Work Plan for NSLS XAFS Training Pilot Program

Goals

1. Provide potential users of XAFS beamlines at the NSLS with information to help them design an effective and appropriate proposal
2. Provide NSLS users inexperienced with XAFS techniques training to allow them to make efficient and successful use of their beam time
3. Assure all NSLS users with XAFS data have the necessary skills to analyze and interpret their data
4. Develop a model for technique-specific NSLS training which can be extended to other techniques utilized at the NSLS
5. Develop materials for XAFS training which can be adapted for use by other synchrotron facilities
6. Develop material for XAFS training which can be adapted for use by members of the NSLS HBCU consortium

Projects

Project I: XAFS Online Orientation

The XAFS Online Orientation (XOO) is meant primarily to fulfill goals 1 and 2, although it is also relevant to goals 4 and 5. XOO will consist of an online web course including the following modules:

- Overview of an experiment, from formulation of problem through interpretation of data
- Creating an experimental protocol
- Preparing samples
- Taking data
- Applying for beam time

These modules will consist of Flash-based web pages, incorporating text, graphics, sound, and video, following established principles of distance learning. The total time for an individual user to take the orientation will be under one hour. More material than this will be available, however, as users will only be viewing information specialized to their experimental needs (for example, users needing only XANES data do not need to watch information on collecting EXAFS). To further goal 5, all material will be published using a Creative Commons "Attribution-Share Alike" license.

Deliverables: Complete XOO web pages, ready for use by users

Project II: XAFS Online Course Modules

The XAFS Online Course Modules (XOCMo) are intended to help fulfill goals 3, 4, 5, and 6. These modules will work either as stand-alone lessons on particular topics, as preparation for a face-to-face course, or as a component of a face-to-face course ("hybrid" distance learning). Topics will be chosen for their appropriateness to an online format. They will include, but are not limited to:

- Overview of synchrotron radiation
- Introduction to XAS
- Evaluating data quality
- Introduction to data reduction
- Fourier transforms
- Introduction to reduction and analysis software
- Statistics and measurement uncertainty

Like XOO, XOCMo modules will consist of Flash-based web pages, incorporating text, graphics, sound, and video. These modules will be more extensive, however, with some requiring up to an hour of the student's time. The total time for a student to work through all modules will be on the order of five hours. To further goal 5, all material will be published using a Creative Commons "Attribution-Share Alike" license.

Deliverables: Complete XOCMo web pages, ready for use by students

Project III: Introduction to XAFS Short Course

The final phase of the program will be the development of a short introductory course in XAFS techniques which can be offered multiple times each year to interested users. For this to be feasible, the course will have the following features:

- It will be taught by graduate students, post-docs, and senior researchers who are relatively new to XAFS. While instructors will be given a stipend, they will in part be recruited through their desire to gain teaching experience in the field.
- XOCMo will be used with the course, increasing the efficiency of the face-to-face component and providing structure for the novice instructors.
- Lesson plans will be developed by experts, and novice instructors will be trained by those with more experience.
- Each session of the course will include 3 instructors, 3 beamlines, and 15 students, and least for 3 days. It is not necessary that the same beamlines be used for each session, and each beamline needs to be available for only ½ day per session.
- Each student will prepare, measure, and analyze the same samples.

The face-to-face portion of the class will have the following structure:

- Day 1: Introductory lectures in the morning, followed by sample preparation in the afternoon
- Day 2: Lectures on data collection, reduction, and theory in the morning, followed by data collection in the afternoon
- Day 3: Lectures and examples on data analysis in the morning, followed by a processing and analysis workshop in the afternoon, followed by a concluding lecture providing information on how to further develop their skills

Deliverables: Lesson plans and a set of novice instructors prepared to teach the course

Personnel

Project Leader: Scott Calvin (Sarah Lawrence College). Prof. Calvin will have primary responsibility for coordinating with NSLS administration, and for coordinating all aspects of the project.

Lead Developers: Faisal Alamgir (Georgia Tech) and Scott Calvin. Prof. Alamgir and Prof. Calvin will be responsible for developing the majority of the materials.

Steering Committee: In addition to Alamgir and Calvin, the steering committee will consist of Anatoly Frenkel (Yeshiva University), Bruce Ravel (NIST), and Syed Khalid (NSLS). The Committee members will:

- Decide what is to be included in each XOO and XOCMo module, and in the Introduction to XAFS short course.
- Review modules as they are developed, suggesting changes or additions as appropriate.
- Consult on questions of schedule, implementation, and dissemination
- Develop XOO, XOCMo, or course materials for which they have special expertise

Web Developer: Stephen Giordano (NSLS). Mr. Giordano will be responsible for implementing the scripts, video, and audio with which he is provided in Flash-based webpages.

Videographer: The NSLS videographer will coordinate with members of the Steering Committee to produce the necessary videos according to scripts developed for the project.

Video talent: Members of the Steering Committee will identify and contact appropriate volunteers to appear in the videos, taking full consideration of issues of diversity.

Novice instructors: Members of the Steering Committee will devise a system for recruiting novice instructors to teach the Introduction to XAFS short course.

Beta testers: Members of the Steering Committee will identify and recruit volunteers to test the online modules.

Milestones

The following target dates have been set. They include a prototype XOO module scheduled for completion early so that the schedule and process for other modules can be adjusted accordingly.

XOO:

Develop storyboards for modules: Sep. 19, 2008 (complete)

Prototype module (Sample Preparation):
Script complete: Oct. 1, 2008
Media complete (video, sound, etc.): Oct. 15, 2008
Flash pages complete: Oct. 20, 2008

Scripts complete: Nov. 20, 2008

Media complete: Dec. 1, 2008

Flash pages complete: Dec. 15, 2008

Beta-testing complete: Jan. 15, 2009

XOO complete and available to all users: Feb. 1, 2009

XOCMo: June 15, 2009. Milestones for XOCMo will be analogous to those for XOO, and will be set in early 2009 once the XOO process can be evaluated.

Introduction to XAFS short course: August 15, 2009. Dates for intermediate milestones will be assigned in spring of 2009, once XOO and XOCMo processes can be evaluated. Milestone events are:

Detailed course outline complete

Lesson plans and course materials complete

Novice instructors selected

Novice instructors trained