Garden City School District

Science Research Program

Presentation to the Board of Education
October 8th, 2013

Dr. Elena Cascio, Curriculum Coordinator for Science 6-12

Science Research Teachers:
  Dr. Steven Gordon, High School
  Dr. Paraskevy Zaferiou, Middle School

Research Students:
  Michael Cassano, Senior
  Yianni Flouskakos, Sophomore
Program Philosophy and Goals

• To inspire an interest and create enthusiasm for science in ALL students
• To foster exploration, creative thinking and problem solving
• To develop independent study skills
• To promote cooperative learning and teamwork
• To recognize the outstanding achievements of our students by presenting their work at local, regional and national competitions
The Benefits of Science Research

Students in the Science Research Program:

• Explore their interests and discover their passion
• Master writing, public speaking and time-management skills
• Participate in interesting projects and exciting contests
• Gain unique experience working with professional researchers
• Earn high school honors and college credit(s) and build their resume
Research Topics

• Medicine & Health Sciences
• Animal & Plant Sciences
• Biochemistry
• Engineering
• Environmental Science
• Epidemiology
• Physics & Astronomy
• Cellular & Molecular Biology
• Behavioral Science
Afterschool and Summer Placements (2007-present)

• Winthrop University Hospital
• Brookhaven National Laboratories
• Cold Spring Harbor Laboratories
• Adelphi University
• Rockefeller University
• SUNY Stony Brook
• SUNY Old Westbury

• SUNY Farmingdale
• M.I.T.
• Boston College
• Brown University
• Columbia University
• Cornell University
• Yale University,
• Hofstra University
• and many more ...
Science Research Courses

• Middle School Science Research course

• High School Honors Science Research courses:
  – Freshmen Science Research H
  – Science Research Seminar 1H
  – Intermediate Science Research 2H
  – Advanced Science Research 3H
Student Enrollment in Research

Enrollment is open to ALL students who are interested in science and willing to work hard!

<table>
<thead>
<tr>
<th>Year</th>
<th>HS</th>
<th>MS</th>
</tr>
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<tbody>
<tr>
<td>2008-09</td>
<td>36</td>
<td>8</td>
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<tr>
<td>2009-10</td>
<td>48</td>
<td>10</td>
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<tr>
<td>2010-11</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>2011-12</td>
<td>64</td>
<td>14</td>
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<tr>
<td>2012-13</td>
<td>85</td>
<td>17</td>
</tr>
<tr>
<td>2013-14</td>
<td>81</td>
<td>30</td>
</tr>
</tbody>
</table>
Middle School Science Research
Teacher: Dr. Zaferiou

Open to ALL 7th and 8th grade students

Elective class
Meets every other day
Current enrollment 30 students
What is Happening in the Middle School Research Class?

- Brain-storming sessions
- Literature research (library)
- Guest speakers (solar energy, DNA structure)
- Students teaching students (senior and peer students presentations)
- Hands-on projects
- Participation in science competitions
A Variety Of Experiences Encourage Exploration, Creative Thinking & Problem Solving
Middle School Contests and Awards

LISEF Broadcom Masters
* First Place Grand Prize Award 2013

Discovery Education: 3M Young Scientist Challenge
* National Finalist 2012

Ocean Pals National Poster Contest
* 2nd Place Winner 2012
* 3rd Place Winner 2012
* Honorable Mention 2011

U.S. Fish & Wildlife Duck Stamp Contest
* Honorable Mention

Science Olympiads
* Gold, Silver, Bronze, HM Medals

Other competitions in which MS students have participated:
DuPont Essay Science Challenge; NASA Spaced Out Sports; Siemens We Can Change the World; Toshiba Exploravision; Cradle of Aviation Contests
High School Science Research

Dr. Gordon

Mr. Stano

Mr. D’Ambrosio

Mrs. Dubuke
Freshman Science Research Honors

• Enrollment is open to ALL freshmen
• Class meets every day
  – Scientific reading and writing
  – Authentic experimental design
  – Differentiated instruction (heterogeneous groups; enrichment for advanced students)
  – Competitions and Presentations:
    • Long Island Science and Engineering Fair
    • Long Island Science Congress
    • Chemagination
    • Exploravision
    • Annual Science Symposium
Science Symposium - Freshman Research Presentation

Poster: Long-Term Effects of Ecstasy Use
Caroline Allen

Introduction
Methods
Results
Conclusions

Bibliography
Science Research Seminar 1H

• Grades 10, 11, 12
• Open enrollment for students who are willing to spend approximately 2.5 hours on independent study per week
• Attendance at seminars (group or individual meetings with Science Research teachers during lunch periods, before/after school)
• Participation in off campus science fairs and competitions
  ➢ Local, Regional, National
• Attendance at outside seminars
  ➢ Hofstra, Adelphi and Stony Brook University, Cold Spring Harbor Laboratories, etc.
• Presentation of independent work at Science Symposium
• Placement in laboratories over summer
Students explaining their in-house research conducted with Vernier LabQuest
INTERMEDIATE SCIENCE RESEARCH – 2H

- Grades 11, 12
- Open for students who have initiated a mentored independent research project
- Students continue to collect data during the school year
- Students attend science competitions, including LISEF and Siemens Competition
Science Symposium – Junior Research Presentation

Students present their research plan for upcoming summer mentored work
ADVANCED SCIENCE RESEARCH 3H

• Grade 12

• This class is for students who have conducted extensive research during their junior year and during the summer

• Students prepare comprehensive research papers to enter the Intel Science Talent Search and Siemens competitions

• Students are also expected to attend regional and national competitions, including LISC, LISEF, NYSSSEF and make a presentation at the Annual Science Research Symposium
The results of the summer mentored research conducted at a local University
Why Do We Take Science Research?

