

James Harber  
Application for Sabbatical 2013-2014  
Spring Semester 2014 requested for Sabbatical at 100%  
October 22, 2012 Draft

**1. Statement of Purpose**

The purpose of this one semester sabbatical is to pursue two goals:

(1) Participate in an unpaid research fellowship/internship in the iPS and Stem Cell sciences. This internship would involve acquisition of knowledge to support the cultivation of cell lines to support research and/or human clinical trials for eye diseases or alternatively another disease model such as heart, liver or kidney. Currently the main university destinations for our transfer students -UC Santa Barbara and UCLA collaborate on this research and are involved in human clinical trials for diseases including macular degeneration. Though unpaid, material support for this internship would be provided from existing support lines from grants to a University of California Science Research Laboratory that collaborates with the California Institute for Regenerative Medicine (CIRM) and/or a private company in the area of the adult induced pluripotent stem cell (iPS) and Stem Cell sciences. The newly awarded 2012 Nobel Prize emphasizes cell reprogramming as a way to achieve “autologous” transplantation, which is the amazing method of taking ones own cells and using them as therapy in personalized medicine. Learning the methods of this new discipline and following the emergence of new curriculum modalities for teaching this science in microbiology and cell biology classes are key goals for my sabbatical.

(2) Draft and submit to the Ventura Community College District for approval and submission to a National Science Foundation (NSF) grant. The purpose of this grant is to improve the ability to transfer Oxnard Community College students to the university. The grant provides full support for the remaining 2 years of university study. This grant falls under the S-STEM funding stream at NSF and requires very little administrative overhead. For this reason, a grant of this nature is often considered to be a good first application by a newly tenured scientist according to the program office of the NSF. The grant cycle starts in October with a letter of intent to apply with the NSF. The deadline for this grant is yearly, usually each June. Thus this project would be targeting the 2014-2015 application period.

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5257&org=NSF](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5257&org=NSF)

Oxnard College Mission, Vision and Statewide Goals:

With regard to the mission and strategic goals of Oxnard College, this internship would allow me to pursue a grant to increase the ability of students to successfully matriculate after transfer to university. This would increase the completion rate of 4-10 students by providing financing for the final two years of instruction for the university. The research internship for learning the new iPS stem cell technologies would improve instruction and provide me with opportunities for additional university level student internship placements. Placement of students in research internships while pursuing a degree has been a success area for my Directed Studies students over the past seven

years. Second, the Community College mission for improving the educational partnerships for economic development and the pursuit of opportunities for lifelong learning are supported by the research internship I intend to pursue. Furthermore, both of my project goals are aligned with the state level mission of the California Community Colleges for supporting transfer education, career and technical education, community education and economic development. The advancement of a highly technical workforce requires well-trained faculty and support for a career pathway for students, which are both goals of this sabbatical.

My project proposal supports the vision statements of Oxnard College for improving my ability to:

>“Rely upon scholarly, comprehensive, and current knowledge in all areas of instruction and service” by improving my knowledge of an area of therapeutic importance.

>“Provide innovative, appropriate, and effective instruction for student success” by allowing me to obtain view best practices of similar curriculum in a university setting.

>“Ensure student and staff access to technology and develop proficiency in all forms of communication, information retrieval, critical thinking and applied analysis” by allowing me to further educate myself to learn which specific items we can focus on at Oxnard College which will keep instruction current in these key areas.

>“Establish mutually beneficial relationships with the industries and communities we serve” including the local biotechnology industry and the medical research community that I intend to engage.

>“Provide leadership and resources for economic development and for improving the quality of life within the region” as I seek out new opportunities for bringing back to Oxnard College competitive technologies that are taught elsewhere.

>“Secure sufficient resources - material, financial and otherwise to facilitate the accomplishment of all of the above” and additionally through a grant proposal I intend to help drive the quest for external resources for student achievement through material support of a university Degree for Oxnard College students.

## **2. Rationale:**

This sabbatical application for the research fellowship/internship in the iPS and Stem Cell sciences for autologous transplantation has applications to section 8.6C of the AFT Local 1828-VCCCD for the followings items: (3) Approved teaching or research fellowships and teacher exchange programs and (4) Work or research in industry, business, or government. Furthermore the inclusion of the grant writing component to support transfer students for the remaining two years of their university degree has applications to the General Community (item e).

Professional Development: My goal is to obtain further experience in the laboratory for projects that relate to curriculum advances for science students. These now include exercises in how skin cells may be turned back into stem cells for the purpose of making new therapeutic cell types in field known as “autologous” transplantation. Many opportunities exist for learning the newly emerging technologies at companies and university research labs. The knowledge remains highly valued because it takes a semester to master a basic technique. One of the most difficult aspects of pursuing a career that emphasizes teaching is the ability to stay current in one’s discipline. In the

biotechnology field where methods and ideas change yearly, the stem cell sciences have emerged as a field that includes human therapeutics since I began teaching at Oxnard College. At Oxnard College as faculty, I have aligned myself with the organization Bio-Link.org that holds a yearly conference at U.C. Berkeley, which I attend in June that satisfies some aspects of professional development through participating exercises with companies and university collaborators. In the past several years, I have become aware that the stem cell sciences are a scientifically strategic area where each institution needs to have faculty with literacy. This is evidenced by the discovery in 2006 of the induced pluripotent stem cell technology in San Francisco at the Gladstone Institute. The 2012 Nobel Laureate for this work now enjoys his own institute in Japan for iPS. Our Oxnard College students need to be trained to understand the nuance of the promise of iPS research, the economic competitiveness of the field and the predicted transformational effects it will have on medicine. For example, since 2011 at Cedars-Sinai Hospital here in Los Angeles therapies for re-introducing cells from the patient for repairing heart attacks have passed the first stages of clinical trials. Heart disease is the highest cost item in healthcare and heart repair in this manner was previously unknown prior to 2011. Discoveries like these have accelerated interest in new areas of medicine that were previously uncharted. One important example from the Cedars-Sinai Medical Center illustrates a contemporary heart therapy that could have been invented decades ago, but was not considered because the intellectual basis of this low cost treatment (labor excluded) was not understood. For example, I recently attended an invitation only conference on stem cell therapies at Cedars Sinai and this video best captures the excitement of this promise of new approaches to therapy:

