



Biological & Biomedical Sciences Program *Community Education Initiative*

The BBS program requires that each student fulfill one semester (60 hours, including preparation time) as a non-paid teaching assistant. We have established the Community Education Initiative, which provides teaching opportunities for BBS students in secondary schools and after school programs in the Boston area.

The programs described below are available as indicated for student teaching credit and/or volunteer opportunities for HMS students, faculty, postdoctoral fellows, technicians and staff. These programs are already in place and are enthusiastic about having help from the HMS community. If you are interested in any, please contact the programs directly. The contact information for each program is listed under the program description.

Students who are fulfilling their TA requirement through the Community Education Program must also complete the Community Education Registration form and submit the completed form to Danny Gonzalez at danny@hms.harvard.edu. When signing up for teaching on your study card, use the course name Time-T and course number 8811.

If you have any questions please contact:

Danny Gonzalez

danny@hms.harvard.edu

617-432-2737

Basic Science Partnership

Basic Science Partnership (BSP) is a program dedicated to the enhancement of science education for students at the middle and high school level. Through a variety of partnerships we encourage students to explore the biological world and the enterprise of biomedical research. There are opportunities for students interested in community education through two of our initiatives; the BSP High School Fellowship Program and HMS KIDS. These programs are described in more detail below. Additional opportunities may be available, please contact Emily Gleason for more details (emily_gleason@hms.harvard.edu).

Basic Science Partnership High School Fellowship Program

The BSP Summer Fellowship Program selects several talented high school students from the Boston area who are interested in pursuing careers in the sciences. These students work in labs at Harvard Medical School under the supervision of faculty, graduate students, or postdoctoral fellows for eight weeks from about mid-June to mid-August. This allows each student to experience what it is like to work in a professional lab and to develop relationships with the faculty and research staff who act as mentors and role models. In addition to the reward of introducing a talented student to the bench science, the faculty, graduate students, and postdoctoral fellows who mentor these students gain valuable teaching and mentoring experience. More information about the program can be found at our website: <http://bsp.med.harvard.edu/>.

Graduate students can receive teaching credit for mentoring a student in the BSP Summer Fellowship Program. Mentoring a student would involve supervising them in the lab for approximately 35 hours per week and helping them to make both an oral and a poster presentation. In order to be selected as a mentor you must obtain permission to host a student in your lab from your faculty advisor.

Contact Information:

Davie Van Vactor (Davie_VanVactor@hms.harvard.edu)

Emily Gleason (emily_gleason@hms.harvard.edu)

HMS KIDS (Kindling Interest in Doing Science)

Do you want a fun and rewarding way to fulfill your TA credit? Do you want to give back to the local community and inspire kids from Boston-area middle schools? If yes, then this is the perfect opportunity for you!

HMS KIDS (Kindling Interest in Doing Science) is run in collaboration with the HMS Basic Science Partnership and the Boston B-SAFE summer program. Each summer, we put on a hands-on, four week science enrichment program for middle school students to show them how fun science can be! Our program takes place at the Epiphany School in Dorchester and we need volunteers! Volunteers design lab-based lessons with demonstrations, and they work closely with the students to help them understand the larger concepts. Our program has a great relationship with B-SAFE, and our past

volunteers have really enjoyed their time at camp. Don't miss out on this opportunity to inspire the next generation of scientists!

Our program runs 2 days/week in July, for a total of 7 sessions, from 9 am -12 pm. Participation will fulfill your TA requirement. Each year, we hold an informational session in the late spring to recruit volunteers, but please feel free to email with any questions!

Contact Information:

Whitney Silkworth (wsilkworth@fas.harvard.edu)

Janice Nieves-Bonilla (jnievesbonilla@g.harvard.edu)

Cambridge School Volunteers (CSV)

CSV is the private, non-profit agency that recruits, trains, places, and supports volunteers in the Cambridge Public Schools, grades K-12. At the K-5 level, volunteers serve as one-to-one and small group tutors, classroom and library assistants, early math and literacy tutors, and more. After-school homework helpers are always needed at the five middle schools serving students in grades 6 through 8. At the Cambridge Rindge & Latin School (CRLS, the city's public high school), volunteers provide one-to-one tutoring before, during and after-school, as well as classroom assistance, Science Olympiad advising, college planning and essay writing help, and more. For over 48 years, volunteers have helped thousands of Cambridge students with almost every subject. Tutors, especially in math and science, are always needed.

