RESOLUTION ON PROPOSAL TO ESTABLISH THE STRAWBERRY SUSTAINABILITY RESEARCH AND EDUCATION CENTER

1 RESOLVED: That the Academic Senate of Cal Poly endorse the attached proposal for the establishment of the Strawberry Sustainability Research Education Center.

Proposed by: Chris Kitts, John Peterson, and Mark Shelton
Date: January 2, 2014
Proposal to Establish the Strawberry Sustainability Research and Education Center

California Polytechnic State University

Submitted by: Dr. John Peterson, Dr. Chris Kitts and Dr. Mark Shelton

January 2, 2014
THE VISION

Cal Poly and the California Strawberry Commission (CSC) aspire to contribute to ensuring the future growth and success of the California strawberry industry by forming a long term and robust partnership focused on innovation and applied research. The Strawberry Sustainability Research and Education Center (Center) represents the mechanism that will be used to achieve this vision. The Center will be the only one of a kind and its activities will reflect the tradition of Cal Poly’s Learn by Doing philosophy.

A Name that Reflects the Vision

The name, Strawberry Sustainability Research and Education Center, is a direct reflection of the Center’s vision. The Center will exemplify Cal Poly’s leadership in education, research, policy formation, and information exchange centered on sustainability.

In 2004, President Warren Baker signed the Talloires Declaration, elevating Cal Poly’s commitment to sustainability and environmental literacy in teaching, theory, and practice. Faculty, staff, and students are today better prepared with the knowledge and abilities to integrate concerns for ecology, social equity, and economics within the concept of social and natural resource systems and the built environment.

Cal Poly has established itself as an award-winning leader in sustainability, in both academics and facilities. The University’s comprehensive and polytechnic programs, many of which include curriculum about issues in sustainability, and its many multidisciplinary collaborations aim at producing exceptional research and sustainable solutions to real world problems. The Center will become a cornerstone among many sustainability related initiatives at Cal Poly.

CALIFORNIA’S STRAWBERRY INDUSTRY

Leading the Nation

California is one of only five agricultural regions in the world boasting a Mediterranean growing climate. As a result, our annual agricultural production exceeds $43 billion in farm gate value, making California the world’s fifth largest supplier of food. California produces more agricultural commodities than any other state, including leading the nation as the largest fruit producing state.

Among California’s top 20 commodities, strawberries maintain a strong position at sixth, with over $1.9 Billion in annual value. The California strawberry industry also maintains a significant presence in the global marketplace and is 14th among California’s top exports, with a value of $336 million.
California's climate lends itself to the longest growing season, allowing for strawberries to be harvested nearly every month. 90% of the U.S. strawberry production occurs along a 500-mile stretch from San Diego to San Francisco. Additionally, Monterey, Ventura, Santa Barbara, Santa Cruz and San Luis Obispo counties' top producing commodity is strawberries, surpassing wine grapes and lettuce.

![California Strawberries](image)

- Coastal production
- California accounts for almost 90% of U.S. production
- Florida accounts for less than 10%

**Emerging Trends, Needs & Challenges**

The California strawberry industry is facing complex and evolving challenges related to water use, water runoff, pesticide regulation and the loss of certain fumigants. These challenges present an opportunity for the industry to examine existing production methods, conduct research, and adopt the highest standards of sustainable management practices.

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The elevated consciousness of sustainability creates a space to lead applied research that will allow for strawberry producers to emerge as model environmental and socially responsible stewards. For example, the recent phase out of methyl bromide fumigation in most agricultural production, due to its stratospheric ozone-depleting nature, has dramatic negative effects on some crop yields, including strawberries. Strawberry plants are extremely sensitive to diseases within the soil and methyl bromide fumigation helps to insure a healthy plant. The fumigant phase out regulations are likely to significantly reduce strawberry quality and quantity, resulting in higher production costs. The need to identify alternative and effective production methods and business decision strategies is timely.

In addition to environmental regulations, California farmers have also been faced with rising water and pumping costs. The agriculture industry, and especially the strawberry sector, is at a critical point to identify technologies that enhance water use efficiency and minimize runoff without reducing crop yield.

Applied research related to fumigant alternatives, effective irrigation technologies and practices, and proactive engagement in evaluating environmental policies, is needed to ensure the success of the California strawberry industry, especially in Cal Poly's backyard along the Central Coast.

ROBUST PARTNERSHIP
"This partnership is an important step forward in our desire to strengthen ties with key California industries so that our students can learn, do and succeed."

