Jean Suzanne VanderGheynst

Dean and Professor of Bioengineering
College of Engineering
Interim Dean, School for Marine Science and Technology
University of Massachusetts, Dartmouth, MA

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EDUCATION

1997 Cornell University, College of Agriculture and Life Sciences and College of Engineering, Ithaca, NY. Doctor of Philosophy in Agricultural and Biological Engineering with minors in Environmental and Soil and Water Engineering. Advised by Professor Larry P. Walker (retired).

1994 Cornell University, College of Agriculture and Life Sciences and College of Engineering, Ithaca, NY. Master of Science in Agricultural and Biological Engineering. Advised by Professor Larry P. Walker (retired).

1991 Syracuse University, College of Engineering, Syracuse, NY. Bachelor of Science in Chemical Engineering, with Distinction.

PROFESSIONAL EXPERIENCE

2018-present Dean, College of Engineering, University of Massachusetts, Dartmouth, MA

2020-present Interim Dean, School for Marine Science and Technology, University of Massachusetts, New Bedford, MA

2018-present Professor, Department of Bioengineering, College of Engineering, University of Massachusetts, Dartmouth, MA

2018-present Adjunct Professor, Department of Biological and Agricultural Engineering, College of Engineering and College of Agricultural & Environmental Sciences, University of California, Davis, CA

2007-2018 Professor, Department of Biological and Agricultural Engineering, College of Engineering and College of Agricultural & Environmental Sciences, University of California, Davis, CA

2017-2018 Executive Associate Dean for Research & Graduate Studies, University of California, College of Engineering, Davis, CA

2013-2017	Associate Dean for Research & Graduate Studies, University of California, College of Engineering, Davis, CA
2006-2016	Staff Research Scientist, Joint BioEnergy Institute, Emeryville, CA
2015	Interim Dean, University of California, College of Engineering, Davis, CA
2009-2013	Associate Dean for Undergraduate Study, University of California, College of Engineering, Davis, CA
2007-2009	Graduate Advisor, Biological Systems Engineering Graduate Program, Davis, CA
2002-2007	Associate Professor, Department of Biological and Agricultural Engineering, College of Engineering and College of Agricultural & Environmental Sciences, University of California, Davis, CA
1996-2002	Assistant Professor, Department of Biological and Agricultural Engineering, College of Engineering and College of Agricultural & Environmental Sciences, University of California, Davis, CA
1992-1996	Graduate Research Assistant, Cornell University, Ithaca, NY
1991	Environmental Consultant, Galson Incorporated, East Syracuse, NY
1990	Manufacturing Engineer, Dow Corning Corporation, Midland, MI
1989	Process Engineer, Dow Corning Corporation, Midland, MI

ADMINISTRATIVE EXPERIENCE

2018-present Dean, College of Engineering, University of Massachusetts, Dartmouth, MA

The dean of the college of engineering oversees program, faculty and student productivity and development; fundraising and grantsmanship; external relations; inter-school and multi-disciplinary collaborations within the university and with the external community. The dean advocates for the college, with a focus on the recruitment and retention of diverse faculty, staff and students with a vision and commitment to capitalize on the assets of the region including its bilingualism, bi-literacy, and bi-cultural environment. The dean promotes the global visibility of the college's programs, fosters research and creativity, and works closely with leaders of the local, state, and regional communities to ensure that the college's graduates have knowledge and skills to succeed in the workplace of the future.

Major Accomplishments:

- Facilitated the development of the cybersecurity center. In 2020 the National Security Agency and the Department of Homeland Security designated University of Massachusetts Dartmouth as a National Center of Academic Excellence in Cyber Research (CAE-R).
- Created proposal development support initiative to support faculty research funding.

- Implemented a Residential Peer Mentoring program focused on first-year female engineering students to increase recruitment and retention of women in engineering.
- Developed and implemented an incentive-based budget model for allocation of student major fees to departments based on student enrollment, graduation, faculty research expenditures, and student credit hours of instruction.
- Developed and implemented a program to incentivize faculty to financially support graduate students.
- Facilitated development of a UMass Dartmouth College of Engineering Diversity and Inclusion Plan for submission to the American Society for Engineering Education (ASEE). The College of Engineering was an "exemplar" recipient of the award in the inaugural year of the ASEE Diversity Recognition Program.
- Partnered on the College Access Pathway (CAP) in Engineering, a new program with Bristol Community College and Diman Regional Vocational High School, that allows students to earn a bachelor's degree in engineering in only three years.
- Facilitated an agreement with the Air National Guard to collaborate on undergraduate and graduate cybersecurity training and workforce development.
- Developed nomination guidelines and allocated funding for an award in the college to recognize faculty commitment to diversity, equity and inclusion.
- Developed nomination guidelines and allocated funding for an award to recognize excellence in staff support for the college.
- Facilitated revision of the freshmen engineering course Introduction to Engineering to meet the needs for a diverse population of students and integrate engineering design.
- Supported renovation of spaces to improve teaching with technology. In 2019 spaces included the Software Studio Laboratory I (SENG 222) in the Department of Electrical and Computer Engineering and the Computer Science Teaching and Learning Laboratory (DION 309). In 2020 spaces included the Software Studio Laboratory II (SENG 212) in the Department of Electrical and Computer Engineering, two computer science teaching laboratories (DION 303 and DION 305), and an Internet of Things Innovation Laboratory (DION 306) in the Department of Computer Science, and the Materials Science Laboratory (SENG 110) in the Department of Mechanical Engineering.
- Supported renovation of laboratories to advance research in fluid dynamics (SENG 007), and cybersecurity and bioinformatics (DION 307).
- Engaged alumni to develop annual event between UMass Dartmouth and Women in Defense on Empowering Women in Engineering (2019) and Women in Negotiation (2020). Proceeds from the event support a scholarship for a participant in the Women in Engineering program at UMass Dartmouth.
- Empowered college technicians and faculty to develop COVID-19 safety protocols for department teaching laboratories and creating a culture of safety for the college community.
- Recruited eight new faculty in 2019 and five new faculty in 2020.

2017-2018 Executive Associate Dean for Research & Graduate Studies, University of California, College of Engineering, Davis, CA

2013-2017 Associate Dean for Research & Graduate Studies, University of California, College of Engineering, Davis, CA

The Associate Dean for Research and Graduate Studies is responsible for coordination and advancement of overall engineering graduate and research programs. Specific responsibilities

are to: (1) collect and analyze data related to graduate recruitment, admissions, enrollment, diversity and financial support, (2) allocate and maintain documentation on college graduate student recruitment and support funds, (3) prepare graduate and research statistics and information for US News and World Report rankings, Dean's reports, college publications/public relations, and college development units, (4) oversee the Distance Learning Program, (5) represent the College of Engineering and provide overview information to visiting international delegations, and coordinate international agreements of cooperation and specific working agreements with research and/or graduate scholar exchanges, (6) collect and analyze data related to proposal submissions, extramural contract and grant awards, and research expenditures for the college and associated Organized Research Units, maintaining awareness of opportunities for support of research by outside agencies, informing faculty of research opportunities, assisting with research agreements, and technology transfer, (7) review requests for exception to policy, and requests for academic year salary cost recovery from extramural grants, (8) coordinate the review and ranking of Limited Submission proposals within the college, (9) assist PIs with matching requests for college and cross-college proposals, (10) coordinate with the Office of Vice Chancellor for Research in promoting College of Engineering research programs, informing college faculty and staff of changes in research related policies, and assisting in informing new faculty about research policies and resources available on campus, (11) serve as a liaison with government laboratories, (12) represent the College of Engineering on campus graduate studies, research, international programs, and technology transfer related committees as required.

Major Accomplishments:

- Developed new guidelines and procedures for cost-share on major research awards and training grants.
- Implemented procedures for requesting financial support for large, interdisciplinary research awards.
- Initiated new, annual, college-wide recruitment program for graduate students including development of promotional materials for graduate groups and programs.
- In partnership with the UC Davis Office of Research, developed workshop series for new faculty research success.
- Proposed and secured funding for the new program Preparing Engineering Graduates for the 21st Century (PEGS21). With $1M from the NSF S-STEM program, PEGS 21 aims to increase the recruitment, retention, student success and graduation of students historically underrepresented in Science, Technology, Engineering and Mathematics (STEM) and to implement and study effective practices and strategies that contribute to their success. Developed quarterly seminars to build a student cohort and support activities that lead to student success.
- Implemented new procedures for allocation of funding and student support to graduate programs to incentivize recruitment and retention of diverse students.
- Facilitated the preparation of guidelines for space metrics for assessment of efficient use of research space in the College of Engineering.
- Supported preparation of a proposal for an NSF Engineering Research Center (ERC) leading to receipt of an award. UC Davis is a partner on an ERC in the area of Geotechnical Engineering led by Arizona State University.
- Managed the successful transition of College of Engineering Technology Transfer Center to central campus leadership.
- Secured a contract from Lawrence Livermore National Laboratory to offer the UC Davis Distance Learning Program. More than 30 scientists from the lab participate in UC Davis graduate courses per year.