[http://www.youtube.com/watch?v=dT8EQrH\\_qvw](http://www.youtube.com/watch?v=dT8EQrH_qvw)

#### Value to Department or Discipline:

The research internship component of this project will enable me to master laboratory skills that have already been incorporated into community college student laboratory activities. City College of San Francisco is the lead for eight Community Colleges for the stem cell disciplines in California and is closely aligned with UCSF. {<http://www.cirm.ca.gov/content/city-college-san-francisco-stem-cell-training-enhancement-program>} As the only full time specialist for Molecular and Cellular Biology, Microbiology and Biotechnology at Oxnard College, I am seeking to address a need for further expertise aligning myself with UCSB and UCLA. These are the two UC schools that our transfer students prefer. Furthermore, the sabbatical will allow me to further understand the student internship placement process at these institutions (which is interwoven with work study). Often students are only granted 10 days to find a job on campus; this might be dishwashing or studying stem cells for minimum wage depending on the student's preparation. I can say unequivocally that the Directed Studies students I have taught have far exceeded my expectations for internships in the life sciences. So gaining further detailed intelligence on UC expectations on curriculum for student success is both important to my internship and the grant application components of the sabbatical.

I am aware that solving the question of disease in humans will involve the new technologies whereby a person's own cells are removed from the skin, reprogrammed with four discrete genes and returned to the same person in a differentiated state. City

College of San Francisco released curriculum related to this area for heart therapy in 2011 but without further formal training, none of the participants nationally including myself were able to achieve the endpoint of the model curriculum. I work exclusively in non-human cells for the work I perform in the lab and follow the guidelines of the NSF, CDC and Bio.org industry organization. However, in the new technologies it is best to observe how a major university is adapting itself to teach these iPS technologies to undergraduates and follow suite here at OC.

I am also aware of the need to balance new curriculum with the existing set of course offerings at Oxnard College. Development of our program for Molecular and Cellular (Majors Biology R120/120L) and Microbiology (MICR R100/100L) may not proceed past these four courses for the next several years due to the budget climate. Each semester I have taught at Oxnard College, I have also offered a limited number of students the option in Directed Studies for teaching areas of biotechnology that are part of the standard curriculum offerings to students at Moorpark and Ventura colleges.

Additionally, with regard to the 2-year university support grants from NSF for transfer students, the value to the department would be to increase awareness of the competitive education that we have to offer in the sciences at Oxnard Colleges by removing the main stumbling block to post-transfer student success in a university degree.

#### Value to College and/or District:

It is widely acknowledged in the scientific fields that many students' high achieving success is the result of the development of an individual strategy for navigating the upper division curriculum and related university laboratory internship opportunities. The current expectation for pre-medical and research oriented students is that they achieve some demonstrated immersion in research prior to applying to professional schools. Already students seek out the BIOL R199 directed studies opportunity I offer and this has provided competitive support for these student applications. My concern is that my thinking should reflect the state of the art and for that I need to return to the research environment to be re-educated in depth periodically. Furthermore, what I observe and participate in within this research environment will be used as additional justification in the grant application to support student success in university matriculation following transfer.

#### Value to Students:

This is the detail from the NSF site for the grant I intend to pursue for NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM):

“This program makes grants to institutions of higher education to support scholarships for academically talented students demonstrating financial need, enabling them to enter the STEM workforce or STEM graduate school following completion of an associate, baccalaureate, or graduate-level degree in science, technology, engineering or mathematics disciplines. Grantee institutions are responsible for selecting scholarship recipients, reporting demographic information about student scholars, and managing the S-STEM project at the institution.”

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5257&org=NSF](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5257&org=NSF)

Our current STEM grant program specifically addresses the transitional difficulties between High School and the Community Colleges. The financial hurdle is much lower between the High School and Community College than the Community College to university transition, which is addressed in the NSF grant proposal I intend to write.

Value to General Community (Optional):

The Oxnard Community contributes more than its share of intellectual capital by way of students entering the university. As we are all aware, there are retention issues related to the significant financial hurdle involved in achieving a degree which limit or delay student completion of the Bachelor's degree. This has a detrimental effect on the rate of creation of science professionals within our Oxnard City and Ventura County community.

**3. Implementation:**

**a. Implementation Procedure:**

The implementation procedure will involve the acquisition of an unpaid research fellowship/internship at UCSB, Caltech, City of Hope, Cedars Sinai Medical Center, USC or other tier 1 research institutions supporting undergraduate and graduate education in the area of iPS stem cell technologies that is supported by the California Institute for Regenerative Medicine ([www.cirm.ca.gov](http://www.cirm.ca.gov)). This may involve collaboration with the private sector in this technology area. Towards that goal, I will include a support letter in this sabbatical application detailing the opportunity to achieve an unpaid research position from Dr. Dennis Clegg, the Center Executive Director of Strategy, Planning, and Operations for the Center for Stem Cell Biology and Engineering at UCSB.

<http://www.youtube.com/watch?v=11INt6PvAU8> He has published methods to derive therapeutic eye cells using the iPS method.

<http://www.thecaliforniaproject.org/bios.html#clegg> Dennis collaborates with the California Project to Cure Blindness that aligns UCSB with USC, Caltech, the City of Hope and the Keck Institute. Dennis also collaborates with UCLA and the Cedars-Sinai Medical Center for clinical trials related to Macular Degeneration. The internship will be secured at one of these institutions for acquiring research skills in stem cell sciences that would lead to the implementation of a student oriented iPS protocol for Community College students. I have personally known Dennis for the past 18 years and recently attended a stem cell conference at Cedars-Sinai that featured his progress on the human clinical trials for macular degeneration.

