NAME: Undergraduate Program

INSTITUTION: Howard Hughes Medical Institute

Howard Hughes Medical Institute
Office of Grants and Special Programs
Updated – 01/15/09

DRAFT: HHMI CURRICULUM DEVELOPMENT : UPPER LEVEL PROTEOMICS GENOMICS COURSE

Inputs	Strategies	Outputs	Outcomes		Impacts
			(Short Term-Learning)	(Medium Term-Action)	(Long Term-Conditions)
Undergraduate Students Curriculum Development Teams (Faculty, Instructors, Postdoctoral fellows, and Graduate and Undergraduate Students) Biology Faculty Chemistry Faculty New Scientific/Pedagogical Discoveries Teaching and Research Laboratories Equipment and Supplies (software) Institutional Commitment Collaborating Institutions Supportive Teaching and Research Environment and Infrastructure: Teaching Seminars/Workshops/Lunch Meetings Charles Center Teaching Mentoring Faculty Release Time Graduate Teaching Assistants Department Curriculum Review Opportunities/External Review HHMI – Staff, Leadership and Funding Other Funding Sources	Review of strategies and resources by interdisciplinary faculty committee: ongoing as lab is developed Continued interaction with Biology and Chemistry faculty as lab is developed : for faculty buy-in and input Use of material (phage) from freshmen phage lab to provide continuity of research experiences Dovetail with faculty research efforts/programs to ensure continuity Provide training opportunities and resources for faculty, lab coordinators, and graduate and undergraduate teaching assistants Provide for faculty release time Provide teaching assistants for new lab Provide training and support for others such as undergraduates, graduate students, and postdocs engaged in curriculum development efforts Update software packages and equipment for mass spec and genomics	An upper level laboratory course providing a real research experience examining the expression of phage genes (from phage isolated from freshmen phage lab) for 15 students each year—one involving genomics and proteomics Development of course materials for the new courses, including powerpoints, problem sets, flexible online lab manual, tutorials Faculty and instructors (lab coordinator and grad students) develop new skills in proteomics and genomics Other Chemistry and Biology faculty y develop interest in employing these new interdisciplinary techniques in their teaching and research	Students have better understanding of genomics, proteomics, neural systems and systems-biology Students have better understanding of phage biology Students have ability to apply genomic and proteomic approaches to wide range of scientific questions Faculty Lab development activities have positive impact on curriculum developers and those who implement it -- longer range they implement these strategies in other courses and in research Students demonstrate more interest and engagement in scientific research Students develop improved attitude toward approaches at interface between chemistry and biology Implementation leads to new collaborations among involved faculty New collaborations are formed between Biology and Chemistry faculty	Students remain engaged in science activities particularly at interface of biology and chemistry; they remain in science major More students take both chemistry and biology courses, and select interdisciplinary majors/minors Students demonstrate better understanding of material in upper level courses, particularly that at interface of biology and chemistry Stronger performance in related biology/chemistry courses and labs Faculty receive recognition for input of new course into curriculum and teaching new course with reduced workload in other areas Faculty continue to be involved in modifying or developing courses with less or no HHMI support Institutionalization of the new course Additional faculty become involved in course development using this courses as a model; Faculty use this course as paradigm for introducing genomics and proteomics in other courses Faculty use this course as paradigm for implementing “continuation” labs so that freshmen involved in research can continue their projects	Students enter interdisciplinary graduate programs or professions Students employ genomics and proteomics-based approaches in future science endeavors Faculty and instructors continue to modify what and how they teach science, in particular introducing many more new courses that involve systems-based approaches and modeling Faculty develop a freshmen-through-senior systems-based curriculum, expanding opportunities at all levels of the curriculum Faculty members disseminate this approach outside of W&M Faculty receive recognition, awards, tenure, promotion for their efforts; Institutions reward faculty for novel teaching and curriculum development activities Institutions commit funds and other similar support for interdisciplinary curriculum revision

NAME: Undergraduate Program

INSTITUTION: Howard Hughes Medical Institute

Howard Hughes Medical Institute
Office of Grants and Special Programs
Updated – 01/15/09

DRAFT: UPPER LEVEL GENOMICS PROTEOMICS LAB EVALUATION FRAMEWORK

Evaluation Questions for OUTCOMES		Possible Data Collection Methods and Information Sources	Rank/Priority (include brief rationale)
1. How effective was course in teaching genomics and proteomics ? 2. Did the students' attitudes towards genomics and proteomics change for the positive? 3. How effectively did the students employ these approaches beyond the course? 4. What was the effect of this course on the biology and chemistry curricula? 5. What impacts were there beyond college on curriculum development activities?	1. a. Students show increased interest in genomics and proteomics b. Students learn basic genomics and proteomics concepts and retain material long term c. Students value genomic/proteomic approaches and knowledge d. Students willing to take additional courses using similar approaches e. Students continue in interdisciplinary biology (majors and careers) and continue taking courses that cross disciplines 2. a. Students value interdisciplinary approaches b. Students willing to take courses outside of their comfort zone in emerging fields c. Students seek out genomics/proteomics courses d. Students recommend courses with genomics and proteomics to friends 3. a. Students take additional courses that bridge chemistry and biology and employ genomics and proteomics b. Students pursue research opportunities that employ genomics and proteomics c. Students employ these approaches in other courses and in their research projects 4. a. Course integrated into curriculum b. Course enrollment increases c. Number of students pursuing genomics and proteomics increases d. Biology Dept creates additional courses modeled on this course e. Faculty employ proteomics and genomics in their research program 5. a. Courses in other departments create similar integrative approaches b. Impacts science pedagogy at College c. Additional curriculum development grants and awards that stress genomics and proteomics d. Other departments and interdisciplinary programs create upper level courses that complement this course; multitidisciplinary courses created	1,2. a. Pre-Post Tests b. Entrance and Exit Questionnaire c. Interview d. Focus Group e. CURE f. Course/Classroom Observations g. Course Surveys 3. a. Data collection on course/curriculum changes (e.g., Enrollment for students) b. Student data for independent research activities 4. a. Data on offerings in curriculum and departmental major b. Interviews/reports from faculty and other curriculum developers c. Focus Group of faculty and other curriculum developers d. Faculty CVs and portfolios 5. a. Review of course offerings, syllabi, and catalogs for research based courses b. Review of teaching workshop topics and teaching seminars c. Assessment of teaching on P&T d. Faculty CVs and portfolios e. Annual report of HHMI-funded activities and their impact f. Grant funding information g. Institutional funding reports	Items are ranked based on how soon they can be captured during and after program activities (strategies) have occurred. However all questions and measures will be evaluated during and after each activity in order to capture the ongoing, longer-term changes in impact. That is, we except to see increasing impact over time.