WESTERN NEW YORK GENETICS IN HEALTH CARE PARTNERSHIP

A NIH's Science Education Partnership Award (SEPA) Program:
investing in educational activities that enhance the training of a workforce
to meet the nation's biomedical, behavioral and clinical research needs.

NIH National Institutes of Health
Turning Discovery Into Health
SEPA SCIENCE EDUCATION PARTNERSHIP AWARD
SUPPORTED BY THE NATIONAL INSTITUTES OF HEALTH

http://nihsepa.org

Informational Guide 2015-16

A partnership with University at Buffalo's Department of Biotechnical and Clinical Laboratory Science

NYS AREA HEALTH EDUCATION CENTER SYSTEM
77 Goodell St., Buffalo, NY 14203
716.816.7225
www.ahec.buffalo.edu

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SEPA SCIENCE EDUCATION PARTNERSHIP AWARD

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NYS AREA HEALTH EDUCATION CENTER SYSTEM

Connecting students to careers, professionals to communities, and communities to better health….

Our Mission..

The New York State AHEC System is a workforce development initiative. We focus on increasing diversity by recruiting and training people of all races and ethnicities for careers in health care. Our mission is to enhance access to quality health care and improve health care outcomes by addressing the health workforce needs of medically disadvantaged communities and populations through partnerships between the institutions that train health professionals and the communities that need those most. New York State AHEC System strategies keep skills and talents in the state, contributing to the health of the economy while improving the health and well-being of all New Yorkers.

Connecting students to careers…

From middle and high school students to adults seeking new skills, AHEC program participants learn the real-life roles and rewards of health care occupations. Early exposure sparks interest and sets adolescents on the right academic path. Retraining directs displaced or downsized workers into jobs with a future.

Our vision for better jobs …

New York has more good health care jobs than qualified workers to fill them. In fact, health care is expected to grow more than five times faster than any other field. AHEC encourages and prepares workers to pursue these rewarding positions.

Making New York State a Campus…

Our nine New York State community-based AHECs are recognized leaders in developing a diverse, skilled and committed workforce across all sectors and disciplines of health care. We devote special attention to underserved urban and rural locales, ensuring that each community gets the help it needs.

Why Workforce Diversity Matters…

Quality health care is not about just biology; it is about treating the whole person. Diversity isn't about just percentages; it is about relating to individuals. The relationship between a health care professional and a patient is influenced by everything from their language and ethnicity to their income and education levels, from their habits and beliefs, to the place where they grew up. The better a provider understands a patient's culture, the better they will communicate. The more they trust each other, the better the care and the outcomes.

Encouraging young people to pursue health careers…

It's hard to imagine working in a field without any knowledge or role models. One of our strategies is to guide students into an education "pipeline," exposing them to the rewards of health care careers as early as possible. This not only encourages interest in health care, it also helps to assure that students take the math and science courses required for acceptance into college or training programs.

Our Website: **www.ahec.buffalo.edu**

Like us on Facebook: **https://www.facebook.com/NewYorkStateAHEC1**

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Introduction to the Western New York Genetics in Health Care Partnership

The purpose of this research is to develop better ways to teach bioinformatics through the use of hands-on, state-of-the-art bioinformatics tools and create awareness of careers in life science and health care.

The Western New York Genetics in Health Care Partnership is being led by researchers at the University of Buffalo and the New York State Area Health Education Center System. The goal of this project is to create the Genetics in Research in Health Care Partnership in Western New York to serve as a pipeline for recruiting students to careers in life science and health care.

High School Biology teachers from partnering schools will attend a Summer Workshop at the University at Buffalo where they will receive training in use of the **GENI-ACT (Genomics Education National Initiative Annotation Collaboration Toolkit)**. Within each of the High School teachers' classrooms during the following school year, 5 life science and health care related college and career exploration sessions will be conducted to familiarize their students with the gene annotation project and to give it some "real world" context. Students will develop career plans by the last of these sessions as well as indicate their interest in being part of gene annotation project the later part of the school year. Each teacher will work with at least 7 students from their school, and will participate in genome annotation using the GENI-ACT during the school year. Each spring, a Capstone Symposium will be held, bringing participating students and teachers together to present their projects and network with researchers and employers. Students will be offered support (e.g., scholarship and career information, new internship opportunities) as they enter and progress through college, supporting entry to, and retention in, health care related careers in the region.