In preparation for writing a grant that would be submitted to the Ventura College District for S-STEM support from the NSF for student fellowships for support for the final two years of the undergraduate degree, I have begun collaborating with the Southern California Conference for Undergraduate Research (SCCUR). In February 2012, I traveled with Dean Carolyn Inouye and Sciences Department Chair Chris Mainzer to Irvine to attend a conference on strategic planning in undergraduate research. At this conference it became clear that there are several grant lines that Oxnard College would be

immediately eligible for from the NSF. The SCCUR organization sponsors regular workshops to support grant applications to NSF.

Additionally, each year since 2009, I attended the weeklong Bio-Link conference at UC Berkeley in June that supports professional development for biotechnology faculty. Several NSF program officers that are in charge of advising, coordinating and reviewing the S-STEM grant applications to NSF, attend this conference. In 2010 I was invited to participate with NSF as a program officer, but I was still in the tenure process and unable to make this commitment. The Bio-Link organization provides direct access to NSF and I have taken advantage of the opportunity to travel to Washington D.C. to participate in the review of grants from other institutions.

Following the careful advice from SCCURS and Bio-Link in conjunction with NSF will be an important component of success in achieving an S-STEM grant. The grant writing process is often tedious and so the opportunity to devote time to this project during the sabbatical is desirable. Already I have been encouraged to write this grant by members of my department and Oxnard College. My experience in grant writing is based on my obtaining approximately 2 million dollars for the Central Coast Biotechnology Center at Ventura College from this type of funding. The unique Hispanic Serving Institution character of Oxnard Community College will be highlighted in this grant application, though the overall intent of the grant is to address economic need.

#### **a. Projected Results**

There are two main deliverables from the proposed sabbatical project. One is the acquisition of skills and technology sufficient to generate a new laboratory curriculum in iPS stem cell biology for the undergraduates here at Oxnard College. The second is the production of a grant application that would be submitted to the VCCCD for S-STEM via the NSF. The financial impacts of the implementation project would not add any additional costs to the College since it does not specifically require any additional equipment or material costs beyond what is currently being provided. The main thrust of the Sabbatical is to acquire knowledge and an analogy would be that sand could be made into silicon computer chips just as salt and water can be used to grow therapeutic stem cells. The cost of media for cell culture is cheap but the knowledge required to implement curriculum in this area is exotic and will require patient study. At present we have the available equipment to implement curriculum in this area as I have already been teaching tissue culture methods for six years in Directed Studies. At Oxnard College we are blessed with donated materials and equipment from Biotechnology Companies that have greatly assisted the implementation of many contemporary laboratories. The two HSI-STEM grants have filled important voids in our supply and equipment needs as well. This iPS Stem Cell internship project is different in that the main objective is knowledge of the methods used to differentiate cells.



**a. Spring 2014 Sabbatical Timeline**

| <b>Semester:</b>           | <b>Fall 2012</b>                         | <b>Spring 2013</b>   | <b>Summer 2013</b>                                  | <b>Fall 2013</b>   | <b>Spring 2014 (proposed sabbatical)</b>                              | <b>Fall 2014</b>                           |
|----------------------------|--|--|---|--|---|--|
| <b>Research Internship</b> | Secure letter(s) of support and veracity | Visit regenerative medicine institutions of interest (UCSB, UCLA or other) | Run OC summer HSI-STEM research with iPS component  | Acquire materials necessary to performing the internship | Perform the Research Internship at one of the specified institutions. | Turn in Final Report for the Sabbatical    |
| <b>Grant Writing</b>       | Discuss S-STEM with NSF program officer  | Attend a SCCURS conference on NSF grants                                   | Attend the Bio-Link conference strand on NSF grants | Participate with NSF for grant writing in Washington DC  | Writing the S-STEM NSF grant while on Sabbatical.                     | Engage NSF and VCCCD for Grant Application |

**d. Dissemination Plan**

The dissemination plan (besides those items required in the contract) includes generating an iPS curriculum for implementation at Oxnard College that can be provided to other faculty via the web. In the past, efforts of this type have been published in texts that I have participated in producing (see scholarship section below for example links to Amazon). In this project, dissemination via the Bio-Link website curriculum section would be desirable: <http://www.bio-link.org/home/content/bio-link-instructional-material-and-curriculum-clearinghouse>. The dissemination plan for the grant application would be the Ventura Community College District to the National Science Foundation

**4. Past Contributions to the District**

**a. Scholarship:**

Please see the Curriculum Vitae for James Harbor that follows these pages for more detail on items 4a-4e. Briefly I have three degrees: B.S. Biology U.C. Davis 1982; M.A. Biology Humboldt State University California 1988; and Ph.D. Genetics from S.U.N.Y Stony Brook, N.Y. 1994. I have held faculty assignments at Caltech, C.S.U. Sonoma, C.S.U. Northridge and Moorpark, Ventura and Oxnard Colleges from 1994-present.

My Contributions include being Director of a Biotechnology Center (CCBC) for six years at Ventura College, writing biotechnology curriculum in a textbook produced at Moorpark College for the NSF <http://www.amazon.com/Industrial-Biotechnology->



[Training-Manual-Harrigan/dp/0759305145](http://www.amazon.com/Best-Practices-Biotechnology-Education-Friedman/dp/0759305145), and publishing details of the Community College Biotechnology Programs in a book while at Oxnard College <http://www.amazon.com/Best-Practices-Biotechnology-Education-Friedman/dp/0973467673>.

#### **4b. Service**

##### **1. Department/Discipline**

I have donated my time to run the Directed Studies BIOL R199 program for student research at Oxnard College. Additionally I have supported maintenance of microbial stocks and laboratory curriculum for both the Microbiology and Biology Majors courses. As of Fall 2012, I have trained six newly hired part time faculty on their laboratory responsibilities in Microbiology (MICR R100L) and/or Majors Biology (BIOL R100L). The outcomes of these were that we retained one person part time at OC (Graham). The economic profile of the cohort are that currently two are employed full time in biotech companies (Martinez, Graham), two are in medical school (Wilson, Du-Graff), one is now full time with the California Community Colleges (Hulbert) and one is employed at the State University (Majda). Three of these persons are still in our area and available for teaching at OC (Martinez, Majda, Graham).