- Coordinated the new Dean's Distinguished Graduate Fellowship program including funding agreements from the Office of Graduate Studies and College of Engineering graduate programs, application review, and award letters to students.
- Initiated new application and review methods for diversity awards for graduate students in the College of Engineering.
- Facilitated the development of a new award to faculty to support collaborative research.
- In partnership with the Office of Research, implemented a competitive funding opportunity for faculty support to prepare NSF Engineering Research Center proposals; developed a call for proposals, proposal submission and review guidelines.
- Led a college wide working group for on-line graduate education to provide recommendations for serving additional graduate students through on-line instruction.
- In collaboration with UC Davis Innovation Access, hosted a workshop for new faculty on resources available in the Office of Research for research commercialization.

2015 Interim Dean, University of California, College of Engineering, Davis, CA

The Interim Dean led the College of Engineering during the transition of leadership between Deans Enrique Lavernia and Jennifer Curtis (July 2015-October 2015).

Major Accomplishments:

- Created position description for the Associate Dean for Facilities and Capital Planning.
- Led recruitment efforts for the Executive Assistant Dean, Associate Dean for Facilities and Capital Planning, and Faculty Director for the Center for Nano and Micro-Manufacturing.
- Initiated searches for twelve new tenure-line faculty positions in engineering.
- In collaboration with department chairs, prepared offer letters and negotiated start-up packages for five new faculty.
- Recruited a new department chair for the Department of Biomedical Engineering.
- Negotiated funding support from the provost for the Center for Nano and Micro-Manufacturing.
- Assisted with on-boarding of new leadership positions, including Dean Jennifer Curtis.

2009-2013 Associate Dean for Undergraduate Study, University of California, College of Engineering, Davis, CA

The Associate Dean for Undergraduate Studies was responsible for overseeing and guiding all undergraduate engineering programs and related services including curriculum development, accreditation, academic advising, and student recruitment and retention. The position supervised the Director for the Undergraduate Student Services unit who supervised four Student Affairs Officers and a Student Services Assistant.

Major Accomplishments:

- Led the ABET task force that oversaw the accreditation of majors in the College of Engineering by the Engineering Accreditation Commission (EAC) and the Computer Accreditation Commission (CAC) of ABET. This included coordinating the preparation of self-study reports, collection of data for reports and a site visit, development of templates and boilerplate text for five out of eight sections of the report to improve the efficiency for all departments preparing self-study reports, and coordination of all communications with

ABET during the months prior to the visit and after the ABET visit including addressing shortcomings identified during the visit. Accreditation for all programs, including one new program in Biomedical Engineering, was approved for six years.

- Implemented the new course Introduction to Engineering (ENG 1) for incoming freshmen. ENG 1 is a one-unit class that served 75-250 students per year between 2009-2013. It aims to improve retention of students admitted as engineering freshmen.
- Implemented the new course Introduction to Issues in Engineering (ENG 11). ENG 11 is a 1-unit, graded, introductory course, developed to allow students to learn engineering concepts through participation in a basic engineering design project and to retain engineering students who participated in the UC Davis Special Transition Enrichment Program (STEP).
- Led the College of Engineering on implementing C- or better grades in prerequisites for engineering classes common to all programs (e.g. programming, properties of materials, statics, circuits, etc.).
- Co-led, with the engineering dean at Sacramento State University, the Sacramento State/UC Davis Math Engineering and Science Achievement (MESA) Center (2009-2012).
- Proposed, developed and raised $250K for the Leadership in Engineering Advancement Diversity and Retention (LEADR) Student Center in the College of Engineering. The aims of LEADR are to recruit and retain a diverse population of undergraduate students in the College of Engineering and to develop professional skills in students to ensure their success upon graduation.
- Developed and obtained funding for a new advising position to serve freshmen international students and implement programs, such as on-line summer advising, to support students' transition to the US and UC Davis.
- Created an on-line orientation video for incoming College of Engineering freshmen.
- Worked closely with faculty on proposing a new college regulation that states that prerequisites will be enforced at the time of registration.
- Developed and implemented a recruitment strategy for increasing application and enrollment rates of transfer students from community colleges.
- Proposed and implemented the Engineering Design Showcase to engage industry in design activities within all majors in the college, particularly at the undergraduate level. The event builds relationships with industry that increase student recruitment and participation in our undergraduate programs, and allows programs to obtain feedback from industry on design projects for continuous improvement of the senior design experience. The event serves all senior engineers in the College of Engineering.
- In collaboration with faculty and advising staff, coordinated the development of a proposal to the provost for new academic advising positions in engineering. Secured partial funding for three new positions.
- Developed the Sandia Design Award and guidelines for intellectual property assignment for engineering design projects supported by the national labs and industry.
- In partnership with Counseling and Psychological Services on campus, created and secured campus funding for a new mental health advisor housed in the College of Engineering.

2010-2017 Director, Renewable Energy Systems Opportunity for Unified Research, Collaboration and Education (RESOURCE), Davis, CA

The Renewable Energy Systems Opportunity for Unified Research Collaboration and Education (RESOURCE) program was a structured graduate training program that paired PhD students with elementary school teachers to develop and deliver Science, Technology, Engineering and Mathematics (STEM) curriculum related to renewable energy and environmental sustainability. RESOURCE was funded by the NSF GK-12 program. The major goals of the project were to transform engineering graduate programs and students by establishing graduate leadership and fostering collaboration and communication training to directly transfer energy-related research to the K-12 curriculum and to strengthen and sustain partnerships with local K-12 institutions. The director was responsible for leading graduate student and teacher recruitment and training activities, supervising an academic coordinator for the project and facilitating the publication of training products.

Major accomplishments:

- Provided fellowship funding for 30 graduate students at UC Davis and 17 teachers for engagement of over 2,000 4th, 5th, and 6th grade students at 16 elementary schools in educationally-disadvantaged communities in the Sacramento region.
- Organized annual meetings to prepare fellows for communicating STEM subjects and their research to technical and non-technical audiences.
- Initiated structured, weekly 1-unit seminars for fellows. Fall quarter seminars helped fellows learn the range of skills needed to achieve student learning outcomes in a classroom, winter quarter seminars emphasized assessment of student learning outcomes, and spring seminars were dedicated to preparation of a lesson and/or activity for submission to TeachEngineering.org, a public site for sharing peer-reviewed teaching materials for K-12 engineering education.
- Oversaw fellow and teacher development and publication of lessons and activities on general energy concepts, which are freely available on TeachEngineering.org.
- Collaborated with the Associate Vice Chancellor in Student Affairs, on establishing the UC Davis and Sacramento State Math, Engineering, Science Achievement (MESA) center at UC Davis. MESA is a nationally acclaimed academic model based on K-16 enrichment in mathematics and science, college preparation, retention, career awareness and teacher professional development. It is funded by the state legislature, corporate contributions and grants. The majority of K-12 schools that participate in MESA have a high percentage of economically disadvantaged students and/or a significant proportion of students from populations that are considered to be underrepresented in U.S. postsecondary/graduate education and the STEM workforce. I have served as PI for the center since its inception at UC Davis.
- Led fellow development and publication of teacher-training materials for ten MESA activities for the K-6 level that are accessible at TeachEngineering.org.
- Facilitated fellow and teacher participation in Sacramento City Unified School District's year-long Project Green program, an initiative to add a real-world application to classroom instruction about the environment and sustainable living (http://www.scusd.edu/post/project-green). Teams coached by RESOURCE fellows were awarded funding (> $1.5M) to improve infrastructure and resource use at their school sites.

AWARDS AND HONORS

2019. California Department of Pesticide Regulation, Integrated Pest Management Achievement Award. Awarded for developing and promoting methods for pest management that reduce the risks associated with using traditional chemical pesticides.

2018. Outstanding Senior Faculty Research Award. Awarded by the UC Davis College of Engineering for excellence in research.

2018. HERS Clare Booth Luce Scholarship Award. Awarded to participate in the 2018 Higher Education Resource Services (HERS) Summer Institute for women's leadership development.

2016. Woman of the Year Award. Congressional commendation awarded by Congressman John Garamendi for leadership and dedication to public service.

2016. Distinguished Postdoctoral Scholar Mentoring Award. Awarded by the UC Davis Academic Senate in recognition of outstanding commitment to mentoring in the overall success of the university's postdoctoral scholars.

2015. UC Davis MESA Citation. Awarded by the UC Davis/Sacramento State MESA K-12 school program for leadership, research and support of mathematics, engineering and science achievement (MESA) at the elementary level.

2011. Nona Sall Award. Awarded by the CA State University Sacramento and UC Davis MESA Center for promoting CA K-12 STEM education.

2011. Outstanding Project Award. Awarded by the National Science Foundation GK-12 program in recognition of the efforts of the RESOURCE program.

2005. Farrall Young Educator Award. Awarded by the American Society of Agricultural and Biological Engineers for outstanding teaching in engineering.

2003. Outstanding Mentor Award. Awarded by the Consortium for Women and Research Advisory Board for mentoring women's research at UC Davis.

1999. California Resource Recovery Association Award. Awarded for leadership, commitment and dedication to education and advocacy to organic recycling in California.

1995-1996. U.S. Environmental Protection Agency Graduate STAR Fellowship.

1995. Alice H. Cook and Constance E. Cook Award. Awarded for efforts on improving the status of women at Cornell through leadership of the Expanding Your Horizons conference.