Science Research students:

Michael Cassano, Senior

Yianni Flouskakos, Sophomore
Annual Science Research Symposium

• Increased Student Attendance
• Community Event
• May 27th, 2014

Increase in students participation in the Annual Science Research Symposium

Number of participants

Year

2006 2011 2012 2013
Science Research Symposium
Examples of GCHS Student Research

• Investigating proteins related to diagnosing pancreatic cancer
• Finding solutions to stop the spread of invasive plant species
• Researching proteins associated with cystic fibrosis
• Building a solar-powered water heater
• Removing harmful metals from water
• Exploring genetic risk factors for heart disease in a population
• Studying astrophotography of globular clusters
• Investigating proteins involved in atherosclerosis
• Identifying gender differences in students’ perception of sports
Future Program Goals

• Increase enrollment in Freshman Science Research course

• Increase student placement in research laboratories
  – After school
  – Summer
  – Collaborations with local universities
Challenges

• Success in advanced research program requires a commitment of time -- students must work before/after school and during school breaks

• Many summer science research programs are expensive (lab and residence fees); free programs are exclusive and very competitive

• Need for updated computers (hardware and software)

• Need for larger space dedicated for science research to support increased enrollment
Sophomore Research Team at Chemagination 2013
## GCHS Research Student Achievements 2007-2012

### Awards

<table>
<thead>
<tr>
<th>Award</th>
<th>Achievements</th>
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<tbody>
<tr>
<td>Intel Science Talent Search</td>
<td>Finalist ‘07, ‘11</td>
</tr>
<tr>
<td>Intel ISEF</td>
<td>First Place Grand Award ‘10</td>
</tr>
<tr>
<td>Siemens Competition in Math, Science &amp; Technology</td>
<td>Regional Finalist ‘07; ‘11; Semi-Finalist ‘08; ‘09 (2)</td>
</tr>
<tr>
<td>Long Island Science and Engineering Fair (LISEF)</td>
<td>First Place (Physics, Biochemistry, Environmental Sciences) ‘10 (2); ‘11 (2); Second Place (Medicine and Health Sciences) ‘12; Honorable Mention ‘11 (1)</td>
</tr>
<tr>
<td>Long Island Science Congress (LISC)</td>
<td>High Honors 09’, ‘10; ‘12; Achievement Award ‘07-’12; Honorable Mention 07-‘12; Meritorious Award 07-‘12</td>
</tr>
<tr>
<td>NYSSSF</td>
<td>Second Place ‘12</td>
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<tr>
<td>American Society for In-Vitro Biology</td>
<td>Recognition Award ‘10</td>
</tr>
<tr>
<td>Museum of Natural History Young Naturalist</td>
<td>Finalist ‘12; Semi-Finalist ‘09 (2); ‘12 (2)</td>
</tr>
<tr>
<td>Protein Modeling Competition</td>
<td>First Place ‘09</td>
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</tbody>
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# GCHS Research Student Achievements 2007-2012 (continued)

<table>
<thead>
<tr>
<th>Awards</th>
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<tbody>
<tr>
<td><strong>Young Epidemiology Scholars (YES Competition)</strong></td>
<td>National Finalist ’10</td>
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<tr>
<td><strong>Neuroscience Research Prize of American Academy of Neurology</strong></td>
<td>National Winner ‘10</td>
</tr>
<tr>
<td><strong>Scholastic “It’s Your Environment” Challenge</strong></td>
<td>First Place Winner ‘08</td>
</tr>
<tr>
<td><strong>Toshiba ExploraVision</strong></td>
<td>Honorable Mention ‘08 (3)</td>
</tr>
<tr>
<td><strong>ACS Chemagination</strong></td>
<td>First Place Awards (Medicine; Alternative Energy) ’11; Regional Winners ‘11</td>
</tr>
<tr>
<td><strong>American Association of Clinical Chemistry</strong></td>
<td>Recognition Award ’12</td>
</tr>
<tr>
<td><strong>Going Green on Long Island: Using Alternative Energy</strong></td>
<td>Second Place ‘12</td>
</tr>
<tr>
<td><strong>High School Sleep Science Research Contest</strong></td>
<td>National Winner ‘12</td>
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<tr>
<td>Awards</td>
<td>Details</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>Siemens Competition</td>
<td>National Semi-Finalist (top 15% out of 1900 applicants)</td>
</tr>
<tr>
<td>Intel STS</td>
<td>Research Report Badge (top 20% of 1839 applicants)</td>
</tr>
<tr>
<td>ACS Chemagination</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; place out of 40 teams in the category of Alternative Energy</td>
</tr>
<tr>
<td>Toshiba ExploraVision</td>
<td>3 Honorable Mentions (top 10% of over 5000 entries)</td>
</tr>
<tr>
<td>Long Island Science and Engineering Fair (LISEF)</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; place Grand Awards in Categories of Medicine, Cell Biology, and Plant Sciences</td>
</tr>
<tr>
<td>Long Island Science Congress (LISC)</td>
<td>High Honors Award</td>
</tr>
<tr>
<td>NBC Universal “Burn Notice” Science Challenge</td>
<td>National Finalists</td>
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<tr>
<td>Environthon</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; place (Oral presentation)</td>
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Science Research Program
Supports the District Mission

Inspiring Minds
Empowering Achievement
Building Community