CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS
NEW CERTIFICATE PROGRAM PROPOSAL
Must be submitted no later than October 15, 2011, and finalized by the end of the fall semester for catalog copy.

PROGRAM AREA BIOLOGY

1. **Title: Stem Cell Technology Certificate Program**

2. **Objectives:**
   - To develop a non-credit, specially-formatted condensed Stem Cell Technology Certificate Program;
   - To increase access of education and training in the theories and techniques of stem cell technology and its potential applications by offering the Certificate Program to science students of the CSU system who are not able to gain admission into the CIRM-funded stem cell research training programs;
   - To offer the Stem Cell Technology Certificate Program to scientists at biotechnology industry to expand the repertoire of their continuing education and training possibilities with an additional high demand field in stem cell science;
   - To meet the economic and workforce development needs of biotechnology companies and research institutions in California in the field of stem cell science;
   - To recruit, train and produce trainees to enter stem cell research and biotech industry.

3. **Program Description:**
   The Stem Cell Technology Certificate Program focuses on modern aspects of stem cell technology, applications in regenerative medicine, and the techniques of stem cell science, including cell culture and characterization and maintenance of pluripotent human embryonic and adult stem cell lines.

   Upon completion of the program, the students are expected to:
   - Describe the specific culture requirements and characteristics of various stem cell lines;
   - Demonstrate ability to routinely culture and maintain human pluripotent and multipotent stem cell lines
   - Apply knowledge and skills in stem cell science in research projects.

   Prerequisites: BS in Biology, Chemistry, Biochemistry or related discipline.

   Required Courses:
   The curriculum for the Certificate Program includes the following components:

   Advanced Topics in Regenerative Medicine (15 hr)
   A seminar series involving presentations and discussions of current knowledge of embryonic and adult stem cells and factors that regulate their growth and development. Emphasizes how advancements in cell and molecular biology and tissue engineering can be applied to

the use of stem cells in regenerative medicine. Discusses social and ethical impacts of stem cell technology.

Advanced Stem Cell Technology (45 hr)
A laboratory intensive course focused on the technical aspects of human embryonic stem cell technology. Develops specific technical skills to successfully culture, characterize and maintain pluripotent human embryonic stem cells.

Both courses are approved by the Curriculum Committee and have been offered for several years at CI.

4. **Program Advisor:** Chunnian Zhao

5. **Justification:**
With the rapid advancement in stem cell technology and the booming of stem cell industry, there is a large demand of skilled workforce to fulfill the needs of stem cell research institutes and biotechnology industry. To meet this specialized workforce demand, California State University Channel Islands (CI) applied for a CIRM Bridges grant to support the expansion of our existing MS in Biotechnology and Bioinformatics program to include an Emphasis in Stem Cell Technology and Laboratory Management. One requirement of the graduate degree program is a 12-month internship. We had reached agreements with several institutions including UCLA, USC, UC Berkeley, UCSB, UCD, UCSB, City of Hope, the Scripps Research Institute and Celavie Biosciences, that have been serving as internship host institutions for our graduate student interns. In the summer of 2009, CI was awarded a $1.75 million Bridges grant to develop and implement the aforementioned program. Our first cohort of graduate students received extensive training at CI and then completed the yearlong internships (from October, 2009 to September 2010). Site visits at our internship host partner institutions indicated that most of our students had already received job offers during the first three months of their internships, nine months prior to the completion of their MS program. Upon completion of their internships, all of our trainees are now gainfully employed in stem cell science areas. In fact, interns are continually being requested by our internship partner institutions. This strongly indicates the demand in workforce development in the field of stem cell technology.

The CIRM-funded internship program has been very successful as demonstrated by the feedback received from internship sites and the participating students. However, the number of students receiving CIRM funding is limited to 10 students per year until 2015; the program is not available for full-time working professionals due to the year-long internship requirement. Consequently, the rapid advancement of stem cell technology demands more trained professionals than the limited CIRM-supported Bridges training programs can produce. Aside from the current CIRM-funded stem cell training programs, there are no additional and alternative stem cell technology training programs that have been developed in California.

To assess the needs of the stem cell technology certificate program, we have conducted a survey among the current CI students and working professionals at surrounding biotech companies. Among 78 respondents, 75% are full-time CI students and the rest of 25% are

employees at regional biotech firms. More than 80% of them are highly interested in attending the proposed stem cell certificate program and obtaining hands-on laboratory experience in this field. These results suggest that the proposed program will be beneficial to the success of the attendees.

CI is located in a region with biotechnology companies interested in stem cell technology. Two of these companies, Amgen Incorporation and Celavie Biosciences have been hosting our CIRM-funded interns and have expressed interests in our proposal of establishment of a new Stem Cell technology Certificate Program. Historically, Amgen and Celavie have provided support to our programs. Considering the lack of an abridged training Certificate Program to meet the needs of working professionals in California, this program will meet the local demand, and also state-wide needs of research institutes and biotech industries.

6. **Other Fiscal Support Required:** None.

7. **Faculty Available to Teach:** Biology Faculty

8. **Procedure:**

Applicants must have a BS Degree in Biology, Chemistry, Biochemistry or related discipline. Upon completion of the required training, students will be granted a Certificate of Completion by the Extended University.

Ching-Hua Wang and Chunnian Zhao **9-30-2011**

Proposer of Certificate Date

Approvals

The CI program review process includes a report from the respective department/program on its progress toward accessibility requirement compliance. By signing below, I acknowledge the importance of incorporating accessibility in course design.

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Program Chair Date

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Curriculum Committee Chair Date

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AVP Date