-President Jeffrey D. Armstrong

In the Heart of the Strawberry Production Belt
Cal Poly University is located in the heart of the strawberry production belt on the California Coast. In San Luis Obispo County alone, the strawberry crop had a farm gate value of $200 million. Cal Poly recently signed an agreement with the California Strawberry Commission (CSC) in which the CSC committed to providing over $1 million in support over the next three years to support the establishment of the Center (see Appendix A). The three year plan is designed to meet immediate needs and opportunities. This vote of confidence by the CSC is a clear demonstration that the strawberry industry fully recognizes the potential of Cal Poly to conduct applied research on the problems facing the industry. The CSC represents 95 percent of the strawberry producers in California, including 400 growers, shippers, and processors.
Higher Education and Industry Aligned

The partnership between Cal Poly and the CSC will transform the way industry and higher education work together to advance student learning and success and to address the needs of the California strawberry industry. The need for a long-term partnership is a high priority of the CSC because Cal Poly’s principles, values, and strategic imperatives align with the educative, applied research, and solution driven interests of the CSC. The partnership will serve as a model for others who may also want to join this collaborative effort. Applied research and innovation across the polytechnic disciplines coupled with access to real world issues will allow us to achieve our collective vision of establishing a world-class center focused on providing educational experiences for Cal Poly students, research opportunities for faculty and students, and ensuring the future growth and success of the strawberry industry.

CSC representatives and several Cal Poly faculty members have already had several meetings to discuss the vision for the partnership and how it could develop. CSC representatives appreciate our faculty member's high work-load, which can make embarking on new projects difficult. CSC has identified some grant opportunities to which our faculty can submit proposals and it has offered to have some of their experts on hand on campus to grow the relationship between them and our faculty. The relationship is ongoing and developing, which includes Cal Poly faculty member visits to strawberry production sites in California, several of which have already occurred.

OVERVIEW OF THE CENTER

Poised for Success

The Center will be a comprehensive, interdisciplinary effort to enhance applied research to support industry needs and to advance student learning. Cal Poly and the CSC are co-creators of this unique Center. Integrating this network of industry leaders and policy makers with Cal Poly faculty leaders and students to conduct applied research based on real industry problems represents the next generation of Cal Poly's commitment to Learn by Doing.

Historically, the CSC has pursued these types of partnerships through the research and extension system of the University of California. However, Cal Poly's emphasis on giving bright, talented students hands-on experiences and state-of-the-art educational opportunities, including partnering with faculty in applied research projects, is well suited to meet the practical needs of the strawberry industry. The partnership between Cal Poly and the CSC requires a different way of thinking about industry and university partnerships, one that is less about the traditional approach of funding primarily PhD-level research projects, and instead, is about investing in applied research to inform the industry.
**Leading Interdisciplinary Innovation**
A full-time Director committed to meaningful industry research, the teaching and learning experience, and interdisciplinary innovation will lead the Center. Faculty and students from across campus, including the College Agriculture, Food & Environmental Sciences (CAFES), College of Engineering (CENG) and College of Science & Mathematics (COSAM) will work alongside members of the CSC on real industry problems. The Orfalea College of Business (OCOB), College of Architecture & Environmental Design (CAED), and the College of Liberal Arts (CLA) will collaborate with faculty and students from other disciplines on projects when appropriate, representing Cal Poly’s true comprehensive polytechnic philosophy.

**Guided by University Learning Objectives**
The Center’s work in teaching, scholarship, and service will provide integrated real world opportunities to bring to life Cal Poly’s learning objectives where all students should be able to:

1. Think critically and creatively
2. Communicate effectively
3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world or the arts, sciences and technology
4. Work productively as individuals and in groups
5. Use their knowledge and skills to make a positive contribution to society
6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues relating to sustainability
7. Engage in lifelong learning

**Guided by Sustainability Learning Objectives**
In addition to the University Learning Objectives, Cal Poly has also adopted Sustainability Learning Objectives which are central to the vision and success of the Center.

Cal Poly defines sustainability as the ability of the natural and social systems to survive and thrive together to meet current and future needs. In order to consider sustainability when making reasoned decisions, all graduating students should be able to:

1. Define and apply sustainability principles within their academic programs
2. Define and apply sustainability principles within their academic programs
3. Explain how natural, economic, and social systems interact to foster or prevent sustainability
4. Analyze and explain local, national, and global sustainability using a multidisciplinary approach
5. Consider sustainability principles while developing personal and professional values
COLLABORATIONS, PROJECTS & ACTIVITIES

“Faculty and undergraduate students from every corner of campus, including hydrologists, entomologists, plant scientists, engineers, packaging scientists and marketers, to name a few, will each have a hand in this important work for one of the nation’s leading industries.”