1989-present. Member of Tau Beta Pi Engineering Honor Society.

1991. Outstanding Senior Engineer and Class Marshall. Syracuse University, College of Engineering.

1987-1991. Regents Scholarship from the State of New York.

PROFESSIONAL SERVICE AND DEVELOPMENT

Service to the State of Massachusetts

2019. Governor's Economic Development Council. Represented UMass Dartmouth and the South Coast region of MA.

HERS Institute Alumna

2018. The HERS Institute is a competitively-selected Leadership Development Institute for women in Higher Education. Since 1976, the curriculum covers general leadership principles, higher education trends, change management, budgets and financial statements, career planning, legal issues, inclusive excellence, and fundraising. Sessions are taught by professional practitioners and leaders in their fields, as well as campus administrators. Successful completion of a HERS Institute requires participants to have the support of their Institution administration, to complete a Capstone Leadership Project related to their role at the Institution, and to engage in introspection and skill development surrounding their own leadership roles and identity as a leader. As a HERS Institute Alumna, participants are connected to 5,000 alumnae across Higher Education Administration, Staff, and Faculty roles from across the U.S.

Editorial and Advisory Boards

2016-2018. Board Member, Engineering Research Council, American Society for Engineering Education

2017-2018. Chair, Curtis W. McGraw Research Award Committee. Engineering Research Council, American Society for Engineering Education

2004-2020. Editorial Board, Industrial Biotechnology

2006-2010. Associate Editor, Biological Engineering

2006-2008. Member and Chair (2007-2008). Farrell Young Educator Award Committee, ASABE

1999-present. Editorial Board, Compost Science and Utilization

Review of External Faculty and Scientist Promotions

2017. Review for Lawrence Berkeley National Laboratory. Promotion to Senior Scientist position

2016. Review for Ohio State University. Faculty promotion from associate to full professor

2015. Review for Cornell University. Faculty promotion from associate to full professor

2014. Review for Lawrence Berkeley National Laboratory. Promotion to Staff Scientist position

2013. Review for University of Hawaii. Faculty promotion from associate to full professor

2011. Review for North Dakota State University. Faculty promotion from assistant to associate professor

2010. Review for Lawrence Berkeley National Laboratory. Promotion to career Research Scientist position

2010. Review for Penn State University. Faculty promotion from associate to full professor

2006. Review for University of Kentucky. Faculty promotion from assistant to associate professor

2006. Review for Cornell University. Faculty promotion from assistant to associate professor

2000. Review for University of Kentucky. Faculty promotion from assistant to associate professor

UNIVERSITY SERVICE AND OUTREACH

University of Massachusetts, Dartmouth, Campus Service

2020. Chair. Search committee for Dean, Charlton College of Business. Successfully recruited Dr. John Williams.

2020. Member. Student Ratings Committee. This labor-management committee created a set of common questions to assess the move to an online modality for each course taught in Spring 2020.

2019. Member. Commonwealth Professor Committee. This labor-management committee developed eligibility, nomination, review and evaluation guidelines for the title of commonwealth professor.

2018-present. Member, Chancellor's Management Council

2018-present. Member, Dean's Council

University of California, Davis, Campus Service

2018. Member, SEA (STEM Equity Achievement) Change UC Davis Self-Assessment Team.

2018. Member, Aggie Square committee.

2017-2018. Member, Search committee for Associate University Librarian for Research and Learning

2017. Member, Review committee for the UC Davis Biotechnology Program

2017-2018. Member, Faculty Advisory Committee for the Microbiome Special Research Program.

2016-2018. Member, Joint Task Force on Research Units

2014-2018. Member, Research Coordinating Council

2013-2018. Member, Administrative Coordinating Council of Deans (ACCD)

2015. Member, Council of Deans and Vice Chancellors

2015. Member, Council of Deans

2015-2016. Member, Crocker Nuclear Laboratory Planning Committee

2014. Member, Studio, Laboratory, and Office Advisory Committee (SLOAC)

2014-2016. Member, Lawrence Livermore National Laboratory & University of California, Davis Joint Administrative Working Group

2013-2014. Member, Carnegie Task Force

2012-2013. Member, iAM-STEM Advisory Committee

2012-2013. Member, STEM Taskforce

2011-2012. Member, 2020 Enrollment Task Force

2011-2012. Member, Program Review Committee for Soils and Biogeochemistry

2010-2013. Member, AB540 Task Force on Unauthorized Immigrant Students

2010-2013. Member, Milan Expo 2015 Planning Committee

2009-2013. Member, Undergraduate Advising Council

2009-2013. Member, Undergraduate Dean's Council

2009-2013. Member and Chair (2009-10, 2012-13) Council of Associate Deans. As chair activities included (1) working with the provost to address enrollment challenges in lower division STEM classes required by multiple majors; (2) preparation of proposal for campus advising resources including new campus-level director for advising, professional development for advisors, and new advising positions in colleges and departments; and (3) creation of new counseling positions (funded by Student Affairs) embedded in the colleges to address student mental health concerns on campus.

2009-2012. Member, Recruitment and Retention Task Force

2009-2013. Member, Yield Committee

2009-2013. Member, Energy Institute: Steering Committee. Developed proposal and bylaws for the Energy Graduate Group a new graduate program in engineering.

2007-2014. Member, Energy Institute Steering committee

2007-2013. Member, CREATE – IGERT executive committee

2010-2013. Director, CREATE- REU program. The CREATE-REU program aimed to engage traditionally underrepresented students in engineering in research related to plant biotechnology. Of the 26 participants, 15 were women, 11 were underrepresented minorities and 6 were first generation community college students. The CREATE-REU program had three key outcomes: (1) active engagement of 26 undergraduates in

mentored research related to plant biotechnology and agricultural sustainability, (2) development of a hands-on plant biotechnology short course aimed at building relevant laboratory and analytical skill sets in sophomore and junior level undergraduates, and (3) increased awareness in participating undergraduates of ethics, policy and regulatory issues related to plant biotechnology.

2003-2006. Member, Undergraduate Scholarship committee

University of California, Davis, College of Engineering Service

2018. Chair, Working group for on-line engineering graduate education

2017-2018. Member, Strategic Planning Committee. Led the development of tactics, timeline and deliverables for the goal "Enhance Interdisciplinary, Collaborative Research."

2015-2018. Member, College of Engineering Awards Committee

2013-2018. Ex-officio, College of Engineering Graduate Studies Committee

2013-2018. Ex-officio, College of Engineering Research and Library Committee

2016. Chair, Search Committee for Associate Dean for Capital Space and Planning

2016. Member, Search Committee for Director of Undergraduate Advising in the College of Engineering

2016. Member, Search Committee for Associate Dean for Undergraduate Studies

2015. Chair, Search Committee for Executive Assistant Dean in the College of Engineering

2013. Chair, Engineering Communications and Design Committee. Developed proposal for a new course in engineering design at the freshmen level.

2012-2013. Chair, Advising Workgroup. Developed a proposal for advising resources in the College of Engineering. Funds were acquired from the central campus for three new advising positions.

2011-2013. Member, Sandia National Laboratory Open Campus

2010-2011. Ex officio, Revenue Generation in College of Engineering

2010-2011. Member, 2025 Committee in College of Engineering

2009-2013. Chair, ABET Task Force for the College of Engineering. Oversaw (1) development of outcome assessment rubric for judges for the Engineering Design Showcase, (2) writing of sections of ABET reports common to all undergraduate programs, (3) coordination of ABET site visit for all undergraduate programs, and (4) responses to weakness and concerns from 2006 and 2012 reviews including program outcome assessment and prerequisite checking.

2009-2013. Faculty Adviser for Tau Beta Pi

2009-2013. Ex officio, Undergraduate Education and Policy

2009-2013. Ex officio, Committee for Student Development

2004-2009. Member, College of Engineering Graduate Study Committee

2007-2009, 1996-2001. Member, College of Engineering Committee for Student Development

University of California, Davis, Dept. of Biological and Agricultural Engineering Service

2016-2017. Member, Search Committee for Lecturer with Potential for Security of Employment

2013-2018. Member and Chair (2015-2018), Awards and Scholarships.

2013-2014. Member, Search Committee for Food Engineer Faculty

2012-2013. Member, Computing & Technology

2012-2013. Department Seminars (Spring)

2012. Viticulture and Enology Seminar (Spring)

2010-2013. Member and Chair (2012-13), Picnic Day committee

2009-2010. Chair, Activities committee

2009-2010. Member, Graduate Executive committee

2009-2010. Member, Planning committee

2008-2009. Member, Shop Advisory Committee

2007-2009. Graduate Advisor

2007-2009. Chair, Graduate Executive Committee

2007-2008. Chair, Department Seminars (Fall)

2007-2009. Member, Undergraduate Study Committee

2006-2007. Chair, Bioconversion Engineer faculty search committee

2003-2006. Member, Graduate Executive Committee

2003-2006. Member, Biological Engineering faculty search committee

2000-2001. Member, Environmental Engineering faculty search committee

2000-2001. Member, Students Relations committee

1999-2000. Member, Facilities and Safety committee

1998-1999. Member, Scholarships and Awards committee

1998-2000. Member, Committee on Research

1997-1998. Chair, Picnic Day committee

1996-2001. Member, Committee on Instruction

1996-1997. Member, Activities committee

Service at Cornell University and Syracuse University

1993-1996. Expanding Your Horizons. Led workshops on organic waste management and served as conference co-director (1995).