Contact Information:

www.csvinc.org

Citizen Schools: Providing Students with the College and Career Pathways to Discover and Achieve Their Dreams

The Organization and Volunteer Opportunity: Citizen Schools (www.citizenschools.org) is a national education non-profit who partners with public middle schools to expand the learning day for low-income children across the country. They mobilize a second shift of afternoon educators to provide academic support and leadership development through their Apprenticeship Program.

- **Apprenticeship Overview:** Hands-on projects taught by volunteer Citizen Teachers from private and public sector organizations. From computer coding and lab experiments to mock trial and financial literacy to yoga and spoken word poetry, volunteers help students connect what they learn in school to the real world, and get excited about opportunities for their futures.
- **Time Commitment:**
 - mid-September until mid-December OR late-January until mid-May

- 11 weeks
- 90 minutes a week between the hours of 2:30-4:30
- **Support for Volunteers:**
 - up-front training
 - developed curriculum
 - in-class support from Citizen Schools AmeriCorps Teaching Fellow

Benefits to Students: The impact of Citizen Schools program shows marked improvements for students in both the short term and long term.

- **Short Term:** Citizen Schools adds 3 months of English learning and 2 months of math learning into the school year.
- **Mid Term:** High school graduation rates of Citizen Schools students improved by 12 percentage points compared to matched peers in Boston Public Schools.
- **Long Term:** College enrollment rates of Citizen Schools students improved by 26 percentage points compared to low-income students across the country.
- **Long Term:** Citizen Schools students 2.25x more interested in careers in STEM after taking a STEM focused apprenticeship compared to NAEP survey of 8th graders

Benefits to Employees: In addition to making a lasting impact on the students they serve, volunteers will improve their own professional skills when they teach as part of a team. A study by University of Vermont proved the positive impact of skills-based with Citizen Schools on corporate volunteers.

- **Professional Development:** Improved leadership, communication, and teamwork skills resulting in better overall performance
- **Job Satisfaction:** Employees express increased levels of job satisfaction and improved morale
- **Employer Loyalty:** Report greater loyalty to employers that provide such an opportunity to work directly with the educational community

Carolyn Navikonis (formerly Roscoe)

Director of Civic Engagement and AppEx
 Citizen Schools Massachusetts
 617.695.2300 ext. 1174

Continuing Umbrella of Research Experiences (CURE)

Dana-Farber/Harvard Cancer Center

Program Description

The CURE (Continuing Umbrella of Research Experiences) program introduces high school and college students from underrepresented minority populations to the world of cancer research. Students obtain a hands-on experience in a cancer research environment. The primary goal of

this program is three-fold: to identify, coach and nurture talented and highly motivated students for potential careers in biomedical cancer research; to increase and enhance students' skills in research practices, analytical thinking, presentations, and ethics; and to expose students to real time research settings by hands-on involvement in ongoing research.

Position Description

We are seeking graduate level students who are willing to prepare and lead weekly journal club sessions for the CURE program (starting in late May and finishing in early August). These sessions should increase scientific knowledge and expand scientific/research curiosity. The topics would include, but are not limited to, cancer research in basic, clinical, and population sciences.

Responsibilities include:

- Choosing a scientific article to be assigned each week
- Leading your group's discussion on the assigned article
- Providing feedback to the CURE program leaders on student participation
- Assisting students in creating a scientific presentation, including reviewing abstracts
- Practicing scientific presentations with the students

For further information and to sign-up, please contact:

CURE Program
iecd@partners.org

Health Professions Recruitment and Exposure Program (HPREP)

Are you interested in teaching high-school students about science in a fun and interactive way or helping plan a high-impact program for adolescents? Then join the Health Professions Recruitment and Exposure Program (HPREP)!

HPREP is a HMS sponsored high school enrichment program organized by graduate, dental, and medical students to recruit Boston-area high schools students from underprivileged backgrounds into careers in science and medicine. We have served nearly 300 students from over 60 high schools since 2011. Students participate in nine full-day Saturday sessions from November to February.

