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2012 CREATE-IGERT PARTICIPANTS

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- ❖ *Beckles, Diane, Assistant Professor, Dept. of Plant Sciences
- ❖ **Benn, Geoffrey, PhD Student, Plant Biology Grad Group, Dept. of Plant Biology
- ❖ **Bernard, Gregory, IBS Training Program recruit, PhD student, Tuskegee University
- ❖ **Bjornson, Marta, PhD Student, Agronomy & Horticulture Grad Program, Dept. of Plant Sciences
- ❖ *Blumwald, Eduardo, Professor, Dept. of Plant Sciences
- ❖ Boothe, Jordan, PhD Student, Chemistry Grad Group, Dept. of Chemistry
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- ❖ **Castillo, Elenor, PhD Student, Plant Biology Grad Group, Dept. of Plant Sciences
- ❖ **Chiniquy, Dawn, PhD Student, Plant Biology Grad Group, Dept. of Plant Pathology
- ❖ *Coaker, Gitta, Assistant Professor, Dept. of Plant Pathology
- ❖ *Dandekar, Abhaya, Professor, Dept. of Plant Sciences & Co-PI, CREATE-IGERT
- ❖ *Dandekar, Satya, Chair & Professor, Dept. of Medical Microbiology & Immunology
- ❖ Danielewicz, Megan, PhD Student, Chemistry Grad Group, Dept. of Chemistry
- ❖ *Dehesh, Katayoon, Professor, Dept. of Plant Biology
- ❖ *Drakakaki, Georgia, Assistant Professor, Dept. of Plant Sciences
- ❖ **Elmore, J. Mitch, PhD Student, Plant Biology Grad Group, Dept. of Plant Pathology
- ❖ *Falk, Bryce, Professor, Dept. of Plant Pathology
- ❖ *Fan, Zhiliang (Julia), Assistant Professor, Dept. of Biological & Agricultural Engineering
- ❖ Franz, Annaliese, Assistant Professor, Dept. of Chemistry
- ❖ **Gales, Dominique, MS Trainee, Tuskegee University
- ❖ *German, Bruce, Professor, Dept. of Food Science & Technology,
- ❖ Gibeling, Jeffery, Dean, Office of Graduate Studies & Professor, Dept. of Chemical Engineering & Materials Science
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- ❖ **Glavan, Tiffany, PhD Student, Microbiology Grad Group, Dept. of Medical Microbiology & Immunology
- ❖ **Harkenrider, Mitch, PhD Student, Plant Biology Grad Group, Dept. of Plant Pathology

- ❖ Jamison-McClung, Denneal, Associate Director, Biotechnology Program & Program Coordinator, CREATE-IGERT
- ❖ *Jenkins, Bryan, Professor, Dept. of Biological & Agricultural Engineering
- ❖ *Jeoh, Tina, Assistant Professor, Dept. of Biological & Agricultural Engineering
- ❖ Joh, Larry, Dept. of Chemical Engineering & Materials Science, CREATE-IGERT Program Engineer
- ❖ Kanyi, Charnita, IBS Program, Tuskegee University
- ❖ **Kerwin, Rachel, PhD Student, Plant Biology Grad Program, Dept. of Plant Sciences
- ❖ Kjelstrom, Judy, Director, Biotechnology Program & Senior Personnel, CREATE-IGERT
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- ❖ *Labavitch, John, Professor, Dept. of Plant Sciences
- ❖ *Lagarias, J. Clark, Professor, Dept. of Molecular and Cellular Biology
- ❖ Lateef, Dalya, IBS Program Graduate, Tuskegee University, CREATE-IGERT Alumna
- ❖ *Lebrilla, Carlito, Professor, Dept. of Chemistry
- ❖ **Lemos, Mark, PhD Student, Plant Biology Grad Group, Dept. of Plant Biology
- ❖ Lindenmuth, Ben, Chemical Engineering PhD Program Graduate, Dept of Chemical Engineering & Materials Science, CREATE-IGERT Alumnus
- ❖ *Liu, Bo, Associate Professor, Dept. of Plant Biology
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- ❖ *Neale, David, Professor, Dept. of Plant Sciences
- ❖ *Negre-Zakharov, Florence, Assistant Professor, Dept. of Plant Sciences
- ❖ **Miller, Sonni-Ali, IBS PhD Trainee, Tuskegee University
- ❖ Newell-McGloughlin, Martina, Executive Director, Life & Health Sciences Research Development & Co-PI, CREATE-IGERT
- ❖ *Nitin, Nitin, Assistant Professor, Dept. of Food Science & Technology
- ❖ **O'Dell, Patrick, PhD Student, Biological Systems Engineering Grad Group, Dept. of Biological and Agricultural Engineering
- ❖ Odom, LaKisha, IBS PhD Program Graduate, Tuskegee University, CREATE-IGERT Alumna
- ❖ *Parales, Becky, Professor, Dept. of Microbiology
- ❖ *Ronald, Pamela, Professor, Dept. of Plant Pathology, & Co-PI, CREATE-IGERT
- ❖ **Samuels, Steven, IBS PhD Trainee, Tuskegee University
- ❖ *Savageau, Michael, Professor, Dept. of Biomedical Engineering