1988-1991. Member and President (1990-91) for Syracuse University chapter of Society of Women Engineers. Led fundraising efforts for chapter and initiated tutoring program with schools in Syracuse, NY.

1989-1991. Member and Treasurer (1990-91) for Syracuse University chapter of Tau Beta Pi.

RESEARCH SUMMARY

My research has addressed problems that involve the transformation, decomposition and conversion of biomass derived from plants to products. "Plants" include dedicated crops and algae, food processing residues and urban and agricultural wastes. I have been fortunate to work with a talented team of collaborators both on and off campus. These collaborations have led to a number of successful research projects as described in the following sections.

Algae production systems. Microalgae have tremendous potential to address global challenges related to water treatment, carbon sequestration and food and fuel production. In my lab, and in collaboration with plant scientists and experts in metabolomics, students and postdoctoral scholars aim to discover and design new processes for cultivation of algal biomass using waste CO_2 and repurposed water. Key research activities are briefly described below.

Investigation of algal interactions between microbes and the impacts of these interactions on accumulation of products. Our research has focused on improved biomass production and nutrient removal from wastewater. A major discovery was that co-cultures of algae and bacteria yield higher quantities of lipid and better-quality lipid for biofuel production. These results demonstrate the importance of studying "mixed" algae cultures for engineering applications. Furthermore, this work provides a basis for research and development of novel cultivation strategies for improved algal wastewater treatment and biofuel production.

Design of water-in-oil emulsions that maintain microalgae viability during storage and that promote rapid delivery and release in an aqueous environment. A number of reports have indicated that economical production of algae and controlled accumulation of targeted products such as oils and polysaccharides will require management of specific strains of microalgae in open ponds. Such agricultural scale systems will need storage and on-demand delivery of "microalgae seeds" for sustained production. We have refined algae processing methods and formulations that facilitate long-term room-temperature storage of algae in water-in-oil emulsions, and have elucidated the impact of production and delivery conditions on cell release upon application.

Methods for quantification of the cell wall, cytoplasmic polysaccharide and lipid contents of model algal strains. We have developed new methods to examine lipid, starch and cell wall carbohydrates. These methods have enabled discoveries on the impact of cultivation methods

on flocculation of algae, cell wall lysis, and quality of accumulated products for biofuel production.

This research has been supported by Chevron Technology Ventures, multiple grants from the National Science Foundation, the CA Energy Commission, the US Department of Energy, and private funding sources. Overall, our research on algae will enable the engineering of new production systems that yield biomass for food and energy as well as clean water.

Valorization of organic wastes. Conversion of organic solid wastes and agricultural residues into energy, biochemicals and food and feed has an untapped potential to reduce our reliance on fossil fuels and other natural resources. One of the challenges facing residue utilization is the recalcitrance of solid wastes and residues to biological conversion. In nature, microbial communities work synergistically to break down plant biomass to products. In my lab and in collaboration with scientists at government laboratories, students and postdoctoral scholars study these communities for the targeted discovery of organisms and functionalities that facilitate plant biomass decomposition. Major areas of research that have been supported by Chevron Technology Ventures, the National Science Foundation, the US Department of Energy, the California Energy Commission, the California Department of Pesticide Regulation, and private and foundation funding sources are described below.

Development of storage and bioconversion systems for agricultural residues. Each agricultural and food processing residue has its own unique set of storage and conversion challenges including stability, moisture, and recalcitrance to bioconversion. Improper storage alone can result in decomposition of the residues, deterioration of biomass, and self-heating to the point of ignition. Equally challenging is the seasonal production of these feedstocks, which requires management and storage for year-round operation of conversion facilities and full utilization of capital investments. In my lab, we investigate these challenges in the context of downstream conversion alternatives. Outcomes have included methods for less expensive storage, pretreatment and processing of organic wastes and agricultural by-products.

High-solids pretreatment of agricultural residues. Most sources of lignocellulosic biomass require pretreatment to improve the efficiency of enzymatic hydrolysis of polysaccharides to sugars. We have examined pretreatment processing scenarios to reduce the input of water. Outcomes have included more efficient pretreatment methods that could be operated under low moisture (high solids) conditions and require less washing of biomass.

Targeted enzyme discovery for lignocellulose hydrolysis. Development of cellulosic biofuels from non-food crops is currently an area of intense research interest. Tailoring depolymerizing enzymes to particular feedstocks and pretreatment conditions is one promising avenue of research. My lab has led and collaborated on several projects aimed at identifying microbial communities that could be mined for novel enzymes using metagenomic and metatransciptomic analyses. Work in this area has led to the design of systems that foster microbial communities capable of secreting enzymes that hydrolyze recalcitrant polymers in lignocellulose and yield rapid decomposition of organic waste.

Soil treatment using solar energy and destabilized lignocellulose. Soil borne pathogens and pests can lead to devastating food and financial losses. Chemical solutions to this problem, such as fumigation with methyl bromide, can lead to even greater environmental damage including ozone layer depletion. Soil solarization is an effective, non-chemical method that not only can control soil borne agricultural pests, but also build a strong and beneficial microbial soil community. I have led and collaborated on projects aimed at engineering organic matter sources and soil amendment strategies to improve the efficacy of soil solarization. Overall our work will lead to more predictable and consistent treatment of soil using solarization with amendment of organic matter.

Production of insect biomass from lignocellulose. The world's population is expected to grow to 9 billion by 2050. Ensuring a secure food supply while protecting natural resources is

an imminent challenge facing the planet. Exploring innovative approaches to food production that are more sustainable than current practices and that yield nutritious food is critical for addressing this challenge. Insect production offers an exciting solution to food insecurity. Insects have nutritional quality that is similar to or exceeds existing sources of protein, and can use less water, land and energy to produce. Black soldier fly larvae (*Hermetia illucens*) have potential as a substitute for common commercially available protein sources, however, the availability of inexpensive, dependable and pathogen-free sources of feedstock for larvae production has presented challenges for commercial production. Our team has demonstrated that almond by-products can be used as a substrate for larvae production. Overall our work will lead to methods for valorization of almond by-products and sustainable production of insect biomass.

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Reddy, A.P., M. Allgaier, J.M. Gladden, S.W. Singer, P. Hugenholtz, B.A. Simmons, T.C. Hazen, and J.S. VanderGheynst. Characterization of the activity of thermophilic microbial communities on bioenergy feedstocks. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach, FL, April 19-22, 2010.

Singer, S.W., J.M. Gladden, P. D'haeseleer, M. Allgaier, D.C. Chivian, T.C. Hazen, J.S. VanderGheynst, P. Hugenholtz. and B.A. Simmons. Targeted Discovery of Enzymes From Enriched Microbial Consortia for High Temperature Saccharification of Ionic-Liquid Pre-Treated Biomass. American Institute of Chemical Engineers annual meeting, November 6, 2010.

Allgaier, M., A. Reddy, J.I. Park, N. Ivanova, P. D'haeseleer, S. Lowry, R. Sapra, T.C. Hazen, B.A. Simmons, J.S. VanderGheynst, and P. Hugenholtz. Targeted discovery of glycoside hydrolases from a switchgrass-adapted compost microbial community. International Symposium on Microbial Ecology, Seattle, WA. ISME 13 – 13th, August 22-27, 2010.

Singer, S., J. Gladden, M. Allgaier, A. Reddy, J.S. VanderGheynst, T.C. Hazen, P. Hugenholtz, P. D'haeseleer, B. Simmons. Targeted enzyme discovery in thermophilic feedstock-adapted microbial communities using proteogenomic and biochemical techniques. ISME 13 – 13th International Symposium on Microbial Ecology, Seattle, WA., August 22-27, 2010.

Reddy, A.P., M. Allgaier, J. M. Gladden, S. Singer, P. Hugenholtz, B. Simmons, T.C. Hazen, and J.S. VanderGheynst. Enrichment of highly efficient thermophilic microbial communities active on switchgrass and corn stover in a high-solids environment. 239th ACS National Meeting & Exposition, San Francisco, CA, March 21-25, 2010.

Cheng, Y-S, J. Labavitch, Orn-U-Ma Tanadul A. Powell, J.S. VanderGheynst. Quantification and characterization of carbohydrate compositions in microalgal biomass. 239th ACS National Meeting & Exposition, San Francisco, CA., March 21-25, 2010.

Zheng, Y. C. Lee, C. Yu, Y-S Cheng, R. Zhang, J.S. VanderGheynst, and B.M. Jenkins. Pretreatment and fermentation of sugar beet pulp into fuel ethanol. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach, FL., April 19-22, 2010

Singer, S. W. J. M. Gladden, M. Allgaier, A. P. Reddy, J.S. Vandergheynst, T.C. Hazen, B.A. Simmons, and P. Hugenholtz. Targeted enzyme discovery in thermophilic feedstock-adapted microbial communities. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach, FL, April 19-22, 2010

Hazen, T.C., P. Hugenholtz, S. Singer, J.S. VanderGheynst, P.M. D'haeseleer, M.P. Thelen, K. DeAngelis, A.P. Reddy, M. Allgaier, J. Fortney, G. Anderson, T. DeSantis, E. Brodie, C. Wu, D. Goodheart, M. Firestone, W. Silver, and B.A. Simmons. JBEI Microbial Communities Deconstruction Research Activities. Genomics: GTL Awardee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop. Bethesda, Maryland. February 8-11, 2009.