Representative curriculum topics:

- Genetics
- Viruses & Vaccines
- Microbiology
- Taking vital signs
- Development
- The nervous system
- Cancer biology

- Sexual health
- Scientific reasoning

Other opportunities we provide for our students:

- One-on-one mentoring to help with essay writing and a final research presentation
- College guidance workshops
- Career fair with professionals from various fields in healthcare and science

How can YOU help?

- Develop and teach a lecture (one-session commitment + practice lectures)
- Mentor a student (weekly commitment)
- Help with volunteer coordination, grant writing, session logistics, and curriculum development as a member of the planning committee
- There are many roles to fill, some with very little time commitment
- All sessions are based in TMEC, so no travel required!

IF YOU'RE INTERESTED IN LEARNING MORE ABOUT THIS STUDENT-RUN PROGRAM:

Contact us at HPREP@hms.harvard.edu for more details on how to get involved!

Visit our website at <http://www.hprep.wordpress.com>

Hinton Scholars AP Biology Program

Hinton Scholars AP Biology Program is an after-school enrichment program that provides tutoring to Boston Public Schools (BPS) high school students, particularly underrepresented minority and/or low income students. The program is designed to enhance understanding of AP Biology concepts, provide laboratory exposure, and increase knowledge about careers in science.

Tutors gain teaching experience by working with a cohort of approximately 8 students from a local Boston Public School (BPS) class who are studying AP Biology throughout the academic year. Materials are provided including the Campbell AP Biology textbook, student study guide and supplementary materials such as electronic slide presentations and animations. Tutors will also communicate and share curriculum resources through a course wiki.

In addition to tutoring the students, tutors will accompany their students into the lab to help facilitate student integration of key biology concepts and principles into the student laboratory experience. Tutors will collaboratively work with AP Biology teachers and lab assistants to develop effective instructional strategies that support student understanding of scientific inquiry in an AP Biology laboratory. Sessions are held on Thursdays, once a month from September – March, 2:30 pm – 5:30 pm. Special events include a program orientation and a

Celebration Dinner in May. Tutoring sessions take place at the Harvard Medical School campus. There are six 3 hour sessions that include a 1 hour tutorial class and 2 hours embedded in the lab. The success of our tutoring model depends on tutors developing a positive mentoring relationship with a small student group throughout the program's duration. The time commitment is estimated to be about 60 hours including preparation time.

Biological and Biomedical Sciences (BBS) students may receive teaching assistant (TA) credit for serving as a tutor in the program. We ask that tutors make a commitment to attend all scheduled program activities and events for their assigned cohort. NOTE: This is an unpaid community outreach activity and there is no remuneration offered.

Learn more about the Hinton Scholars AP Biology Program by watching <https://youtu.be/JNILDkHtZI>

Contact Information:

Dr. Sheila Nutt, Director, Education Outreach Programs

sheila_nutt@hms.harvard.edu

617-432-4634

Robert Simpson, Science Curriculum Specialist, Program Director

robert_simpson@hms.harvard.edu

617-432-1557

intercollegiate Genetically Engineered Machines Competition (iGEM)

During the Summer and early Fall, students and instructors from over a dozen universities throughout the country will participate in iGEM (the intercollegiate Genetically Engineered Machines Competition) to work to design, build and characterize genetically-encoded finite state machines. These 'living' machines will try to program cells to for example count, decode signals, or produce specific patterns. Additional information including descriptions from last years competition and background material can be found online at http://2008.igem.org/Main_Page

Last year Harvard fielded its first team, who conceived and constructed the "Biowire and Bio-sketch" circuits in bacteria cells. The team of 12 undergraduates, with backgrounds in biology, chemistry, CS and physics, collaborated all summer and presented their work at the iGEM Jamboree. Entries from the year before have recently been published in Nature and featured in the New York Times. The field of synthetic biology is rapidly taking off.

This year we again plan to have a Harvard Team and are looking for up to 12 students (undergraduate or graduate) for the team.

Project work will include:

- System design and modeling

- Building genetic circuits in bacteria
- Testing, debugging and all that fun stuff

Note: that there will be a combination of dry and wet lab work. Thus we are hoping to assemble a group who, collectively, is excited to learn and work on both computers and in the laboratory.

