



Course Syllabus

An Understanding of DNA: Making the Invisible Visible

Part 1 of the 3 Part Workshop: Easy as ABC: Applications of Biotechnology in the Classroom

Dates:

Friday, December 7, 2012, 4:00-8:00 PM

Saturday, December 8, 2010, 9:00 AM-5:00 PM

Location: Shoreline Community College

16101 Greenwood Avenue N., Shoreline, WA 98133

Instructors:

Adrienne Houck

The Amgen Bruce Wallace Lab program coordinator, Adrienne Houck, has worked for Shoreline Community College for 7 years in biotechnology outreach and science education. She got her BA in secondary education with biology, earth science and general science endorsements from Western Washington University. With her classroom experience as well as field experience working as a pipette vendor for Rainin and companies like Geospiza, My Girl Boat marine science outreach and assisting with the middle school program at NWABR, she has a unique view of the importance of local biotech and how to merge new curriculum into current classroom logistics. Adrienne is driven to provide opportunities that assist teachers in bringing current science to the classroom.

Dina Kovarik, M.S., Ph.D.

Bio-ITEST Program Manager, Bioinformatics, NWABR. Dina has fourteen years of experience in molecular biology, obtaining an M.S. in Epidemiology and a Ph.D. in Molecular and Cellular Biology from the University of Washington working primarily on HIV/AIDS. She also worked as a Teaching Associate in the Department of Biology, Sonoma State University, and was a founding member of FOSEP, the Forum for Science, Ethics and Policy. She has been the Program Manager for NWABR's Bio-ITEST bioinformatics program since 2009, assisting with professional development workshops for teachers, development of bioinformatics curricula, and team-teaching "Dynamic DNA: Exploring Biological Systems" through the Washington Innovative Careers Network (WaNIC).

Program Description

This is the first workshop of a three-part series, *Easy as ABC: Applications of Biotechnology in the Classroom*, developed as a partnership between Shoreline Community College's Amgen Bruce Wallace Lab Program and the Northwest Association for Biomedical Research (NWABR)'s Bio-ITEST bioinformatics program.

This introductory workshop is designed for middle school life sciences teachers and high school biology teachers who are new to working with DNA. The overall goal of this workshop is to help teachers infuse a basic understanding of DNA into their classrooms by including techniques from multiple perspectives, so that life sciences students can visualize the unseeable (DNA) by making concrete connections to things that students *can* see. Activities include an introduction to micropipetting and agarose gel electrophoresis (separating

molecules based on size), DNA extraction (purifying DNA that you can see in a test tube), genomic DNA purification from cheek cells (purifying DNA that you can use in an experiment), and using a bioethics case study about how genetic information is impacting medical decisions. Bioinformatics is the application of computer science and information technology to biology and medicine. In addition to the hands-on activities covered in this workshop, teachers will learn how to use the freely-available Cn3D program to help visualize a variety of macromolecules, including DNA.

For links to the Amgen Bruce Wallace laboratory activities and NWABR's bioinformatics lessons covered in this workshop, as well as regular program updates, visit the Shoreline Partnership Workshop at: <http://www.nwabr.org/shoreline-partnership-workshop>

Clock Hours and Resources

Ten clock hours will be provided free of charge. Dinner will be provided on Friday, December 7. Lunch will be provided at the Saturday session. A light breakfast will be available prior to the Saturday session, from 8:30-9:00 AM. Teachers will also receive access to various biotechnology and bioinformatics resources, including free access to all lab equipment, supplies and reagents used in these trainings to bring these labs into your classroom!

Workshop Agenda

| Friday, Dec 7 | Topic / Event | Instructor(s) | Location |
|---------------|---|-----------------|-----------------------|
| 4:00-4:30 | Program Introduction | Adrienne & Dina | Room 2946 |
| 4:30-5:30 | Case Study: BRCA & Genetic Testing <i>NWABR's Bio-ITEST Introductory Lesson 3</i> | Dina | Room 2946 |
| 5:30-6:30 | Introduction to Micropipetting <i>Bruce Wallace Lab 1, Part 1</i> | Adrienne | Biotech Lab (Rm 2930) |
| 6:30-7:00 | Dinner | | Room 2946 |
| 7:00-7:45 | Setting up Micropipetting Activities in the Classroom <i>Bruce Wallace Lab 1, Part 1, Teacher Prep</i> | Dina | Biotech Lab |
| 7:45-8:00 | End of Day Wrap-Up | Adrienne & Dina | Biotech Lab |

| Saturday, Dec 8 | Topic / Event | Instructor(s) | Location |
|-----------------|---|-----------------|-------------|
| 8:30-9:00 | Light Breakfast | | Room 2946 |
| 9:00-10:00 | DNA Extraction & Purification: Introduction & Set-Up | Adrienne & Dina | Biotech Lab |
| 10:00-10:45 | DNA Extraction with Students | Adrienne | Biotech Lab |
| 10:45-11:00 | Break | | |
| 11:00-12:00 | Genomic DNA Purification <i>Bruce Wallace Lab 8</i> | Adrienne | Biotech Lab |
| 12:00-12:45 | Lunch | | Room 2946 |
| 12:45-2:15 | Using Cn3D to Visualize Macromolecules: DNA and the BRCA1 protein <i>NWABR's Bio-ITEST Introductory Lesson 5</i> | Dina | Biotech Lab |
| 2:15-2:30 | Break | | |
| 2:30-3:00 | Agarose Gels: Prepping Gels & Dyes <i>Bruce Wallace Lab 1, Part 2, Teacher Prep</i> | Adrienne | Biotech Lab |
| 3:00-4:00 | Agarose Gel Electrophoresis with Dyes <i>Bruce Wallace Lab 1, Part 2</i> | Adrienne | Biotech Lab |
| 4:00-4:30 | Visualizing and Interpreting Agarose Gels <i>Bruce Wallace Lab 1, Part 2</i> | Adrienne | Biotech Lab |
| 4:30-5:00 | Program Wrap-Up | Adrienne & Dina | Biotech Lab |

Workshop Collaborators

The Amgen Bruce Wallace Lab program, funded by the Amgen Foundation was established in California as a way to connect Amgen pharmaceutical research with the local communities. With about 7 centers in the locations where the Amgen company is established across the country, Shoreline Community College and the Seattle area were lucky enough to be awarded the program and SCC has been training teachers coming upon its 8th year. We reach over 5000 students a year through our curriculum trainings, kits to classrooms and classroom visits.

NWABR is a non-profit dedicated to promoting an understanding of biomedical research and its ethical conduct through dialogue and education. A membership organization with over 60 institutional and associate members conducting or involved closely with biomedical research, NWABR connects the scientific and education communities and helps the public understand the vital role of research in promoting better health outcomes. Members include industry, academia, health care, and voluntary health organizations. Major collaborators with NWABR's Bio-ITEST bioinformatics program include Digital World Biology, the EdLab Group (formerly the Puget Sound Center for Teaching, Learning, and Technology), and Shoreline Community College. The program also draws on NWABR's strong relationships with school districts, community groups, bioethicists and NWABR member research institutions.

Bruce Wallace

BIOTECHNOLOGY LAB PROGRAM

For more information, including links to the laboratory activities covered in this workshop and many more, visit: <http://www.bwbiotechprogram.com/>



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For more information about the Bio-ITEST program, visit:
<http://www.nwabr.org/education/itest.html>

For links to the bioinformatics lessons and activities covered in this workshop, visit:
<http://www.nwabr.org/curriculum/introductory-bioinformatics-genetic-testing>