President Jeffrey D. Armstrong

Meaningful Collaborations
The Center will accomplish its interdisciplinary work through creative collaborations with other centers, institutes and units university-wide. Potential collaborations include, but are not limited to:

- Irrigation Training and Research Center
- Cal Poly Packaging Research Consortium
- California Institute for the Study of Specialty Crops
- CAFES Center for Sustainability
- Coastal Resources Institute
- Brock Center for Agricultural Communications
- Cal Poly Center for Innovation and Entrepreneurship
- Global Waste Research Institute
- Center for Applications in Biotechnology
- The Institute for Advanced Technology and Public Policy
- Center for Solutions through Translational Research in Diet and Exercise

Existing Projects
In 2009, the Cal Poly Irrigation Training and Research Center began a multi-year analysis of the current irrigation practices of strawberry growers on the Central Coast of California. Specifically, the project examines the impacts of salinity on young strawberry transplants and the current practice of sprinkler use during the establishment of transplants for salinity control in areas where drip irrigation is available. The overall goal of the project is to study current practices to determine any conditions where growers can minimize or eliminate sprinklers use on strawberries, thereby conserving water, saving pumping costs and reducing runoff.

Potential Projects & Activities
Potential projects speak to the immediate needs and opportunities facing the California strawberry industry. Cal Poly also intends to remain flexible in the pursuit of projects and responsive to emerging industry issues. Potential projects include:

- Reduce the chemical inputs for soil sterilization, fertilization, weed control, and pest management
- Reduce the energy inputs in productions, handling, storage, and transportation
- Improve soil quality and health in the production system for succeeding crops
- Resistance screening
- Packaging study to increase shelf life of strawberries
- Evaluate environmental regulations
- Active engagement in advocacy and policy making
- Innovative approaches related to trade agreements and tariffs
- Agricultural market analysis and strategic business plan development
- Examine biochemical composition, cancer prevention, cardiovascular health, metabolism regulation, brain aging and other health properties of berry fruits
- Agricultural education and community outreach programming

Cal Poly faculty members have identified some potential projects on which they and their students could partner with the Center. Potential projects for partnership include:

In the Biology Department, Chris Kitts reports that faculty and grant project staff are currently working with BioWish Technologies Inc. whose product (a consortium of microorganisms) shows some interesting anti-fungal properties. They are examining the BioWish product's capacity to inhibit growth in pathogens of interest to the strawberry industry. Should these experiments provide encouraging results the next step would be to partner with the Strawberry Research Center to field test formulations on strawberries, either in soil, on the fruit or on growth substrates.

In the Mechanical Engineering Department John Ridgely identified several potential senior projects, including:

- Improved blades for the bug vacuums in the fields.
- Improved design for the calyx removal tool for farmworkers
- Bathroom improvements (hand washing, etc.)
- Improved picking cart design for field workers

Also from the Mechanical Engineering Department, Saeed Nicu identified some potential robotics projects:

- Work on component parts of a larger idea of robotic strawberry picking. These can include the development of expertise, routine, understanding, possibilities of finding ready-to-pick strawberries with vision systems, development of robotic arms that may eventually be used in picking, the development of a platform to be used, etc.
- The development of a complete robotic strawberry-picking device. This includes all the necessary components of such a device, including the vision system, robot arms, the platform, testing, etc. This would be a huge multi-millon dollar project that would be years in the development.

From the Horticulture and Crop Science Department Wyatt Brown has identified several
potential post-harvest areas of focus. At present, discussions with the CSC have tended to be field oriented, however, should that change to include post-harvest concerns and foci, Cal Poly faculty can assist with several different types of projects, such as:

- Bioactive packaging and antimicrobial - evaluation and modeling
- Biodegradable polymers characterization and development
- Package closure testing
- Determination of produce and flower respiration
- Evaluation of package barrier properties
- Heavy metals content analysis of plastics
- Modified atmosphere packaging and controlled atmosphere storage simulation
- Package burst testing
- Package or material storage under controlled temperature and relative humidity
- Plastic migrants determination
- Produce constituent analysis
- Shelf life and supply chain modeling
- Ultraviolet degradation of plastics
- Volatiles analysis

Finally, also from the Horticulture and Crop Science Department, Lauren Garner is currently supervising a graduate student, Ms. Mel Carter, whose work is directly relevant to the vision and mission of the Center and for which she is likely to receive some funding from the CSC. From Ms. Carter’s thesis proposal:

“For my thesis, I would like to research the effectiveness of cover cropping systems along with Anaerobic Soil Disinfestation (ASD) to reduce the amount of soil-borne pathogens (specifically Fusarium oxysporum, Verticillium dahliae, and Macrophomina phaseolina) in soil used for strawberries.”

