

Summer Professional Development for High School Biology and Math Teachers

Research as Pedagogy

A 2-credit graduate course covering topics in
Molecular Biology and Statistics

Offered through the Science Research Institute (SRI), Concordia University –
St. Paul and Northwestern College

Description: Receive college credit from Concordia University – St. Paul by participating in the Science Research Institute (SRI) this summer and implementing materials into your high school classes.

Location: Northwestern College, Roseville

Dates: Options available between July 3, 2012 – August 3, 2012

9:00 am – 1:00 pm, M – F

SRI description: The Science Research Institute (SRI) is a year-long program partnering college science majors and under-represented populations of high school students with an interest in science, technology, engineering and math (STEM) to develop their knowledge and skills in STEM and research. SRI begins with a 5-week summer program during which students learn science and math content through research modules that include laboratory experiments, group-based problem solving, field exploration and lecture. During the academic year, students engage in monthly science activities as they continue to develop their understanding of STEM, explore career opportunities, and reach out to the community. High school teachers play an important role during the summer by mentoring students and partnering with the college faculty in teaching.

A partnership between Concordia University-St. Paul & Northwestern College



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<http://www.nwc.edu/web/biology>



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One of the goals of the SRI program is to impact as many high school students as possible. Students who participate in the summer program are the primary beneficiaries of the program, but we also seek to touch high school students on a broader scale by involving high school teachers in who can use their SRI experience to impact students in their own classroom. One way we ask for this to happen is for teachers to use material covered in SRI to develop lessons for use in their classroom. For some teachers this is not always feasible and we recognize that this is not the only way to have an impact. Therefore, we encourage applications from all teachers who could bring something unique to the program or who would benefit from this program professionally.

SRI Summer Program Structure and Benefits

- Two research projects will be done this summer focusing on molecular biology and statistics. See following page for project descriptions.
- Each project runs for two weeks and is taught by a college faculty member.
- During the final week of the program, high school students prepare and give presentations based on one of the research projects they completed.
- Teachers have the option of participating in either or both of the projects along with the final week of the program.

3 week Molecular Biology option

- July 2 – July 13, 2012 **and** July 30 – August 3, 2012 (9:00 am – 1:00 pm, M – F)

3 week Statistics option

- July 16 – August 3, 2012 (9:00 am – 1:00 pm, M – F)

5 week option

- July 2 – July 13 – August 3, 2012 (9:00 am – 1:00 pm, M – F)
- The program only runs half-days, freeing time for other pursuits.
- Teachers are paid a **stipend** proportional to their commitment.
 - The stipend is **\$1200** for three weeks and **\$2000** for five weeks.
- Two credits of college credit for the course Research as Pedagogy are earned from Concordia University – St. Paul if teachers develop materials from the summer for use with their high school students and evaluate their effectiveness. **Tuition for the course is waived for participants.**

Research Project Descriptions

Molecular Biology

- The first two weeks will focus on molecular biology, using biotechnology techniques such as DNA extraction, PCR, electrophoresis, and sequencing. The exact research project is still in development.
- Taught by Dr. Heather Haemig of Gustavus Adolphus College.
- July 2 – July 13, 2012 and July 30 – August 3, 2012 (9:00 am – 1:00 pm, M – F)

Statistics

Uncertainty and partial information – that is what we face every day when we try to make informed decisions. Statistics is one important tool in solving real life problems. Often we have to estimate the chance of various outcomes and then make a choice to maximize gain or minimize loss. In statistics we want go through 6 steps to:

- (a) **Identify** important variables related to the phenomenon of interest
- (b) **Analyze** those important variables, assigning probabilities to various possible outcomes
- (c) Make an **hypothesis** concerning a relationship between those variables
- (d) **Collect** some data
- (e) **Describe** the data visually and numerically
- (f) **Test** the hypothesis

In this module you will investigate statistics from the perspective of practical data collection. You will apply these principles to everyday decision making, including: understanding everyday occurrences, developing winning strategies for games, analyzing the stock market, predicting the weather, etc. This module will also provide you with additional tools for investigating your biology research topic.

- Taught by Dr. Jonathan Zderad of Northwestern College
- July 16 – August 3, 2012 (9:00 am – 1:00 pm, M – F)

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Science Research Institute (SRI)
High School Teacher Application Form
2012-2013

To apply for the SRI program, please complete the following form along with a CV/resume and submit to Joanna Klein by **Friday, April 13th, 2012**.

Dr. Joanna Klein
Associate Professor of Biology
Northwestern College
3003 Snelling Ave. N.
Office N3048
St. Paul, MN 55113
651-286-7468
jrklein@nwc.edu

1. Name: _____
2. School: _____
3. Local contact information (school address):
Address: _____
City, State, Zip: _____
Phone(s): _____ Email: _____
4. Courses you teach/specialty:
5. I am interested in (Please check all that apply):
 - Molecular biology option (3 weeks - see program dates above)
 - Statistics option (3 weeks – see program dates above)
 - Participating in the entire 5-week program
 - Earning college credits to enhance my professional development
6. On a separate sheet, please discuss your previous course work or teaching experience with either or both of the two topics that will be covered; molecular biology and statistics. Also discuss how your involvement in SRI will impact students in your classroom and how it would benefit you professionally.