##### **2. College**

I have been involved with the organization of the yearly Gold Coast Science Network Conference at Oxnard College for High School teachers and Community College faculty from 2007-2012. I hosted the Cold Spring Harbor Laboratory for workshops in Cancer Biology and Neurobiology in 2010.

##### **3. District**

For six years, I was the Director of the Central Coast Biotechnology Center at Ventura College. This provided support for the development of biotechnology within the curriculum of all three colleges of the Ventura Community College District.

##### **4. Community**

The awards I received for my work as Director of the Central Coast Biotechnology Center were evidence of my extensive involvement in Community affairs for assisting with articulation to the CSUCI campus, development of a biodiesel refinery at the Port Hueneme base among others. I was a participant in Governor Davis' Statewide Biotechnology Initiative in 2002 and was recognized by Governor Schwarzenegger for my work in Technology in 2006.

##### **5. Length of Service & Past Sabbaticals Awarded**

**a.** I began full time faculty status in Spring 2001 at Ventura College for the position of Biotechnology Director and in Fall of 2007 I became eligible to engage the sabbatical process when I became a tenure track faculty as Associate Professor at OC.

**b.** I have not received a sabbatical previously and would gratefully reward Oxnard College for this opportunity with the knowledge I receive for furthering our student's career success.

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## Curriculum Vitae

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### **Faculty**

- 2007-2012: Oxnard College, Associate Professor, Tenured for Microbiology, Cell/Molecular Biology and Biotechnology
- 2005-2009: California State University, Adjunct Faculty and Advisory Board, Channel Islands Masters Program in Biotechnology/Bioinformatics and Adjunct for the Undergraduate Biology Program
- 2001- 2007: Ventura College, Central Coast Biotechnology Center Director  
[www.ccbcweb.net](http://www.ccbcweb.net) and full time Faculty
- 2000-2001: California State University, Northridge (Adjunct)
- 1999-2001: Moorpark Community College, California (Adjunct)
- 1996-1998: Sonoma State University, California (Adjunct)
- 1994-1996: California Institute of Technology (Full Time, Non-Tenure Track)

### **Education**

- 1994-1996: Research Associate of the Howard Hughes Medical Institute at the California Institute of Technology performing research on the structure and function of immune system proteins including the MHC, TCR and FcRn. Dr. Pamela Bjorkman, Advisor/Principle Investigator.
- 1987-1994: Ph.D. of Genetics from the State University of New York, Stony Brook working on the thesis: A study of the structure, genetics and evolution of picornaviruses and their cellular receptors (see publications sections). Dr. Eckard Wimmer, Advisor/Principle Investigator.
- 1984-1987: Biological Sciences M.A. degree at the Humboldt State University, California: research for understanding multiple antibiotic resistant bacteria generated by dairy farming and their role in the aquatic environment. Dr. James F. Welsh, Advisor/Principle Investigator.
- 1977-1982: B.S. in Biological Sciences at U.C. Davis with a undergraduate project studying biological insect control with the UCD Ecology Graduate Group at Point Reyes. Dr. Norma J. Lang, Advisor.

## Special Projects

- 2009-2012 HSI-STEM Grant participant for Biotechnology at Oxnard College (total institutional award \$5 Million). New award (\$6 Million) begins Fall 2011.
- 2008-2012 June. Bio-Link Summer Fellow. Week long workshop for Community College biotechnology faculty and NSF participants at the U.C. Berkeley Campus ([www.bio-link.org](http://www.bio-link.org)) Sample: [bio-link.org/home/sites/files/102009\\_Newsletter.pdf](http://bio-link.org/home/sites/files/102009_Newsletter.pdf)
- 2010 November. Reviewer for the article “Academic Entrepreneurship and Entrepreneurial Universities” for the Journal of Commercial Biotechnology.
- 2010 August. National Science Foundation Participant; Washington DC.
- 2010 July. Author of a review for the Journal of Commercial Biotechnology of: Biotechnology: A Comprehensive Training Guide for the Biotechnology Industry (by Syed Imtiaz Haider and Anika Ashtok *CRC Press, 2009*) <http://www.palgrave-journals.com/jcb/journal/v16/n3/abs/jcb20101a.html>
- 2010 June-July (7 weeks). Three days per week laboratory curriculum development projects for Microbiology and Biotechnology with STEM students at Oxnard College. These are PCR for bacterial detection, western blot, cell culture, fluorescence microscopy, and investigations of portable environmental sampling instrumentation. (volunteer faculty).
- 2010 April. Presenter Title: “Careers in Medicine, Research and Biotechnology” for the Oxnard College Youth Conference 2010. <http://www.oxnardcollege.edu/departments/academic/STEM/2010YC/workshops.shtml>
- 2010 April. Co-Organizer, Presenter and Member of the Board for the Gold Coast Science Network Conference at Oxnard College for High School teachers and Community College science faculty. <http://goldcoastscience.org/conference.htm>
- 2010 March. Presenter Title: “Biotech Skills Development Research Program”, PITTCON conference, Orlando, Florida. Advances in Biotechnology Workforce Education (strand). <http://www.pittcon.org/website/archive.php> for March 1, 2010 Session 790-4 pg.60 <http://pittcon.dirxion.com/WebProject.asp?BookCode=pit10flx&from=2#>
- 2009 October. Organizer for the Cold Spring Harbor Laboratory Workshops in Cancer Biology and Neurobiology for College and University Faculty at Oxnard College. [www.dnalc.org](http://www.dnalc.org) and see pg. 12 of: [www.dnalc.org/files/pdf/annreppdf/annrep2009.pdf](http://www.dnalc.org/files/pdf/annreppdf/annrep2009.pdf)
- 2009 June-July (8 weeks). Four days per week laboratory curriculum development projects for Microbiology and Biotechnology with STEM students at Oxnard College.
- 2009 June. Bio-Link Summer Fellow. Week long workshop for biotechnology faculty and NSF participants at the U.C. Berkeley Campus ([www.bio-link.org](http://www.bio-link.org)) [bio-link.org/home/sites/files/102009\\_Newsletter.pdf](http://bio-link.org/home/sites/files/102009_Newsletter.pdf)
- 2008 Author of the chapter “The Central Coast Biotechnology Center and The Role of the Regional Biotech Center in Emerging Curriculum Development” in *22 Best Practices in Biotechnology Education* (Yali Friedman, Ed.) Logos Press. [http://www.logos-press.com/books/biotechnology\\_education.php](http://www.logos-press.com/books/biotechnology_education.php)