THE INVESTMENT

$1 Million Donation Accepted
In February 2013, Cal Poly leadership signed an agreement accepting a $1 million donation, issued over a three-year period, from CSC, in order to create the Center. The CSC recognizes the importance of academic freedom and creativity if the Center is to be successful in its mission. The CSC recognizes, too, that the faculty at Cal Poly develop all curriculum, certainly in response to industry needs, but importantly, by using guiding principles of academic freedom.

Umbrella Research Agreement
Upon the formal establishment of the Center, a drafted executive order will allow for research contracts with specific deliverables to be funded by the CSC independent of the progress of other stated objectives of the Center, and on an as-needed basis.
Innovation & Research Fund

A fund to support student and faculty projects of joint interest to Cal Poly and the CSC will be established. Projects will be developed collaboratively with the Strawberry Sustainability Research and Education Center Council (Council) comprised of CSC members and Cal Poly faculty. Initial opportunities include projects related to robotics and water quality issues. Future growth of this fund is important to allow for additional multi-interest applied research projects.

Facilities & Equipment

Applied research projects will initially take place on existing plots located on land owned by local growers, with the planned goal of establishing a permanent research site on Cal Poly’s campus to include strawberry test plots (acreage to be determined), in addition to laboratory and office space. The partnership also seeks to include access to equipment for applied research.

Director’s Fundraising Leadership

In addition to teaching and leading applied research, the Center Director’s time will be allocated to include obtaining external funding to support the applied research and educational mission of the Center. External funding will be secured through the collaboration and cooperation of Cal Poly’s University Advancement team and sought from the CSU System, as well as private, state and federal sources.

Initial Budget

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ORGANIZATIONAL STRUCTURE, STAFFING & GOVERNANCE

Center Director & Role Responsibilities

The Center Director's Role is guided by Cal Poly's teacher-scholar model, which emphasizes engaging in dynamic teaching and scholarship to create vibrant learning experiences.

In accordance with the partnership plan (see Appendix A) a search for a full-time Center Director was launched in early Fall 2013 for an initial three-year term, which is the length of the current agreement between Cal Poly and the CSC. It is preferable that the position be filled with an individual who has at least 5 years of research program leadership (i.e. mid-career) in an applied agricultural field. The Center Director will seek direction and support from a standing Strawberry Sustainability Research and Education Center Council.

Responsibilities of the Director may include:

- Develop and coordinate initiatives and activities of the center in cooperation with industry partners, the Strawberry Sustainability Research and Education Center Council, and Dean of CAFES
- Spearhead the development of mutually beneficial partnerships with industry, agencies, key national forums and other institutions
- In cooperation with the Council, develop specific measurable goals and objectives in general and, in particular, the use of resources committed to the Center
- Work to secure involvement of industry experts who can deliver specialty courses
- Uphold the highest principles of academic freedom
- In collaboration with faculty, develop strategic directions for curriculum development relating to addressing relevant real-world needs and challenges of the strawberry industry
- Work with industry partners to secure student internship positions
- Prolific grant writing and actively seeking external funding support including equipment, contracts, and faculty endowments
- Seek sponsored research projects in collaboration with faculty and industry partners
- Be aware and supportive of the development of entrepreneurial opportunities within the strawberry industry
- Participate in and represent Cal Poly in key professional meetings

Center Technician
In 2014, a Center Technician search and hiring process will be completed in consultation with the Center Director.

**Strawberry Sustainability Research and Education Center Council**
The Council serves as a critical champion of the Strawberry Sustainability Research and Education Center and will include 3 Cal Poly faculty and 2 CSC/industry representatives. The Council supports the center's growth and development and advises the Director on complex or specialized matters as well as general research, project and programmatic goals, and direction. Members of the Council share their gifts in service to the vision of the Center by providing: their professional expertise; their diverse knowledge of constituent and stakeholder perspectives; their connections to local, national or international resources, colleagues or peers; and their philanthropic support or other forms of needed assistance. Members shall also be firmly committed to improving the learning experience of Cal Poly students and promoting strategic linkages to the California strawberry industry.