Allgaier, M., A.P. Reddy, J.S. VanderGheynst, A. Copeland, V. Kunin, P. D'haeseleer, K. DeAngelis, J. Fortney, D. Chivian, P.S. Dehal, B.A. Blake Simmons, T.C. Hazen, and P. Hugenholtz. Metagenomic Characterization of Compost and Rain Forest Soil Microbial Communities. Genomics:GTL Awardee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop. Bethesda, Maryland. February 8-11, 2009.

Knierim, B., L. Prak, S. Singh, D. Jorgens, M. Zemla, K. DeAngelis, A.P. Reddy, J.S. VanderGheynst, T.C. Hazen, B. Holmes, R. Sapra, B.S. Simmons, P. Adams, and M. Auer. Electron Microscopic Imaging at JBEI. Genomics: GTL Awardee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop. Bethesda, Maryland. February 8-11, 2009.

Zheng, Y., M. Yates, D. Yang, Y-S Cheng, C.W. Yu, T. Dooley, J.S. VanderGheynst, R. Zhang, B.M. Jenkins. Sugar Beet Pulp Storage via Ensilage: Effects on Sugar Yield upon Enzymatic Hydrolysis. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Yu, C.W., B.M. Jenkins, J.S. VanderGheynst, R. Zhang, Y. Zheng, and Y-S Cheng. Leaching of Food Industry Residues to Improve Feedstock Quality and Resource Recovery. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Scher, H., H. Guo, Y-S Cheng and J.S. VanderGheynst. Stabilization and Delivery of *Chlorella vulgaris* in Water-in-Oil Emulsions. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Cheng, Y-S, Y. Zheng, C.W. Yu, J.S. VanderGheynst, R. Zhang and B.M. Jenkins. A comparison of lime and sodium hydroxide pretreatment for delignification of rice straw. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Reddy, A.P., M. Allgaier, P. Hugenholtz, B. Simmons, T.C. Hazen and J.S. VanderGheynst. Tracking microbial community changes during decomposition of switchgrass. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Zheng, Y., M. Yates, Y-S Cheng, C.W. Yu, T. Dooley, R. Zhang, J.S. VanderGheynst and B.M. Jenkins. Effect of Moisture Content on the Ensilage of Sugar Beet Pulp and Tomato Pomace. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May 3-6, 2009.

Singer, S., A.P. Reddy, J.S. VanderGheynst, and B.A. Simmons. *Aspergillus fumigatus* JF1: An Ionic Liquid Tolerant fungus Isolated from Compost. 31st Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA. May, 3-6, 2009.

Zheng, Y., H. Aung, J.S. VanderGheynst, R. Zhang, D. Yang, C.W. Yu, and B.M. Jenkins. Screening and Selection of Lactic Acid Bacteria for Ensiling Food Processing Wastes. 30th Symposium on Biotechnology for Fuels and Chemicals. New Orleans. May 4-7, 2008.

Aslam, D.N., T.R. Rumsey and J.S. VanderGheynst. Models to estimate planting time delay to prevent phytotoxicity of compost amended soil. 16th Annual US Composting Council Conference. Oakland, CA. February 9-12, 2008.

VanderGheynst, J.S., T. Dooley, H. Guo, H. Scher. Storage and release of solutes and microalgae from water-in-oil emulsions stabilized by silica nanoparticles. ASABE Annual International Meeting. Providence, Rhode Island. July. 2008

Marshall, M., T. Rumsey, and J.S. VanderGheynst. The effect of solarization on activity, composition, and inactivation of soil microbial communities. ASABE Annual International Meeting. Providence, Rhode Island. July. 2008

Aslam, D.N. and J.S. VanderGheynst. Management of compost production and soil amendment to prevent phytotoxicity. Pacific Southwest Organic Residuals symposium, September 22-24, 2008. UC Davis.

VanderGheynst, J.S., H.B. Scher, and H. Guo. Storage and delivery of aquatic microorganisms in emulsions stabilized by surface-modified silica nanoparticles. Presented at the 234th ACS National Meeting. August. 2007

Reddy, A.P., and J.S. VanderGheynst. Biological activity and community structure leading to thermal runaway in stored agricultural biomass. Presented at the International Conference on The Future of Agriculture: Science, Stewardship, and Sustainability. April. 2006

Marshall, M.N., T.R. Rumsey, and J.S. VanderGheynst. Development and validation of predictive models of soil heating and pathogen inactivation during soil solarization. Presented at the International Conference on The Future of Agriculture: Science, Stewardship, and Sustainability. April. 2006

VanderGheynst, J.S., and H.B Scher. Improving the survival kinetics of cells stored in water in oil emulsions through osmotic pressure tailoring of droplet size. Presented at the 232nd ACS National Meeting. September. 2006

Simmons, C.W., and J.S. VanderGheynst. Modeling of T-DNA transfer and resultant transient transgene expression in agroinfiltrated leaf tissue. Presented at the 232nd ACS National Meeting. September. 2006

Shultz, D., N. Sabeh, and J.S. VanderGheynst. Production and delivery of a biocontrol agent for Eutypa prevention. Presented at American Society of Enology and Viticulture Meeting. 2004

VanderGheynst, J.S. Quantitative detection and distribution of *Eutypa lata* in grapevine. Presented at American Society of Enology and Viticulture Meeting. 2004

Joh, L., and J.S. VanderGheynst. Agroinfiltration of plant tissues as a protein production system. Presented at the Annual UC Biotechnology Retreat. 2004

Suarez, M.J., L.D. Joh, and J.S. VanderGheynst. Extraction of β-Glucoronidase (GUS) from tomato fruit. Presented at the Annual Biomedical Research Conference for Minority Students. October. 2003

VanderGheynst, J.S. Production of a biological control agent on agricultural residues. Presented at the American Chemical Society National Meeting. August. 2002

Block, D.E., K. Chador, M. Marshall, M. Olsen, K. Sananikone, N. Tran, J.S. VanderGheynst, and W. Yeh. Optimization of the fermentation of *Fusarium lateritium* for use as a biological control agent. Presented at the American Institute of Chemical Engineers Annual Meeting. November. 1999

Marshall, M., and J.S. VanderGheynst. Molecular analysis of fungal plant pathogens and biological control agents. Proceedings of the Institute of Biological Engineering, 2: C6. 1999

VanderGheynst, J.S. The use of phospholipid fatty acid analysis to measure microbial community structure changes in composting processes. Proceedings of the Institute of Biological Engineers, 2: C7. 1999.

Lavin, B., and J. VanderGheynst. Growth and oosporogenesis of *Lagenidium giganteum* in semi-solid phase cultivation. Proceedings of the Institute of Biological Engineering, 1: C22. 1998

VanderGheynst, J.S. How agricultural end-users can assess compost quality. Presented at UC Workshop on Compost Use for Pest Management, UC Davis, Davis. May 13. 1997

VanderGheynst, J.S., and R.C. Fowler. Fostering self-directed learning in biosystems projects: methodology and case examples. Poster presented at the August 1997 IBE meeting, Paper No. 4-7

VanderGheynst, J.S., D.J. Cogan, and J.M. Gossett. The effect of process management on the emission of odors from composting processes. Poster presented at the August 1997 IBE meeting, Paper No. 6-7.

PATENTS

JS VanderGheynst; HB Scher. Storage Stable Compositions of Biological Materials.

U.S. Patent 7485451 B2 issued Feb 3, 2009

N Nitin; S Young; JS VanderGheynst. Bioactive Delivery Vehicles.