The Harvard team will start first week of June. We will continue work throughout the summer and into the Fall as schedules permit. There will be a competition-wide jamboree in November at which all students and instructors will assemble to present/judge their systems and to share their experiences.

The Harvard Team will be advised by:

- George Church (Dept of Genetics, HMS)
- Radhika Nagpal (Computer Science, DEAS)
- Johan Paulsson (Dept of Systems Biology, HMS)
- Pam Silver (Dept of Systems Biology, HMS)
- Jagesh Shah (Dept of Systems Biology, HMS)
- William Shih (BCMP, HMS)

Please send an email to Alain Viel (aviel@fas.harvard.edu) if you would like to participate in what will be a very exciting summer. In your email, please mention why you are interested and what areas of expertise you might bring to the project.

The Journal of Emerging Investigators (JEI)

The Journal of Emerging Investigators (JEI) is an open-access journal that publishes original research in the biological and physical sciences written by middle and high school students. JEI provides students, under the guidance of a teacher or advisor, the opportunity to submit and gain feedback on original research and to publish their findings in a peer-reviewed scientific journal. Much of this original work comes from classroom-based projects, science fair projects, or other forms of mentor-supervised research. Our hope is that JEI will serve as an exciting new forum to engage young students in a novel kind of science education that nurtures the development and achievements of young scientists throughout the country.

JEI is a non-profit group run and operated by graduate students at Harvard University, and provides the opportunity for graduate students to participate in the editorial, review, and publication process, as well as one-on-one student mentoring. At JEI we are especially interested in guiding students in their research projects and teaching them how to communicate their projects to the public. To that end, we have initiated several programs in the greater Boston area to help middle and high school students turn science projects into manuscripts. In the past, we have presented 2-hour science research and writing workshops to students at several local high schools. JEI members have also been involved with semester- and year-long projects of students in local high school AP biology classes and internship programs.

Available positions:

Editor: JEI editors are responsible for coordinating the review and editing process for middle- and high-school student manuscripts, with an estimated workload of one manuscript every month.

Time commitment: 6-8 hours / month

Science Writing Coach: JEI science writing coaches work one-on-one with students over the internet to help improve manuscripts that otherwise might be rejected from the journal due to structural, grammatical, or scientific errors.

Time commitment: 6-8 hours / month

Science Mentor: Science mentors visit local schools and internship programs to lead 2 hour science writing workshops or work with students as they design and perform their own experiments. At the completion of the projects, science mentors will help students write up and format their projects as a scientific manuscript that can then be submitted to the journal.

Time commitment: 5-10 hours / month (depending on level of involvement)

Communications: Volunteers in communications are responsible for developing educational materials for use in science writing workshops and local science fairs, in addition to generation of instructional content for the JEI website and monthly newsletters.

Time commitment: 5-10 hours / month

Interested students should contact jeiscience@gmail.com

Personal Genetics Education Project (pgEd) – Map-Ed

The Personal Genetics Education Project (pgEd) is an educational outreach program directed by Ting Wu in the Department of Genetics at Harvard Medical School. Its mission is to increase public awareness about personal genetics and the ethical, legal, and social implications around personalized genome sequencing. We've developed an on-line educational tool, called Map-Ed (map-ed.org), which invites people to work their way through five question quizzes on key concepts and topics in genetics and then pin themselves on a world map. Map-Ed has thousands of pins in nearly 100 countries and on all 7 continents, including Antarctica. Map-Ed has pins from pioneers at the 3 U.S. research stations in Antarctica as well as a pin from the Curiosity rover on Mars.

Position description: (Uncertain whether to be offered this year)

We are seeking BBS volunteers who are interested in educating a general audience by expanding Map-Ed to new topics. A list of potential topics includes basic genetic concepts (modes of inheritance, mutations, etc), population genetics, cancer genetics, genetics of common disease (Alzheimer's disease, schizophrenia, etc), reproductive testing, genetics and violence, cloning, embryonic stem cells/iPS cells, and gene therapy.