**Strawberry Sustainability Research and Education Center Organizational Chart**

*ASSESSMENT*

**California State University System**
As required by the California State University system, the Strawberry Sustainability Research and Education Center will be reviewed regularly in accordance with Cal Poly center and program review policies, practices, and timelines.

**Partnership Satisfaction & Sustainability**
Assessment of the Center is tied to its mission. Therefore, the primary assessment question
will be: how is the center utilizing applied research to further advance the mission of Cal Poly and CAFES and meet the needs of the California strawberry industry? The Council will meet regularly and play an important role in establishing goals and evaluating accomplishments. Furthermore, the Council will determine a mechanism to ensure sustainability, such as a rolling multi-year contract or agreement, which will extend beyond the first three years and allow for a true long-term partnership.
Faculty Engagement
The quality and outcomes of center activities will be reported in program review. Faculty involved with the center will develop performance metrics for student engagement that measures output and outcomes (learning achievements). In addition, faculty will develop appropriate metrics for their activities within the center, such as the number of grants developed, workshops held, industry involvement, contracts secured, donations, and student projects.
November 26, 2013

Academic Senate
California Polytechnic State University
Building 38; Room 143
San Luis Obispo, CA 93405

RE: Strawberry Sustainability Research and Education Center

Dear Academic Senate:

I am writing in support of the valuable partnership recently established between the California Strawberry Commission and California Polytechnic State University, resulting in the formation of the Strawberry Sustainability Research and Education Center. As a Cal Poly graduate in Crop Science, now serving as the President and CEO of Plant Sciences, Inc., I can attest first-hand to the vitally important role that Cal Poly plays in equipping young people for service and contribution to the California agricultural sector in general, and specifically the California strawberry industry.

I understand the role of the Research and Education Center will be primarily to fund faculty and student research, with the aim of providing solutions to many of the production and harvest challenges we face as an industry. In my opinion, the California strawberry industry has never been stronger (directly contributing 2.3 billion dollars annually to our state economy, while providing tens of thousands of jobs), yet has never been more vulnerable. We face constant challenges on numerous fronts; among the most pressing are: ever-increasing costs associated with growing the crop, ever-changing pest and disease complexes combined with fewer pest control options and increasing regulatory pressures, limited supplies of suitable water, and immigration policies that compromise both the employers and the laborers.

I am convinced that many solutions to our challenges will be provided by the curious and creative young people who will be well-equipped through the teaching and hands-on experience they will receive at Cal Poly, specifically with the support and encouragement of the staff and fellow students at the Research and Education Center. Hence, I fully commend your efforts and encourage your continued support of the Strawberry Sustainability Research and Education Center.

Sincerely,

Steven D. Nelson
President and CEO
January 29, 2014

Academic Senate
California Polytechnic State University
Building 38; Room 143
San Luis Obispo, CA 93405

RE: Strawberry Sustainability Research and Education Center

Dear Academic Senate:

I am writing in support of the recently established Strawberry Sustainability Research and Education Center. I believe this partnership between the California Polytechnic State University and the California Strawberry Commission will play a critical role in procuring and directing the funding and resources required to solve the critical issues impacting the future of California strawberry production. The protection of California’s finite supply of natural resources including soil, water, and air while maintaining the strawberry industry’s economic competitiveness is a mutual vision shared by Driscoll’s Strawberry Associates and the Strawberry Sustainability Research and Education Center. In addition, the complex interactions between the industry and labor necessitate new solutions to enhance this mutually beneficial relationship.

My colleagues and I at Driscoll’s Strawberry Associates believe it is imperative to continue the further education and training of students so they may become the next generation of problem solvers and solution providers for the ever-changing, complex issues impacting the future of California agriculture. Thus, I applaud your efforts to support the establishment of the Strawberry Sustainability Research and Education Center and look forward to future collaborative educational and research activities with the California Polytechnic State University.

Sincerely,

Dan O. Chellemi, Ph.D.
Research Manager, Northern District
Based upon the above subject Resolution, the positive endorsement by the Academic Deans' Council at its October 28, 2013, meeting, as well as the recommendation of Provost Enz Finken, I am pleased to approve the establishment of the Strawberry Sustainability Research and Education Center.