U.S. Patent 2018/0296490 A1 issued Oct. 18, 2018

FUNDED RESEARCH AND CONTRACTS

Title: Land application of tomato processing effluents and field debris: adding value while minimizing treatment demands
Agency: CA League of Food Processors
Period: 04/01/2018 - 03/31/2019
Amount: $51,557
PIs: C. Simmons, J. Fernandez-Bayo, J.S. VanderGheynst

Title: The impact of almond by-product composition and nitrogen amendment on black soldier fly cultivation and quality
Agency: CA Almond Board
Period: 03/01/2018 - 12/31/2019
Amount: $177,880
PIs: J.S. VanderGheynst (PI)

Title: Distance Learning Program
Agency: Lawrence Livermore National Laboratory
Period: 10/01/2016 - 09/30/2020
Amount: $390,658
PIs: J.S. VanderGheynst (PI between 2016-2018)

Title: Production of *Hermetia illucens* (black soldier fly) larvae on almond by products
Agency: CA Almond Board
Period: 08/01/2017 - 12/31/2017
Amount: $40,000
PIs: J.S. VanderGheynst (PI), C.J. Ceballos

Title: Field trial assessment of biosolarization using almond residue amendments to improve soil health and manage pests in almond orchards
Agency: CA Almond Board
Period: 08/01/2017 - 07/31/2018
Amount: $70,000
PIs: C. Simmons, J.S. VanderGheynst, J.J. Stapleton

Title: UC Davis/Sacramento State Math, Engineering and Science Achievement Program
Agency: UC Office of the President
Period: 04/01/2017 - 03/31/2018
Amount: $180,000
PIs: J.S. VanderGheynst (PI)

Title: Assessment of almond residual biomass as soil amendment for biosolarization
Agency: CA Almond Board
Period: 03/01/2017 - 07/31/2017
Amount: $58,862
PIs: C. Simmons, J.S. VanderGheynst, J.J. Stapleton

Title: Reducing toxin exposure for workers in western agriculture: Development of sustainable alternatives to soil fumigation
Agency: NIOSH
Period: 01/01/2017 - 12/30/2022

Amount: $1,200,000
PIs: C. Simmons, J.S. VanderGheynst, J.J. Stapleton

Title: Preparing Engineering Graduates for the 21st Century
Agency: NSF
Period: 07/01/2016 - 06/30/2021
Amount: $1,000,000
PIs: J.S. VanderGheynst (PI between 2016-2018), C.E Bronner (PI), K.A. McDonald

Title: UC Davis/Sacramento State Math, Engineering and Science Achievement Program
Agency: UC Office of the President
Period: 04/01/2016 - 03/31/2017
Amount: $180,000
PIs: J.S. VanderGheynst (PI)

Title: California LSAMP Bridge to the Doctorate (BD) Activity
Agency: NSF
Period: 10/01/2016 - 09/30/2018
Amount: $1,075,000
PIs: Hillman, P. Mohapatra, J.S. VanderGheynst

Title: Improving microalgae feedstock for biofuel production using CO_2 and waste nutrients from anaerobic digesters
Agency: California Energy Commission
Period: 1/01/2016 - 08/31/2018
Amount: $600,000
PIs: A. Franz, A.M. Kendall, R. Zhang, J.S. VanderGheynst

Title: UC Davis/Sacramento State Math, Engineering and Science Achievement Program
Agency: UC Office of the President
Period: 04/01/2015 - 03/31/2016
Amount: $180,000
PIs: J.S. VanderGheynst (PI)

Title: Continuous biological protection and control of algal pond productivity
Agency: US Department of Energy
Period: 9/01/2015 - 8/31/2018
Amount: $1,000,000
PIs: M. Thelen, L. Carney, T.W. Lane, J.S. VanderGheynst

Title: UC Davis/Sacramento State Math, Engineering and Science Achievement Program
Agency: UC Office of the President
Period: 07/01/2014 - 07/01/2015
Amount: $180,000
PIs: J.S. VanderGheynst (PI)

Title: Developing co-products from anaerobic digestion: Application of composted anaerobic digestate to soil to enhance sustainable agriculture and waste

management
Agency: Diamond Developers Co. LTD, Sustainable Research and Training Program
Period: 9/1/14-12/30/16
Amount: $150,000
PIs: C. Simmons, J.S. VanderGheynst

Title: Sequential energy and compost production from organic residues
Agency: Diamond Developers Co. LTD, Sustainable Research and Training Program
Period: 9/1/14-12/30/16
Amount: $150,000
PIs: J.S. VanderGheynst (PI), C. Simmons

Title: Managing soil organic matter amendment and microbial community structure to enhance soil heating during solarization
Agency: NSF – CBET Environmental Sustainability program
Period: 7/1/14-6/30/19
Amount: $300,009
PIs: J.S. VanderGheynst (PI), C. Simmons, J. Stapleton

Title: Managing mixotrophic algae cultivation for efficient water treatment and biofuel production
Agency: NSF – CBET Energy for Sustainability program
Period: 7/1/14-6/30/19
Amount: $318,766
PIs: J.S. VanderGheynst (PI), B. Higgins, O. Fiehn, T. Kind

Title: Methane Enhancement by Anaerobic Composting of Food Waste and Fats, Oil and Grease
Agency: CA Energy Commission
Period: 7/1/14-12/31/15
Amount: $149,999
PIs: J.S. VanderGheynst (PI), R. Yazdani

Title: Modeling of enhanced soil heating, microbial restructuring, and pest disinfestation during solarization of soil with lignocellulosic amendment
Agency: California Department of Pesticide Regulation
Period: 7/1/14-3/30/17
Amount: $299,999
PIs: C. Simmons, J. Stapleton, J.S. VanderGheynst

Title: Integrating cheminformatic resources for investigating photoautotrophic and mixotrophic metabolism in algae
Agency: National Science Foundation
Period: 1/1/12-12/30/17
Amount: $2,510,859
PIs: O. Fiehn, T. Kind, J.S. VanderGheynst, J. Labavitch

Title: Ionic liquid resistance in a cellulose degrading community
Agency: UC Lab Fees Research Program
Period: 7/1/12-06/30/16

Amount: $1,324,958
PIs: J.S. VanderGheynst (PI), M. Thelen, P. D'Haeseleer

Title: Winery Waste Water Treatment using Algae
Agency: Gallo, Inc.
Period: 2/1/12-12/31/12
Amount: $11,000
PIs: J.S. VanderGheynst (PI)

Title: Co-Robots for STEM Education in the 21st Century
Agency: NSF National Robotics Institute
Period: 9/1/12-08/31/15
Amount: $950,590
PIs: H. Cheng, J.S. VanderGheynst, T. White

Title: Renewable Energy Systems Opportunity for Unified Research Collaboration and Education (RESOURCE)
Agency: National Science Foundation
Period: 10/1/10-2/28/17
Amount: $2,803,933
PIs: J.S. VanderGheynst (PI), K. McDonald, B. Jenkins, A. Bellman, L. Joh

Title: Microbial Fuel Cells to Generate Electricity from High-Solids Food-Processing Wastes
Agency: California Energy Commission
Period: 10/1/10-1/31/12
Amount: $95,000
PIs: J.S. VanderGheynst (PI), F. Rezaei

Title: Leaching Pretreatments for Biomass Feedstock Upgrading
Agency: Chevron Technology Ventures
Period: 1/1/09 – 12/31/12
Amount: $408,930
PIs: B.M. Jenkins, J.S. VanderGheynst, R. Zhang, T. Jeoh, C. Lesher, P. Thy, S. Kaffka

Title: Liquid fuels from microalgal cell walls and cytoplasmic polysaccharides
Agency: Chevron Technology Ventures
Period: 1/1/09-03/31/12
Amount: $344,418
PIs: J.S. VanderGheynst (PI) and J. Labavitch

Title: Developing a business case model for the production of bioethanol from food processing wastes and rice straw
Agency: Chevron Technology Ventures
Period: 1/1/09-12/31/11
Amount: $208,956
PIs: J.S. VanderGheynst (PI), Ogden, B. M. Jenkins, Z. Fan and R. Zhang

Title: The effect of combined solarization and in solum compost decomposition on soil health
Agency: BARD
Period: 10/1/09-03/30/13
Amount: $325,000
PIs: J.S. VanderGheynst (PI), J. Stapleton, M. Raviv, D. Minz

Title: Control of Ash and Slag Transformations and Syngas Quality in Biomass Gasification for Liquid Fuels Synthesis
Agency: Chevron Technology Ventures
Period: 1/1/08 – 12/31/11
Amount: $884,160
PIs: B. M. Jenkins, J.S. VanderGheynst, R. Zhang

Title: Emulsion technology for the long-term storage and delivery of microalgae for large-scale biofuel production
Agency: Chevron Technology Ventures
Period: 2/1/08-2/1/12
Amount: $505,248
PIs: H. Scher, J.S. VanderGheynst

Title: REU Site: Collaborative Research and Education in Agricultural Technology and Engineering (CREATE)
Agency: National Science Foundation
Period: 10/1/08-10/1/12
Amount: $360,000
PIs: J. S. VanderGheynst (PI), P.C. Ronald

Title: Joint BioEnergy Institute (JBEI)
Agency: Department of Energy (DOE)
Period: 9/1/07-9/1/15
Amount: $125,000,000; subcontract to JSV: $537,434
PIs: J. Keasling

Title: IGERT: Collaborative Research and Education in Agricultural Technologies and Engineering (CREATE)
Agency: National Science Foundation
Period: 7/1/07-6/30/13
Amount: $3,098,985
PIs: K. McDonald, A. Dandekar, M. Newell-McGloughlin, P. C. Ronald, J.S. VanderGheynst

Title: Development and evaluation of biomass storage alternatives to accommodate seasonal production of biofuel feedstocks
Agency: Chevron Technology Ventures
Period: 6/1/07-6/1/11
Amount: $945,463
PIs: J.S. VanderGheynst (PI), B. M. Jenkins, R. Zhang

Title: New Metabolic and Lignocellulosic Deconstruction Technologies from *Acidothermus*
Agency: Chevron Technology Ventures
Period: 6/1/07-6/1/11
Amount: $899,998
PIs: A. Berry, J.S. VanderGheynst

Title: Biological Process Research and Development Equipment
Agency: Chevron Technology Ventures
Period: 03/01/07 - 02/29/08
Amount: $497,650
PIs: K.A. McDonald, J.S. VanderGheynst