GENI-ACT Details

The innovative technology experience for students and teachers used in this project involves a "hands-on" cyber-learning approach, known as GENI-ACT, that will involve participants in a current and global research project while learning basic concepts of biology. The GENI-ACT consists of nine independent modules which includes learning about: DNA Sequencing, Cellular Localization Data, Structure-based Evidence, Enzymatic Function, Gene Duplication/Gene Degradation, Horizontal Gene Transfer, and RNA.

The use of the GENI-ACT modules encourages participants to:

- Use and master multiple database analysis software packages related to bioinformatics.
- Strengthen library and web-search skills.
- Develop skills in making hypotheses and the design of experiments to test them.
- Sharpen skills in analysis, synthesis and in the presentation and interpretation of results.
- Experience the collaborative nature of science.

Watch the YouTube video "**A Head Start for Tomorrow's Scientists**" for more information:
http://youtu.be/C5bo4alokp4

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Department of Biotechnical and Clinical Laboratory Sciences

Research Study

High School Science Teachers Wanted!

"Western New York Genetics in Research in Health Care Partnership"

Purpose: The purpose of this research is to develop better ways to teach bioinformatics through use of hands-on, state-of-the-art bioinformatics tools and create awareness of careers in life science and health care. This project will train teachers in GENI-ACT (Genomics Education National Initiative Annotation Collaboration Toolkit), an innovative technology experience for students and teachers which includes a "hands-on" cyber-learning approach, to increase knowledge of bioinformatics and allow them to gain experience with bioinformatics software for classroom use. The project will expand student understanding of basic bioinformatics and the scientific process through the use of GENI-ACT, and provide ongoing support to students as they pursue life science and health care career plans.

Criteria for participation: High school (grades 9-12) teachers from Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Steuben, Wayne, Wyoming and Yates counties/schools categorized as disadvantaged based on the percentage of free/reduced lunch and the percent of students entering college.

Benefits to Teachers: Through the activities of this project, you will participate in an intensive Summer Teacher Workshop led by University at Buffalo faculty who are part of the Education Program of the U.S. Department of Energy's Joint Genome Institute. This workshop will increase your knowledge of bioinformatics and allow you to gain experience with bioinformatics software for classroom use.

Time commitment: With support from project researchers, participating teachers will:

- July 2015: participate in 5 days of training in on the GENI-ACT.
- Oct. – Dec. 2015: coordinate 5 In Class/After School sessions related to gene basics and health care careers.
- Sept. – Dec. 2015: recruit 14 students – 7 will be randomly selected for the GENI-ACT project.
- January – May 2016: lead a group of 7 students in 5-month GENI-ACT project.

Compensation: Teachers will be paid for training, teaching and preparation, up to $2,137.50 per year, for an expected 85.5 hours of work annually ($25/hr).

Who to contact if you have questions about the research: Stephen T. Koury, PhD, Principal Investigator, University at Buffalo, Department of Biotechnical and Clinical Laboratory Sciences, 26 Cary Hall, Buffalo, NY 14214, 716-829-5188 [stvkoury@buffalo.edu].

A YouTube video with background information relevant to the project can be found at:
http://youtu.be/C5bo4alokp4

2015-16 Calendars of Events for Study Activities:

Timeline	Study Activity
July 2015	Teachers will participate in GENI-ACT training
October – Dec. 2015	In class/ after school lessons 1-5 will be conducted by your local AHEC center.
January – May 2016	Students/ teachers & WNY Genetics in Research Partnership staff work to complete GENI-ACT modules.
June 2016	Capstone Symposium at UB.

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What to Expect During the Study School Year

During the beginning of the school year, teachers will work with the local NYS AHEC Center representatives to schedule 5 activities with their students to be completed between October and December 2015. NYS AHEC representatives will present and guide the first 4 activities with the students, and the final activity will be presented by Dr. Stephen Koury a faculty member of UB's Biotechnical and Clinical Laboratory Sciences. All materials used during these activities will be provided by NYS AHEC.