Responsibilities include:

- Selecting topics of interest and meeting as a group to brainstorm the key concepts to convey
- Developing a set of 5 multiple-choice questions as well as a series 'fun facts' or explanations to guide players towards the correct answer
- Road-testing with friends and family to adjust the content and level of difficulty
- Presenting the quiz to the group for feedback

Time commitment:

In our experience, developing the concepts and building the quiz takes at least 60 hours. Aside from 2-3 group meetings, most of the work will be carried out independently.

For further information, please contact:

Marnie Gelbart – Director of Program Development & National Initiatives, pgEd
mgelbart@pged.med.harvard.edu

The Scholars in Medicine Office (formerly Office of Enrichment Programs)

The Scholars in Medicine Office advises and matches students with community service, international, language (Spanish) and research programs. The Community Service Program offers information about local community agencies and helps match students with service projects in and around Boston. The Program Manager for Boston-based Community Service is available to assist students with thinking through possible project ideas and linking them with appropriate faculty mentors and community agency personnel.

Contact Information:

Kari Hannibal, Program Manager

kari_hannibal@hms.harvard.edu

617-432-1573

SMO is located in the TMEC building, Suite 265, Upstairs in the Holmes Society.

Science Club for Girls (SCFG)

The Science Club for Girls (SCFG), winner of the 2009 Non-Profit of the Year awarded by the City of Cambridge, is looking for female volunteer-mentors to lead our hands-on science clubs. SCFG's mission is to increase the self confidence and science literacy of K-12th grade girls belonging to groups that are underrepresented in the sciences, through free after school and Saturday programs. Girls work with mentor-scientists who model and foster leadership, affirms college as an expectation, and promote careers in science and technology as goals and options. Volunteers are provided with training, supplies, staff support, and a flexible, hands-on curriculum. Our mentors work in pairs leading 8 to 10 public school girls in fun science and technology experiments. Please join us to make a difference in the futures of these young girls! Science Clubs asks volunteers to commit to 2 hrs once a week for 9 weeks per semester. These 2 hrs include prep and planning time. Clubs are held at 4 different schools in Cambridge, with

smaller sites in Boston, Newton and Lawrence. You may choose the day and location which is most convenient for you from our site options. View www.scienceclubforgirls.org

Science in the News

Science in the News (SITN) is a graduate student organization at Harvard with a goal that is two-fold: (1) to bridge the communication gap between scientists and non-scientists and (2) to effectively train the next generation of scientists to be able to communicate their research and engage with people of all backgrounds. SITN is the largest student-run science outreach group at Harvard, providing the community with over 30 events per year including a Fall and Spring lecture series, science cafes called Science by the Pint, various school outreach events, regular publication of articles on our online blog, and various social media engagement events. In 2015, we produced a day-long science conference for the general public called DayCon, which now regularly gathers more than 70 members of the public each year. In Fall 2015, we launched our monthly podcast series entitled "SIT'N Listen" exploring topics ranging from GMOs, allergies, and women in science. Each of our events is entirely prepared and executed by graduate students and covers topics spanning most scientific fields. Our model of peer-to-peer feedback, in conjunction with our large-scale engagement of members of the public, allows graduate students to evaluate and hone broad communication skills. There are many ways to be involved with SITN! Please visit our website SITNBoston.com or email us at sitnboston@gmail.com for more information.

Contact the current co-directors at sitnboston@gmail.com to get involved today!

The Science Mentor Program at the Boston Latin School

The Science Mentor Program at the Boston Latin School (BLS, www.bls.org) offers many talented students the opportunity to experience experimental science. The program also encourages students to excel at various Science Fairs at the school, city, state, national, and international levels. The program starts in late September and ends the following January when the first of the science fairs begin. During the program a mentor meets with his/her student mentee one or two hours after school each week. The mentor is to guide the mentee to form a project, to fulfill the project, and to work with the student to hone his/her presentation skills. The meeting place can be either at Boston Latin School (78 Avenue Louis Pasteur, Boston, MA 02115) or at the mentor's place of business.

If you are interested in participating in the Science Mentor Program as a mentor this year, please contact Grace Zuo, Parent Coordinator for the Science Mentor Program from Friends of Mathematics and Science (www.blsfms.org) at BLS, at frederickzhang@yahoo.com