Title: Equipment Request for Biomass Pretreatment and Processing
Agency: Chevron Technology Ventures
Period: 03/01/07 - 02/29/08
Amount: $35,000
PIs: R. Zhang, B.M. Jenkins, J.S. VanderGheynst

Title: Influence of sub-lethal heating and soil type on microbial colonization of weed seeds
Agency: UC Integrated Pest Management Program
Period: 02/01/07-05/01/07
Amount: $12,500
PIs: J. Stapleton, J.S. VanderGheynst

Title: Design of Water-in-Oil Emulsions for Storage of Microorganisms and Their Controlled Release in Aquatic Ecosystems
Agency: National Science Foundation
Period: 10/1/06 - 9/30/08
Amount: $ 270,000
PIs: J.S. VanderGheynst (PI), H. Scher

Title: Control of trunk diseases by protecting new pruning wounds, and by trunk surgery and subsequent protection of surgical and pruning wounds
Agency: American Vineyard Foundation
Period: 04/01/06-04/01/07
Amount: $25,000
PIs: L. Epstein, J.S. VanderGheynst

Title: Epidemiology and control of trunk canker in grapevines in the Sacramento valley
Agency: American Vineyard Foundation
Period: 04/01/05-4/01/06
Amount: $49,000
PIs: J.S. VanderGheynst (PI), L. Epstein

Title: Simulating Soil Recolonization Under Typical Conditions
Agency: Integrated Pest Management

Period: 10/11/05 - 09/30/10
Amount: $ 2,580
PIs: J.S. VanderGheynst (PI)

Title: Novel formulation methods to improve the shelf life and delivery of biological control agents
Agency: USDA-NRI
Period: 10/01/03-10/01/06
Amount: $200,000
PIs: J.S. VanderGheynst (PI), H. Scher

Title: Development of molecular techniques for the analysis of microbial communities on grapes
Agency: American Vineyard Foundation
Period: 06/01/01 - 06/01/02
Amount: $25,000
PIs: J.S. VanderGheynst (PI), D. Mills

Title: Graduate Assistance in Areas of National Need
Agency: US Department of Education
Period: 10/01/00-10/01/03
Amount: $365,400
PIs: J.S. VanderGheynst (PI), B. Hartsough, R. Zhang

Title: Food and Agricultural National Needs Fellowship Grant
Agency: USDA National Needs
Period: 10/01/00-10/01/03
Amount: $207,000
PIs: M. Delwiche, J.S. VanderGheynst

Title: Development of Control Methods for Eutypa Dieback Disease
Agency: California Competitive Grant Program for Research in Viticulture and Enology, and the American Vineyard Foundation
Period: 04/01/00-03/01/04
Amount: $525,000
PIs: D. Block, L. Epstein, Gu, D. Gubler, Molyneux, J.S. VanderGheynst

Title: Research Experience for Undergraduates
Agency: National Science Foundation
Period: 06/01/00 - 10/01/01
Amount: $10,294
PIs: D. Block, J.S. VanderGheynst

Title: Influence of moisture and oxygen levels on *Lagenidium giganteum*
Agency: BioSTAR-Agraquest
Period: 09/01/00 - 08/31/01
Amount: $45,785
PIs: J.S. VanderGheynst (PI)

Title: Solid state fermentation for upgrading grape pomace
Agency: UC Mexus Conacyt
Period: 07/01/99 - 06/30/00
Amount: $24,990
PIs: J.S. VanderGheynst (PI)

Title: Research Experience for Undergraduates
Agency: National Science Foundation
Period: 09/01/98 - 08/31/99
Amount: $10,294
PIs: D. Block, J.S. VanderGheynst

Title: Semi-solid phase cultivation of *Lagenidium giganteum*
Agency: BioSTAR- Agraquest
Period: 06/01/98 - 05/31/99
Amount: $24,823
PIs: J.S. VanderGheynst (PI)

Title: Monitoring biological control agents in composting
Agency: National Science Foundation
Period: 09/01/98 - 08/31/00
Amount: $99,993
PIs: D. Block, J.S. VanderGheynst

Title: Efficient production of *Botrytis cinerea* for vineyard inoculation
Agency: Far Niente
Period: 07/01/99 - 11/30/00
Amount: $10,005
PIs: D. Block, J.S. VanderGheynst

Title: Controlled degradation of organic wastes for production of disease-suppressive soil amendments
Agency: USDA
Period: 10/01/98 - 09/30/00
Amount: $63,614
PIs: J.S. VanderGheynst (PI)

Title: Graduate assistance in areas of national need
Agency: US Department of Education
Period: 09/01/97 - 08/31/00
Amount: $351,258
PIs: B. Hartsough, R. Zhang, J.S. VanderGheynst

AGRICULTURAL EXPERIMENT STATION PROJECTS

CA-D-BAE-2228-RR. The Science and Engineering for a Biobased Industry and Economy - S1041 Multistate Regional Project, 10/1/2013-09/30/2018

CA-D-XXX-2091-H. Developing Microalgae Conversion Systems for Enhanced Biofuel and Bioproduct Refining. 10/01/2010-09/30/2014

CA-D-BAE-2005-RR. The Science and Engineering for a Biobased Industry and Economy - S1041 Multistate Regional Project, 10/1/2009-09/30/2013

CA-D-BAE-7102-RR. The Science and Engineering for a Biobased Industry and Economy. S1007 Multistate Regional Project, 10/1/2003-09/30/2008

CA-D*-XXX-7027-H. Production and Delivery of Microorganisms for the Biological Control of Plant Pathogens and Insects. 10/1/2001-09/30/2006

CA-D*-XXX-7210. Controlled Degradation of Organic Wastes for Production of Disease-suppressive Soil Amendments. 10/01/1998 - 09/30/2001

RESEARCH SUPERVISION

Post-Doctoral Researchers Supervised

Dr. Shannon Ceballos (PhD in Molecular and Cellular Biology, University of CA, Davis), December 2013-November 2017.

Dr. Sara Pace (PhD in Biological Systems Engineering, University of CA, Davis), July 2017-November 2017.

Dr. Ygal Achmon (PhD in Biotechnology and Food Engineering, Technion-Israel Institute of Technology, Haifa, Israel), October 2014-August 2017.

Dr. Jesus Fernández-Bayo (PhD in Soil Science. University of Granada, Spain), February 2015-December 2016.

Dr. Brendan Higgins (PhD in Biological Systems Engineering, University of CA, Davis), December 2014-August 2016.

> *Dr. Higgins is an Assistant Professor in the Department of Biosystems Engineering, Auburn University, AL.*

Dr. Chao Wei Yu (PhD in Biological Systems Engineering, University of CA, Davis), July 2012-November 2016. Deceased.

Dr. Amitha Reddy (PhD in Biological Systems Engineering, University of CA, Davis), July 2007-August 2016.

Dr. Christopher Simmons (PhD in Biological Systems Engineering, University of CA, Davis), July 2011- August 2013.

> *Dr. Simmons is a Professor in the Department of Food Science, University of CA, Davis.*

Dr. Farzaneh Rezaei (PhD in Biological and Agricultural Engineering, Penn State University, PA), July 2009-August 2016.

Dr. Yu-Shen Cheng (PhD in Biological Systems Engineering, University of CA, Davis), December 2010 –February 2012.

Dr. Cheng is an Associate Professor in the Department of Chemical and Material Engineering, National Yunlin University of Science and Technology, Yunlin, Taiwan.

Dr. Yi Zheng (PhD in Biological Systems Engineering, University of CA, Davis), July 2007-September 2010.

Dr. Zheng is an Assistant Professor in the Department of Grain Science and Industry, Kansas State University.

Service as Major Professor

Current PhD Students

Duff Harrold

Graduated PhD Students under Direct Supervision

Dr. Lydia Palma	2020	Cultivation of Black Soldier Fly Larvae on Almond Byproduct as a Sustainable Protein Source
Dr. Lauren Jabusch	2018	Algae Production Under Predation and with Probiotic Amendment: Techno-economic Analyses
Dr. Sara Pace	2017	Life Cycle Assessment Based Modeling of Organic Waste Residue Using Anaerobic Digestion and Composting
Dr. Josh Claypool	2017	Understanding Microbial Community Dynamics in High-Solids Lignocellulolytic Systems Using Bioinformatics Tools
Dr. Brendan Higgins	2014	Co-culturing Green Algae with Bacteria for Enhanced Growth and Production of Biofuel Precursors
Dr. Lorena Fernandez	2013	Biological Stability and Delivery Studies to Elucidate the Role of Thickener Solid Particles on Water-in-Oil Emulsion Containing Microalgae
Dr. Orn-u-Ma Tanadul	2013	Storage Carbohydrate Metabolism in Microalgae at Elevated CO_2
Dr. Christopher Simmons	2012	An Analysis of *Agrobacterium tumefaciens* Attachment to Leaf Tissues and Subsequent Plant Transformation

Dr. Yu-Shen Cheng	2011	Comparative study of *Chlorella* Carbohydrates and Associated Biological Processes for Biofuel Production
Dr. Megan Marshall	2007	Development and Validation of Predictive Models of Soil Heating and Pathogen Inactivation during Soil Solarization
Dr. Amitha Reddy	2007	Biological Activity and Community Structure Leading to Thermal Runaway in Stored Rice Straw
Dr. Larry Joh	2005	High-Level Transient Expression, Extraction, and Purification of Recombinant β-glucuronidase from Agroinfiltrated Lettuce