Below are the activities the students will attend during Semester 1 of the study.

Semester 1: October – December 2015

- **Activity 1**: "Introduction to the Power of Molecular Diagnostics" using a "Disease Detectives" approach and discussion of methodology.

- **Activity 2:** "Specific Application of Molecular Diagnostics to Disease" using cystic fibrosis as an example.

- **Activity 3:** "Ethics of DNA Testing" in which students will be presented with scenarios dealing with ethical issues related to DNA testing and be encouraged to think about the impact it will have on their lives.

- **Activity 4:** "Spotlight on Health Professionals and Genomics" including videos of interviews with those individuals discussing how and why they entered the field. Students will be offered career guidance by AHEC facilitators at the end of this activity as well.

- **Activity 5:** "Applications of Molecular Diagnostics" in relation to microbial infections. This module will include an introduction to the genome annotation activities in Semester

Semester 2: January – May 2016

Teachers and members of the UB WNY Genetic in Research Partnerships Staff will help teachers and students complete a series of a series of GENI-ACT modules as follows:

- Module 1: Basic Information
- Module 2: Sequence Based Similarity
- Module 3: Structure Based Evidence
- Module 4: Cellular Localization
- Module 5: Alternative Open Reading Frame
- Module 6: Enzymatic Function
- Module 7: Duplication and Degradation
- Module 8: Horizontal Gene Transfer
- Module 9: RNA

June 2016

A Capstone Symposium will be held at UB, bringing participating students and teachers together to present their projects and network with researchers, educational programs and employers.

Bioinformatics is considered one of the fastest-growing career fields in the state and across the country.

Careers in Bioinformatics & Genomics

It is projected that nationally 80 percent of future careers will somehow be tied into biomedical sciences.

Bioinformatics is a rapidly growing field that provides research tools to better understand diseases at the molecular level, leading to improved health care and disease management, and facilitating a future era of individualized medicine.

We're finding new ways to discover our past, solve crimes, restore the environment!

There's a lot more to life sciences than lab coats and test tubes. Western New York's growing industry cluster of more than 125 life sciences companies includes both established and fledgling firms, as well as research institutions like Roswell Park Cancer Institute and the Hauptman-Woodward Medical Research Institute. Collectively, these companies and institutions employ more than 10,000 people, and offer job opportunities within these seven Career Pathways:

- **Laboratory Sciences**
- **Engineering**
- **Information Technology**
- **Manufacturing**
- **Quality Control**
- **Business**
- **Support**

At the beginning of the decade, there were approximately 8,940 medical and clinical laboratory technicians employed throughout New York State. By 2012, there will be approximately 9,680. This represents an increase of 74 jobs each year.

Nationally, employment of clinical laboratory workers is expected to grow to 362,000 by 2016. That is a 14% annual increase, which is faster than average for most occupations.

Source: www.nycareerzone.org

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"Connecting students to careers, professionals to communities, and communities to better health."

NYS AHEC http://www.ahec.buffalo.edu

The New York State AHEC System encourages local individuals to pursue careers in health care. To aid with this we have helpful links to a variety of web sites that offer programs for the development of health professionals and to aid students in making a decision to pursue a health career.

What do biomedical informatics companies do?

Biomedical informatics organizations provide products and services that use computers, software and databases to gather, manage, and analyze data for other life sciences and health care companies and institutions. These data can include genetic information, clinical trials or laboratory research information, electronic patient medical records and more.

What types of people do they employ?

Biomedical informatics organizations employ a range of individuals with technical and non-technical backgrounds, including biostatisticians, customer service representatives, computer engineers, administrative assistants, IT support people, accountants, and clinical research associates.

