000.00) each summer as well as funding for classroom materials and equipment.
- Teachers become part of a cohort of teachers sharing ideas and working together to promote STEM for students in the Capitol Region.

### ***Program's Results (Reference Science Magazine Article: Oct 2009)***

- Research shows that the Summer Science Research Program has significantly enhanced the interest and proficiency of students in the classrooms of participating teachers.
- Students whose teachers have participated in the program have increased interest and proficiency in science, as indicated by greater participation in science competitions and after-school science programs, and a higher success rate on the Regents Exams in science.
- Teachers' instructional practice improves and they are excited with what they are doing in class with their students.

### ***Why is this program worth implementing in the Questar III Region?***

*It is expected that like the science program, this STEM program will:*

- Demonstrate improvement in student achievement and in meeting NYS graduation requirements.
- Demonstrate effective professional development for teachers given its in-depth summer work.
- Practicing professionals working with teachers, will increase our teachers' knowledge of **how** engineering, mathematics and technology are used in careers, which results in new and improved lessons in the classroom. Science teachers who attend attest to the fact that their practice has changed: "Before I entered this program I taught **about** chemistry. Now I teach chemistry."
- Increase student interest and participation in STEM fields in the future.