- 2008 October. Participant of Bio Advances in Stem Cell Discoveries Conference, S.F., CA <http://www.gtcbio.com/userAgenda.aspx?id=135>
- 2008 September. Presenter, California Institute for Nanotechnology at San Bernadino Community College (<http://www.cinano.com>)
- 2008 June-July (8 weeks). Laboratory curriculum development projects for Microbiology and Biotechnology with STEM and MESA students at Oxnard College.
- 2003-2009: Advisor to “The New Genetics”, a Stanford University Center for Biomedical Ethics and National Science Foundation project. [http://bioethics.stanford.edu/\(http://www.thenewgenetics.net/participant\\_list.html\)](http://bioethics.stanford.edu/(http://www.thenewgenetics.net/participant_list.html)). This project is designed to create a modular curriculum for undergraduates that broaden the original “new genetics” curriculum for medically oriented students and provided ongoing education credit for medical professionals. Also: [http://www.ccewd.net/industry\\_publications.cfm](http://www.ccewd.net/industry_publications.cfm)
- 2004-2009: Member and Chair (2008-2009), Advisory Board of the California State University at Channel Islands Master’s Degree in Biotechnology. Provided consulting related to initial program start-up, recruitment and organization related to the capstone team project course and for the speaker’s symposium. The symposium includes leadership speakers from local technology companies that mentor students towards the development of their second year team projects. See also the section on teaching repertoire herein. See <http://www.csuci.edu/exed/msbiotech.htm>
- 2007 August: Workforce Needs Assessment in Biotechnology for the Central Coast. Produced by the Resource Group in Conjunction with Moorpark and Ventura Colleges with an introduction by Dr. Harber (Central Coast Biotechnology Center). [www.ccbcweb.net/pdf/Biotech\\_Final\\_Report\\_2007.pdf](http://www.ccbcweb.net/pdf/Biotech_Final_Report_2007.pdf)
- 2007 March: Presentation to the Tech-Ed new technologies conference in Ontario, CA organized by the California Community College Foundation. The conference presentation illustrated the use of the three-dimensional computer projection for having entire classes visualize GIS mapping and molecular modeling data. <http://www.techedevents.org/2007/conference/> (download program, page 8)
- 2006 September: Development of a teaching module in rapid genetic detection of bacteria (20 minutes) for mapping sites of environmental contamination along coastal waterways. This is a grant-funded project awarded collaboratively for the geographic and biotechnology sciences. The curriculum has now been deployed at Community Colleges in Moorpark, Canyons, Salinas, Ventura and Sacramento. [http://www.cccco.edu/Portals/4/EWD/Economic%20Development/2005-06\\_annual\\_report.pdf](http://www.cccco.edu/Portals/4/EWD/Economic%20Development/2005-06_annual_report.pdf)
- 2006 August: NCLT. National Center for Learning and Teaching in Nanoscale Science and Engineering. Participant in the annual curriculum development conference for the national center (<http://www.nclt.us>). This is a National Science Foundation center for developing K12 through University curriculum in the nanosciences and bionanotech. <http://www.nclt.us/workshop/ws-faculty-aug06.shtml>
- 2006 April: The Business and Technology Partnership Committee awarded the “Technologist of the Year” to Dr. James Harber. This included a presentation at the Reagan Presidential Library and awards from the Governor, State Senate and State Assembly members for the regional community work of the Central Coast

- Biotechnology Center. As reported by Ventura College:  
[http://www.venturacollege.edu/assets/pdf/vcnews\\_200604.pdf](http://www.venturacollege.edu/assets/pdf/vcnews_200604.pdf)
- 2005 November: Bioreactor Certificate of Training from Mark Smith Laboratories at the University of Vancouver, British Columbia.  
<http://www.msl.ubc.ca/training/workshops>
- 2002, 2003, 2004, 2005, 2006: “Who’s Who in Healthcare and Biotechnology” Dr. Harber was recognized in special editions of the Pacific Coast Business Times along with C.E.O.s of all the local biotechnology companies (Amgen, Baxter, Biosource, and many others) in three consecutive years. (November 15-21, 2002, December 5-11, 2003, December 10-16, 2004 and December 2005 editions).<http://www.pacbiztimes.com/>
- 2004 May: Participant/Co-organizer for the Los Angeles Region Life Sciences Strategic Action Plan Regional Meeting and Publication  
 This set of recommendations is the result of the California’s Governor's Life Sciences Initiative to collect the strategic thinking of the C.E.O.s of biotechnology companies, Chancellor’s of the University of California, State University CSUPERB leadership, Community Colleges Biotechnology Initiative (CCCEWDP) and local biotechnology industry organizations (VCBio, GCIC, SCBC). Three regional reports and a statewide report describe a long range strategy for California. Dr. Harber participated with the Los Angeles Regional Life Sciences Action Plan which can be downloaded from:  
<http://www.monitor.com/Expertise/Industries/PharmaceuticalsLifeSciencesandHealthcare/tabid/80/ctl/ArticleDetail/mid/687/CID/11122007164053101/CTID/1/L/en-US/Default.aspx>
- 2004 January: Co-author of the White Paper: The History, Current Status, and Future Direction for the California Community Colleges Biotechnology Initiative: Helping Meet the California Biotech Industry Need for an Operational Workforce.  
[www.cccewd.nethttp://www.cccbitech.org/http://www.cccewd.net/industry\\_publications.cfm](http://www.cccewd.nethttp://www.cccbitech.org/http://www.cccewd.net/industry_publications.cfm)
- 2001-2005: Member of the Board, Venture Coast Biotechnology Industry Organization[http://web.archive.org/web/\\*/http://www.vcbio.org](http://web.archive.org/web/*/http://www.vcbio.org)  
 This was a group of professionals who are interested in business development and workforce training in biotechnology. VCBio sponsors business forums and educational seminars on topics such as New Local Biotechnology Companies, F.D.A. regulations, Medical Devices and Biosciences Venture Capital.
- 2002-2007: Participant and Chair (2004-5) of the Biotechnology Subcommittee of the Business and Technology Partnership Committee (University Foundation of the California State University Channel Islands). Seminars related to biotechnology and bioenergy were cosponsored for the University community in conjunction with other organizations such as the M.I.T. Enterprise Forum, VCBio, CIB2C and GCIC.  
<http://www.csuci.edu/btp/>
- 2001-2004: Member of the Board, Gold Coast Innovation Center This is an organization with its own business incubator located at CSUCI (Channel Islands University) that is concerned with energy entrepreneurship and business innovation. Its flagship company was Onsite Power, that constructs biomass digesters to convert plant clippings into methane/Hydrogen for energy production:

<http://web.archive.org/web/20040729034000/http://www.gcic.org/>

- 2004, 2005, 2006: Grant Reviewer at California Polytechnic University, San Luis Obispo C3RP. <http://www.c3rp.org> Participant with all science deans in the prioritization of research grant awards to C.S.U. faculty. Approximately one million dollars of Office of Naval Research Funding was awarded to thirty faculty teams.
- 2004: Judge for the California State University Graduate Student Research Competition (held at CSU Northridge).
- 2003: Biodiesel Refinery Groundbreaking Participant. Original member of the Ventura County Memorandum of Understanding between the National Park Service, U.S. Navy, County of Ventura, Central Coast Biotechnology Center (Harber, Director) and Biodiesel Industries (Santa Barbara).  
<http://www.zyn.com/flcfw/fwnews/fwarch/fw032a.htm>
2003. Contributor to the document The History, Current Status and Future History of the California Community Colleges Biotechnology Initiative. Helping Meet the California Biotech Industry Need for an Operational Workforce.[http://www.cccbitech.org/images/white\\_paper.pdf](http://www.cccbitech.org/images/white_paper.pdf)
2002. Contributor to the document California Careers in Biotechnology, A Counselor's Guide to the Best Jobs, 2nd Edition by Gina Frierman-Hunt and Julie Solberg (published by the California Community Colleges Economic Development Network Statewide Initiative in Biotechnology and Women at Work.  
<http://www.cccbitech.org/cacareers.html>)
2001. Presenter. A two-hour computer laboratory presentation on Proteomics and three-dimensional molecular structure strand was delivered at the National Science Foundation Summer Institute in Bioinformatics (University of California at Davis).
- 1999-2006: Advisory Board Member for Moorpark College's Industrial Biotechnology technical training program. In conjunction with employment at Moorpark College, Dr. Harber developed curriculum for teaching at the laboratory located at the California State University Channel Islands Campus.
- 2000: Author of the PCR Mycoplasma Detection and SDS-PAGE chapters in the text developed by Moorpark College instructors titled: Industrial Biotechnology, A Training Manual. Thompson Publishing, 2001, ISBN 0-7593-0514-5
- 1998: Consultant to Norse Associates (Thousand Oaks). Preparation of research reports for the purpose of pursuing acquisitions and mergers. Reports were prepared summarizing the development of bio-pharmaceutical products by emerging companies in development. This included information on clinical trial stage, aspects of the scientific strategy, intellectual property, chemical syntheses and genetic origin (see research publications below).
- 1996-2007: James Harber Consulting, Thousand Oaks. Technology analysis and research support for wireless internet and biotechnology start-up companies.
- 1996: Biological Sciences Judge at the Statewide Science Fair in Los Angeles.
- 1988-1994: Co-established and staffed a bioinformatics and three-dimensional molecular graphics and World Wide Web (internet) facility (Microbiology and Genetics Department at the State University of New York at Stony Brook). This resource was based around a Silicon Graphics workstation that bridged a T1 (megabit) World Wide Web connection to a local network of personal computers. Research Faculty, Staff

and graduate students were advised in the use of resources such as Genbank, The Wisconsin Genetics Group GCG suite of molecular analysis programs, National Center for Biotechnology Information (NCBI), European Molecular Biology Laboratory (EMBL), and Protein Data Bank (PDB). The maintenance of the facility involved configuring and maintaining routers, IP numbers, and e-mail accounts. The machines that interoperated on the network included UNIX, VAX-VMS, DOS/Windows and Macintosh systems.

1986-1987: Computer Program Development. A method for illustrating the biochemical reactions of glycolysis using interactive computer animations on the Macintosh 512 was presented at the annual meeting for the California State University Association of Biologists for Computing.

### **External Funding**

2008-2010: Faculty Participant for the Biotechnology section of the Hispanic Serving Institution Science Technology Engineering Math (HSI-STEM) grant awarded to Oxnard College

2001-2007: The Director of the Central Coast Biotechnology Center for the Counties of Ventura, Santa Barbara, San Luis Obispo and Northern Los Angeles ([www.ccbcweb.net](http://www.ccbcweb.net)) that is funded by the California Community Colleges Economic and Workforce Development Program ([www.ccewd.net](http://www.ccewd.net)).

2006-2007: SB-70 grant for rapid bacterial genetic detection and GIS (principally authored by W. Budke (Environmental Sciences, Ventura College).

2004-2005: The Director for the Ventura College section of the Highway 126 Biotechnology Corridor Industry Driven Regional Collaborative Grant (collaboration with College of the Canyons).

1994-1996: An Associate Scientist funded by the Howard Hughes Medical Institute at Caltech.

1987-1994: A Graduate Student funded by the National Science Foundation and National Institutes of Health (including National Institute of General Medical Sciences National Research Service Award 5T32GMO7964-07)

1985-1987: A Graduate student funded by the Nielsen Dairy Institute, Arcata, CA.