WNY Bioinformatics Companies & Institutions

AHRM Inc.
Buffalo, New York
www.ahrminc.com

Celerity LLC
Buffalo, New York
www.celerityllc.net

Cognigen Corporation
Williamsville, New York
www.cognigencorp.com

CTG Life Sciences Solutions
Buffalo, New York
www.ctg.com/ lifesciences

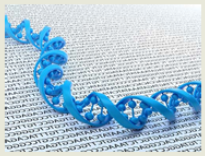
Dendress Corporation
Buffalo, New York
www.dendress.com

HealthTransaction Network
Williamsville, New York
www.healthtransactionnet.com

Integral Information Systems LLC
Amherst, New York
www.integral.bz

Tactus Technologies
Amherst, New York
www.tactustech.com

TenEleven
West Seneca, New York
www.10e11.com



AndroBioSys, Inc.
Buffalo, New York
www.androbiosys.com

Angus Buffers & Biochemicals
Niagara Falls, New York
www.dow.com/angus

Buckler Biodefense
Buffalo, New York
www.bucklerbiodefense.com

Buffalo Clinical Research Center, LLC
Buffalo, New York
www.bcrc.us

CH3 Biosystems, LLC
Buffalo, New York
www.ch3biosystems.com

CPL Associates, LLC
Amherst, New York
www.cplassociates.com

Hauptman-Woodward Medical Research Institute
Buffalo, New York
www.hwi.buffalo.edu

Life Technologies Corporation
Grand Island, New York
www.lifetechnologies.com

Rheonix, Inc.
Grand Island, New York
www.rheonix.com
Buffalo, New York

Roswell Park Cancer Institute
Buffalo, New York
www.roswellpark.org

United Biochemicals
Sanborn, New York
www.unitedbiochemicals.com

University at Buffalo
Buffalo, New York
www.buffalo.edu

ZeptoMetrix Corporation
Buffalo, New York
www.zeptometrix.com

Empire Genomics
Buffalo, NY
www.empiregenomics.com

New York State Center of Excellence in Bioinformatics & Life Sciences
Buffalo, NY
www.bioinformatics.buffalo..edu

EDUCATION & TRAINING

Regional Higher Education Institutions

Alfred State College
Bryant & Stratton Business Institute
Buffalo State College
Canisius College
D'Youville College
Daemen College
Empire State College
Erie Community College
Everest Institute - Rochester
Genesee Community College
Hilbert College
Hobart and William Smith Colleges
Houghton College
ITT Technical Institute
Jamestown Business College
Jamestown Community College
Keuka College
Medaille College
Monroe Community College
Nazareth College
Niagara County Community College
Niagara University
Olean Business Institute
Roberts Wesleyan College
Rochester Institute of Technology
St. Bonaventure University
St. John Fisher College
SUNY at Brockport
SUNY at Fredonia
SUNY at Geneseo
Trocaire College
University at Buffalo
University of Rochester
Villa Maria College

Genomic & Bioinformatics Career Resources & Links

The National Institute of Health Genomic Careers Resource:

http://www.genome.gov/genomicCareers

The National Human Genome Research Institute (NHGRI) has developed this interactive tool to help students explore the possibilities of finding a fulfilling and rewarding career in a Genetics or Genomic-related field. It is also designed as a resource for counsellors and teachers. Through the use of interactive video, this unique tool allows students to listen to professionals explain what they do and what they find inspiring about their work. With many of the interviews, students can choose which question they would like to ask and they take a tour of some of the most cutting-edge facilities in the United States. The interviews and tours are conducted in a fun, light-hearted and engaging manner.

iSciWNY Careers in Life Sciences

http://isciwny.com

iSciWNY is your gateway to the life sciences industry in Western New York. Through this program, you'll learn about: career pathways, types of life sciences companies, available education and training, and more!

The Hauptman-Woodward Institute's High School Apprenticeship Program

http://www.hwi.buffalo.edu/outreach/high_school_program.html

The Hauptman-Woodward Institute's high school apprenticeship program is a unique learning experience that affords area high school students the opportunity to study evolution and bioinformatics in the laboratory of H. A. Hauptman Distinguished Scientist, Dr. William L. Duax. If you are a Buffalo-area high school student, and you would like to join the team working on this exciting project, download an application or contact Dr. Duax for more information at duax@hwi.buffalo.edu

New York State Center of Excellence in Bioinformatics & Life Sciences

http://www.bioinformatics.buffalo.edu

The mission of the University at Buffalo's **New York State Center of Excellence in Bioinformatics and Life Sciences** is to foster economic development by connecting university resources with life sciences and high-tech industry through funding, research and development support, programming, and education, with the goal of helping companies find business solutions, accelerate new ideas, and grow. This technology-based economic development mission is complemented by the COE's efforts to support the advancement of new discoveries in science that seek better ways of preventing and managing disease and improving lives.