Graduated MS Students under Direct Supervision (with thesis)

Matthew Paddock	2019	Growth of Microalgae on Anaerobic Digestate for Wastewater Treatment & Biofuel Production
Kelley Hestmark	2017	Investigation of the Impact of Green Waste and Compost Addition on the Efficacy of Soil Biosolarization
Lauren Jabusch	2016	Characterization of Algal Cell Walls for Biofuels Development
Esther Jin Kim	2016	Understanding Microbial Activity and Silica Degradation in Rice Straw
Todd Dooley	2010	Economic, Energy, and Environmental Alternative Analysis of Process Models for Producing Bioethanol
Damien Shultz	2007	Evaluation and Optimization of Two Water-in-Oil Emulsions for the Storage and Delivery of Fungal Biopesticides
Danielle Aslam	2006	Measuring the Phytotoxicity of Compost
Christopher Simmons	2007	Biological and Physical Factors that Affect Transient Expression in Agroinfiltrated Harvested Leaf Tissue
Yik Lam	2007	Improving the Consistency and Yield of Recombinant Protein Expression in Agroinfiltrated Lettuce Tissue
Megan Marshall	2001	Characterization of a Molecular Method for Distinguishing Microbial Communities in Compost
Melinda Jones	2002	An Economic Analysis of Alpha-1-Antitrypsin Production in Rice Seed and Rice Cell Culture
Beth May	2001	A Study of the Efficacy and Kinetics of *Lagenidium giganteum*

TEACHING EXPERIENCE AND CURRICULUM DEVELOPMENT

ENG 3. Introduction to Engineering Design.
Instructor of record in Fall 2015 and Winter 2017

- Course description: Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process.
- Format: 2 units of lecture and 2 units of studio
- Curriculum development: Developed and implemented the course. Created all lectures and assignments. In partnership with the College of Engineering development team, acquired $200,000 for renovating the Richard Dorf Engineering Communications and Design Classroom, which was officially opened for instruction in Fall quarter 2015.

ENG 1. Introduction to Engineering.
Instructor of record in Fall 2009, Winter 2010, Fall 2010, Winter 2011, Fall 2011, Winter 2012, Fall 2012, Winter 2013, and Fall 2013

- Course description: Introduction to the role of engineers in the acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering.
- Format: 1 unit of lecture
- Curriculum development: Developed and implemented the course for all incoming freshmen in the College of Engineering

ENG 11. Introduction to Issues in Engineering.
Instructor of record in Fall 2011, Fall 2012, and Fall 2013

- Course description: Introduction to communication, teamwork and design for freshman engineering students who participated in a summer transition program.
- Format: 1 unit of lecture
- Curriculum development: Developed and introduced a design project and presentation assignment.

ENG 98. Gearing up for Graduate School.
Instructor of record in Winter 2014, Winter 2015, Winter 2016, Winter 2017, and Winter 2018

- Course description: This seminar series aims to clarify the opportunities available to engineering students who pursue a graduate degree. General guidance is provided on the elements of a graduate school application. Assignments are intended to prepare seminar participants to submit the required elements of a graduate school application.
- Format: 1 unit of lecture

EBS 127. Mass Transfer and Kinetics in Biological Systems.
Instructor of record in Fall 2008, Fall 2009, Fall 2011, Fall 2013, and Fall 2017

- Course description: Fundamentals of mass transfer and kinetics in biological systems. Molecular diffusion and convection. Biological rate equations. Heterogeneous kinetics. Batch and continuous reaction processes. Mass transfer operations.
- Format: 3 units of lecture and 1 unit of laboratory
- Curriculum development: Developed and implemented the course. It is required for students in the Biological Systems Engineering undergraduate major and used for assessment of ABET outcomes. Developed lectures, assignments and laboratories.

EBS 125. Heat and Mass Transfer in Biological Systems.
Instructor of record in Spring 1997, Spring 1999, Spring 2001, Spring 2003, Spring 2005, and Spring 2007

- Course description: Fundamentals of heat transfer with application to biological systems. Steady and transient heat transfer. Analysis and simulation of heat conduction, convection, and radiation. Heat transfer operations.
- Format: 3 units of lecture and 1 unit of laboratory
- Curriculum development: Developed new course notes and laboratory on solar heat transfer.

EBS 132. Unit Operations in Biological and Food Engineering.
Instructor of record in Spring 1998, Spring 2000, Spring 2002, Spring 2004, and Spring 2006

- Course description: Mechanical unit operations which involve non-Newtonian flow. Thermal operations related to drying, sterilization, freezing and refrigeration. Mass transfer operations applied to membrane separations, adsorption and absorption processes.
- Format: 3 units of lecture and 1 unit of laboratory
- Curriculum development: Developed new course notes and laboratories on recovery of recombinant proteins from plants.

EBS 160. Biotechnical Systems Engineering.
Instructor of record in Winter 2000, Winter 2001, Winter 2002, Winter 2003, Winter 2004, Winter 2005, Winter 2006, Winter 2007, and Winter 2008

- Course description: Microbial and enzyme kinetics. Biomass conversion. Microbial pesticides. Production and recovery of biochemicals from plants and animals. Detection of recombinant tissues and microorganisms.
- Format: 3 units of lecture and 1 unit of laboratory
- Curriculum development: Responsible for developing this new elective course at the undergraduate level to serve students in the specialization of biotechnical engineering. Developed all lectures, assignments and laboratories.

EBS 267. Renewable Bioprocessing.
Instructor of record in Fall 2002, Fall 2004, Fall 2006, Fall 2008, Fall 2010, Fall 2012, and Spring 2015

- Course description: Applications of biotechnology and bioprocess engineering in the use of plant biomass for the production of biochemicals and fuels. Design of microbial and plant - based production systems including associated fermentation, extraction and purification processes.

- Format: 3 units of lecture
- Curriculum development: Responsible for developing this new course at the graduate level to support graduate students investigating the biochemical conversion of biomass to biofuels and bioproducts. Developed all lectures, assignments and case studies.

MCB 263. Biotechnology Fundamentals.
Co-instructor of record in Winter 2006, Winter 2008, and Winter 2010

- Course description: Fundamentals of molecular biology and engineering as they relate to recombinant DNA technology. Rate processes of biological systems, optimization of bioreactor performance, and other practical issues related to over-expression and production of recombinant molecules.
- Format: 2 units of lecture

EBS 170. Engineering Design for Biological Systems Engineers.
Served as project advisor (3-unit commitment) for the following projects:

2015-2016. Cultivation of black soldier fly larvae.
2015-2016. Algal encapsulation of nutraceutical compounds (co-adviser with N. Nitin).
2010-2011. The effects of varying calcium and boron supplied to *Lactuca sativa* on *in planta* transgene transient expression following Agroinfiltration.
2008-2009. Estimation of overall heat transfer coefficients for an acid pretreatment cooling system.
2005-2006. Economics of agroinfiltration for recombinant protein production.
2004-2005. Production, formulation and delivery of *Lagenidium giganteum* for mosquito control.
2002-2003. Efficient production and delivery of *Fusarium lateritium* for Eutypa dieback control.
2001-2002. Design of a gradient maker for denaturing gradient gel electrophoresis.
2000-2001. Production of *Lagenidium giganteum* oospores in insect cell culture.
1999-2000. Efficient cultivation of *Botrytis cinerea* for production of late-harvest wines.
1999-2001. Encapsulation of the fungus *Hirsutella rhossiliensis* for biological control.
1998-1999. A system to measure pressure drop during the solid-state cultivation of fungi.
1998-1999. Development and characterization of a fluidized bed reactor for solid-state cultivation.
1997-1998. Design and testing of a semi-continuous reactor for solid-state cultivation.
1997-1998. Experimentation and modeling of a bench-scale composting reactor.

EBS 162. Industrial Bioprocessing.
Guest lecturer in Winter 2009

- Course description: Processing steps involved in the collection of feedstocks, processing biological materials to value added products such as enzymes, biopharmaceuticals, fuels, and chemicals and subsequent waste management.
- Format: 3 units of lecture

PBI 214. Higher Plant Cell Walls.
Guest lecturer in Fall 2008, Fall 2010, Fall 2012, and Fall 2016

- Course description: Lectures focus on the structure, analysis, synthesis, and development-related metabolism of cell walls. Discussions center on analysis of scientific papers related to lecture topics.

- Format: 2 units of lecture and 1 unit of discussion
- Curriculum development: Developed lecture notes and exam questions on the pretreatment of lignocellulose for biochemical conversion to biofuels and biochemicals.

ECI 190. The Civil Engineer in Society.
Guest lecturer in Winter 2014, Spring 2014, Winter 2015, and Spring 2015

- Course description: The Civil Engineering profession; introduction to concepts in business, management, public policy and leadership including the importance of professional licensure and a discussion of professional ethical and societal issues related to civil engineering.
- Format: 2 units of lecture
- Curriculum development: Developed lecture and assignment on the biology of leadership.