### **Teaching Repertoire**

#### ***California Community Colleges (1999-2010):***

Majors BIology (Cellular and Molecular); (126 hours, 2009-2010). An introduction to the central paradigms of contemporary biology including cell function, Mendelian genetics, genomics, metabolism, signal transduction, biochemistry, proteomics, epigenomics, embryology and immunology. A significant writing component is emphasized for developing a research paper based on peer reviews and a powerpoint based on contemporary laboratory methods.

Methods: Biotech and Molecular Biology (team taught 144 hours, 2006-7). A unique high technology curriculum consisting of on campus laboratories taught by faculty and industry instructors (2/3 of the course). One third of the course consists of off-campus laboratories at eight company sites. The flexible industry driven curriculum format assures that the students are exposed to the most recent technologies. Students



are provided resources to find employment directly at local companies or in laboratories at the universities. The course has been operating in various formats since 1986 at Ventura College.

Biotechnology Modules (Grant Supported Regional Activity, 2001-2007). Organization, distribution and delivery of curriculum for various techniques including real time PCR, bioreactor, DNA isolation, western blotting, polymerase chain reaction, DNA transformation, and electrophoresis.

Human Heredity(54 hours/semester at Ventura College, 2001-1007)

This course provides an introduction to the applications of genetics to human disease prediction, genetic counseling and therapeutic intervention. Mendelian and population genetics, biotechnology, reproductive sciences, and cancer are topics covered with an emphasis on new technologies and products available from local companies.

Principles of Microbiology with Laboratory(160 hours/semester with 6 hr/wk lab at Ventura College, Moorpark College and Oxnard College, 1999-2010). An introduction to microbiology designed for the health/medical/biotechnology sciences student. Replication strategies of bacteria, fungi, protozoans, helminths and viruses are emphasized. Microbes are presented both as potential adversaries and as necessary commensals. Microbial disease processes involved in cancer, cardiovascular/heart disease, sepsis and AIDS are covered. The laboratory provides an introduction to classical biochemical and contemporary genetic molecular methods including the determination of bacterial unknowns.

Biotechnology Laboratory (technical assistance for the 188 hour course at Moorpark College 1999-2000). Support for the establishment of the industrial biotechnology course and laboratory in its first semester on the California State University Channel Islands campus. The course industry instructors generated a biotechnology lab text that included two chapters contributed by Dr. Harber. The class was designed to expose students to all phases of biotechnology from research through clinical development and production. A high placement rate to industry and university was achieved for the students.

***California State University Channel Islands, M.S. Biotechnology and Bioinformatics (2006-2009):***

Team Projects (4 Units, M.S. Biotech)

This capstone course for the second year students was designed to prepare students to advance in their employment or enter new employment. The class consisted of presentations and extensive reports of the team projects (approximately four students each) prepared with an industry advisor. A discussion of the strategic goals of the class can be found in "22 Best Practices in Biotechnology", edited by Yali Friedman (2008).

Seminar (1 Unit, M.S. Biotech)

***California State University (1996-1998; 2000; 2007):***

Biotechnology in the Twenty First Century (3 units Undergraduate, CSUCI).A review course for a combination audience of business and biology undergraduates. An interdisciplinary approach emphasizes the major achievements in biotechnology as

well as trends in business, finance and regulation. Students are encouraged to develop semester projects which emphasize emerging technology applications.

Team Project (3 units Master's Program for Biotechnology and Bioinformatics, CSUCI).

Local industry scientist team leaders have been paired with four students in each of six teams. The teams are performing research investigations into bioenergy, structural biology, vaccine formulations, stem cells for heart therapy, nanobiotech microfluidics, and the neurobiology of Alzheimers disease. The Team Projects Produced by Dr. Harber in a team taught course with Dr. Ching-Hua Wang (2007) and Karol Pessin, J.D. (2008-2009) include the first 19 projects listed on the following site (Industry Advisor Mentors, Project Names, and Student Numbers Listed):

[biology.csuci.edu/Team%20Projects%20and%20Internships%20for%20MS%20Biotech%2005-%202009.pdf](http://biology.csuci.edu/Team%20Projects%20and%20Internships%20for%20MS%20Biotech%2005-%202009.pdf) - 2009-10-30

Student Seminar (1 unit Master's Program for Biotechnology and Bioinformatics,

CSUCI). Scientists and leading business people from local industry were invited to speak on biotechnology topics including cancer biology, F.D.A. regulations, venture capital, nanobiotechnology, bioinformatics, medical devices and marine biotechnology.

General Biology(45 hours/semester at C.S.U. Northridge). This was the classical course designed as a two-semester curriculum for the pre-professional student majoring in the biological. The course provided a survey of contemporary cell biology, Mendelian genetics, population genetics, ecology, evolution, taxonomy, physiology and behavior.

General Genetics and Laboratory(90 hours/semester at C.S.U. Sonoma). An upper division science majors course that emphasized principles of heredity, including topics in classical and molecular genetics, cytogenetics and population genetics.

Biology of Cancer(45 hours/semester at C.S.U. Sonoma). A contemporary view of cancer was presented including predisposing genetics, stem cells, environmental carcinogens and presence of oncogenic microbes. The course involved many oncology professionals as guest lecturers. Science undergraduates were encouraged to take opportunities provided by the course for job shadowing oncology, surgery, radiation, hospice, counseling and public health professionals.

General Microbiology with Laboratory(90 hours/semester at C.S.U. Sonoma).

Undergraduates were provided an introduction to the organization and characteristics of microorganisms, including bacteria, fungi, protozoa and viruses. Topics included the role of microbes in agriculture, industry and disease processes. The laboratory emphasized identifying unknown bacteria relevant to human health and disease.

Sexually Transmitted Diseases(45 hours/semester at C.S.U. Sonoma). A medical microbiology class for non-majors that emphasized contemporary disease issues, including AIDS. The biological, psychological, social and economic impacts of sexually transmitted diseases were covered by me, the instructor and guest lecturers.

The Biology of Aging (45 hours/semester at C.S.U. Sonoma). This course introduced non-majors to human physiology, nutrition, disease processes, cancer, biochemistry and immunology. It examined the cumulative molecular processes of human senescence including gene mutation, oncogenes/tumor suppressor gene alteration,

mitochondrial mutation and disruptions of the cell cycle. Aging avoidance strategies were discussed in detail.