Bioinformatics at Rochester Institute of Technology (RIT)

http://www.rit.edu/cos/bioinformatics/index.html

Graduates of the RIT Bioinformatics programs have entered such laboratories, both in industry and academia, as bioinformaticists. Some have also gone on to leverage their biotechnology experiences as wet lab experimentalists themselves. RIT offers a combined BS/MS program which can be completed in a total of five years. For those who wish more laboratory experience, they also offer a Molecular Genetics Option with less computer science and more molecular genetics experience.

NYS Area Health Education Center System

Erie Niagara AHEC

Mary E. Craig, MSHC , President
34 Benwood Avenue
Buffalo, NY 14214
716-835-9358
www.erieniagaraahec.org

Rural AHEC

Ken Oakley, PhD, CEO
20 Duncan Street
PO Box 152
Warsaw, NY 14569
585-786-6275
www.r-ahec.org

NYS AHEC System Statewide Office

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SEPA Research Participant Letter of Commitment

This document serves as a letter of commitment by *(print name)*_____
to participate as a teacher in the *Western New York Genetics in Health Care Partnership Research Project*.

Purpose: The purpose of this research is to develop better ways to teach bioinformatics through use of hands-on, state-of-the-art bioinformatics tools and create awareness of careers in life science and health care. This project will train teachers in GENI-ACT (Genomics Education National Initiative Annotation Collaboration Toolkit), an innovative technology experience for students and teachers which includes a "hands-on" cyber-learning approach, to increase knowledge of bioinformatics and allow them to gain experience with bioinformatics software for classroom use. The project will expand student understanding of basic bioinformatics and the scientific process through the use of GENI-ACT, and provide ongoing support to students as they pursue life science and health care career plans.

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- January – May 2016: lead a group of 7 students in 5-month GENI-ACT project.

Compensation: Teachers will be paid for training, teaching and preparation, up to $2,137.50 per year, for an expected 85.5 hours of work annually ($25/hr).

Teacher Contact Information:

School Name: _____

School Address: _____

Grades & Courses Taught:_____

e-mail:_____

Cell or home phone:_____

I have read this document and I pledge my commitment to participate in this study. My signature indicates that I am committed to participate in this research project freely, without coercion. I understand that participation in this research is voluntary and that I will not be penalized if I choose not to participate in the research.

Teacher name (please print): _____

Teacher signature _____ **Date** _____

NYS AREA HEALTH EDUCATION CENTER SYSTEM
Statewide Office
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716.8136-7225
www.ahec.buffalo.edu

LOCAL NYS AHEC CENTERS:

Erie Niagara AHEC Center: 34 Benwood Ave. Buffalo, NY 14214 http://www.erieniagaraahec.org

Western New York Rural AHEC Center: 20 Duncan St., Warsaw NY 14569 http://www.r-ahec.org

SEPA in the NEWS:

NIH award will prepare WNY high school students for careers in genetics and genomics

http://www.buffalo.edu/news/releases/2014/09/023.html#sthash.nSadPgj6.dpuf

University at Buffalo Lands $1.2M to Launch Genomics Training for Regional High Schools

https://www.genomeweb.com/university-buffalo-lands-12m-launch-genomics-training-regional-high-schools

Higgins, UB announce $1.2 million grant to help high schools prepare students for careers in genetics, genomics

http://www.wnypapers.com/news/article/current/2014/09/16/117622/higgins-ub-announce-1.2-million-grant-to-help-high-schools-prepare-students-for-careers-in-genetics-genomics

New program encourages students to study genetics & genomics

http://news.wbfo.org/post/new-program-encourages-students-study-genetics-genomics

A Head Start for Tomorrow's Scientists:

http://youtu.be/C5bo4alokp4