***Caltech (1995-1996):***

Semester Seminar. (45 hours/semester). Caltech. A weekly seminar course organized by Dr. Harber that emphasized molecular biology, virology, immunology and internet methods for undergraduates. The discussion topics included emerging diseases, contemporary molecular medicine, laboratory research of human pathogens and genome sequencing projects. The course was taught in the only internet-enabled classroom on the campus at the time.

### **Research Publications**

- Emerging Pharmaceutical and Biotechnology Companies of the Western United States. A Summary of Products in Clinical Trials and their Chemical Syntheses. Part I: Southern California Area and Part II: Northern California Area. Norse Associates Consulting, Thousand Oaks, CA. (1999)
- James Harber, Gunter Bernhardt, Hui-Hua Lu and Eckard Wimmer. Canyon Rim Residues, Including Antigenic Determinants Modulate the Serotype-Specific Binding of Poliovirus to Mutants of the Receptor. *Virology*; volume 214: p. 559-570 (1995).
- Hui-Hua Lu, C.F. Yang, Andrew Murdin, Michael H. Klein, James J. Harber, Olin M. Kew and Eckard Wimmer. Mouse Neurovirulence Determinants of Poliovirus Type-1 Strain Ls-A Map to the Coding Regions of Capsid Protein VP1 and Proteinase 2a(pro). *Journal of Virology*; volume 68 (11): p. 7507-7515 (1994).
- Gunter Bernhardt, James Harber, Andree Zibert, Marie de Crombrughe and Eckard Wimmer. The Poliovirus Receptor: Identification of Domains and Amino Acid Residues Critical for Virus Binding. *Virology*; volume 203, p. 344-356, (1994).
- Peter Mason, Barry Baxt, Fred Brown, James Harber, Andrew Murdin and Eckard Wimmer. Antibody Complexed Foot and Mouth Disease Virus, but not Poliovirus Can Infect Normally Unsusceptible Cells via the Fc Receptor. *Virology*; volume 192: pp. 568-577, (1993).
- Ralf Altmeyer, Andrew D. Murdin, James J. Harber and Eckard Wimmer. Construction and Characterization of a Poliovirus/Rhinovirus Antigenic Hybrid. *Virology*; volume 184, p. 636-644 (1991).
- James J. Harber, Jonathan Bradley, Carl W. Anderson, and Eckard Wimmer. Catalysis of Poliovirus VP0 Maturation Cleavage is not Mediated by Serine 10 Of VP2. *Journal of Virology*; volume 65: p. 326-334, (1991).
- Hans-Georg Krausslich, Christina Holscher, Quentin Reuer, Jim Harber and Eckard Wimmer. Myristoylation of the Poliovirus Polyprotein is Required for Proteolytic Processing of the Capsid and for Viral Infectivity. *Journal of Virology*; volume 64: p. 2433-2436, (1990).

### **Research Reviews**

- David Solecki, Matthias Gromeier, James Harber, Gunter Bernhardt and EckardWimmer. Poliovirus and its cellular receptor: A molecular genetic analysis of virus/receptor affinity interaction. *Journal of Molecular Recognition*, Vol. 11, 2-9 (1998).
- Mathias Gromeier, Hui-Hua Lu, Gunter Bernhardt, James J. Harber, James A. Bibb and EckardWimmer. The Human Poliovirus Receptor - Receptor-Virus Interaction and Parameters of Disease Specificity. *Ann. N.Y. Acad.*; volume 753: p. 19-36 (1995).
- EckardWimmer, James J. Harber, James A. Bibb, Mathias Gromeier, Hui-Hua Lu, and Gunter Bernhardt. Poliovirus Receptors in Cellular Receptors for Animal Viruses, (EckardWimmer, ed.), p. 101-128, Cold Spring Harbor Laboratory Press, Plainview, NY, (1994).
- James Harber and EckardWimmer. Aspects of the Molecular Biology of Poliovirus Replication in The Regulation of Gene Expression in Higher Animal Viruses, (Luis Carrasco, ed.), p. 189-224. Plenum Press, New York. (1993).
- Hui-Hua Lu, Andrew D. Murdin, Ralf Altmeyer, James Harber and EckardWimmer. Antigenic Hybrids of Poliovirus: Trivalent Polioviruses and Characterization of a Poliovirus/Rhinovirus Hybrid in Vaccines '92, (Harold Ginsberg, ed.), p. 287-293. Cold Spring Harbor Laboratory Press, (1992).

### **Auxiliary Employment and Activity**

- 1999-2012: Technology Consultant for Biotechnology and Nanotechnology
- 1988-2000: Consultant for: Cellular and Wireless Internet Infrastructure Development  
[http://web.archive.org/web/\\*/http://www.cellulartechnics.com](http://web.archive.org/web/*/http://www.cellulartechnics.com)
- 1984-1987: Teaching Assistant for Biology and Genetics Laboratories, Humboldt State University for Dr. James Welsh, Dr. William Allen, Dr. Ray Meredith, Dr. Dan Brandt, Dr. Jack Yarnall (Dr. Milton Boyd, Chair). <http://www.humboldt.edu/biosci/>
- 1983-1984: Ranch Hand (winter) and Camp Counselor (summer) at the Jameson Ranch in Glennville, CA. (construction, horse & cattle ranching).  
[www.jamesonranchcamp.com](http://www.jamesonranchcamp.com)
- 1982-1983: Intern for the Los Ninos Project assisting children in Mexican orphanages (<http://www.losninosinternational.org>).
- 1980-1982: Participant and Advisor to the Residence Life Program, U.C. Davis for the Integrated Studies Honor Program <http://integratedstudies.ucdavis.edu>
- 1979-1980: Participant in the Tri-Coop Housing Program  
[http://www.housing.ucdavis.edu/housing/tri\\_cooperatives.asp](http://www.housing.ucdavis.edu/housing/tri_cooperatives.asp)