- ❖ Shange, Raymon, IBS Program Graduate, Tuskegee University, CREATE-IGERT Alumnus
- ❖ *Shoemaker, Sharon, Executive Director, California Institute Food & Agricultural Research (CIFAR)
- ❖ Simmons, Chris, Biological Systems Engineering Program Graduate, Dept. of Biological & Agricultural Engineering, CREATE-IGERT Alumnus
- ❖ *Theg, Steven, Professor, Dept. of Plant Biology
- ❖ *Tricoli, David, Manager, Ralph M. Parsons Foundation Plant Transformation Facility, & Senior Personnel, CREATE-IGERT
- ❖ *VanderGheynst, Jean, Associate Dean of Undergraduate Studies, College of Engineering, Professor, Dept. of Biological & Agricultural Engineering, & Co-PI, CREATE-IGERT
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- ❖ Wolf, Mark, MS Graduate, Biochemistry & Molecular Biology Grad Group, Dept. of Microbiology, CREATE-IGERT Alumnus
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- ❖ **Worden, Natasha, PhD Student, Plant Biology Grad Group, Dept. of Plant Sciences
- ❖ *Yilma, Tilahun, Distinguished Professor, Dept. of Pathology, Microbiology & Immunology, School of Veterinary Medicine
- ❖ *Yoder, John, Professor, Dept. of Plant Sciences
- ❖ **Zeng, Tracy, PhD Student, Plant Biology Grad Group, Dept. of Plant Biology
- ❖ *Zhang, Ruihong, Professor, Dept. of Biological and Agricultural Engineering
- ❖ **Zicari, Steve, PhD Student, Biological Systems Engineering Grad Group, Dept. of Biological and Agricultural Engineering

**CREATE-IGERT Faculty Trainer*

***CREATE-IGERT Trainee*

CREATE-IGERT External Advisory Board Members

- ❖ Aglan, Heshmat, Professor & Associate Dean, College of Engineering & Physical Sciences, Tuskegee University
- ❖ Castle, Linda, Research Director Trait Discovery Pioneer Hi-Bred, Verdia Campus
- ❖ Cuevas, Hector, Director of Outreach, Recruitment & Retention, UC Davis Office of Graduate Studies
- ❖ Hamann, Bernd, Associate Vice Chancellor, UC Davis Office of Research
- ❖ Huang, Ning, Vice President of Research & Development, Ventria Bioscience
- ❖ McHughen, Alan, CE Biotechnology Specialist, UC Riverside & 2011-2012 Jefferson Science Fellow, Dept. of State, Washington, D.C.
- ❖ Roberts, Susan, Associate Professor, Dept. Chemical Engineering, & Director, UMass Institute for Cellular Engineering
- ❖ von Boxtel, Jos, Principal Scientist, GHG Reduction Program, Arcadia Biosciences, Inc.
- ❖ Yaver, Debbie, Director, Novozymes, Inc.
- ❖ Yu, Lloyd, Director of Process Development, Planet Biotechnology



Many thanks to the members of the EAB for providing their professional expertise in plant biotechnology and/or graduate education, reviewing and evaluating the CREATE-IGERT training program.

***Collaborative Research and Education in
Agricultural Technologies and Engineering (CREATE)***

***IGERT Symposium and Distinguished Lecture
Genome Center, UC Davis***

February 3, 2012

Welcome to the 2011-2012 CREATE-IGERT Distinguished Lecture and Symposium!

The Integrative Graduate Education and Research Traineeship (IGERT) program is a National Science Foundation program that encourages new approaches to interdisciplinary graduate education to prepare students to tackle complex, multifaceted real-world problems. The Collaborative Research and Education in Agricultural Technologies and Engineering (CREATE) IGERT, is a multi-institutional, international educational partnership between UC Davis, Tuskegee University, the National University of Ireland, Galway, the National University of Ireland at Maynooth, and the Teagasc Oak Park Research Centre, in Carlow, Ireland. CREATE integrates training in the plant sciences, molecular biology and engineering, to advance research and catalyze breakthroughs in the sustainable use of plants for production of non-food products ranging from biofuels to vaccines. In addition to the underlying scientific and engineering principles, trainees develop an understanding of the complex interconnected issues (environmental, ecological, sustainability, public/societal concerns, global impact, regulatory, innovation and entrepreneurship, and intellectual property), preparing them as the research, educational, business, and policy leaders of the future.

Thank you for joining us as we honor our trainees and CREATE-IGERT affiliates (formerly funded trainees and other students working in faculty trainer labs), as well as our Tuskegee partners, faculty trainers, industry affiliates, and this year's Distinguished Lecturer, Dr. Vidadi Yusibov, Executive Director of the Fraunhofer Center for Molecular Biotechnology.

I'd especially like to thank Dr. Denneal Jamison-McClung, CREATE-IGERT Program Coordinator and Associate Director of the Biotechnology Program, and Dr. Judith Kjelstrom, Director of the Biotechnology Program, as well as the Biotechnology Program Staff, Marianne Hunter and Demian Sainz, for all of their hard work in organizing this symposium.

The CREATE program is made possible through funding by the National Science Foundation (DGE-0653984), and support from the UC Davis Office of Research, Office of Graduate Studies, Biotechnology Program and Department of Chemical Engineering & Materials Science.

With warmest regards,

***Karen McDonald
Director, CREATE IGERT Program
Professor, Chemical Engineering & Materials Science***

CREATE-IGERT Distinguished Lecture and Symposium Schedule
February 3, 2012
Genome Center, UC Davis

7:30-8:00am Registration & Coffee

8:00-9:00am Welcome and CREATE-IGERT Program Highlights

Oral Presentations

9:00-9:15am Marta Bjornson, Dehesh/Dandekar Laboratory, UC Davis
"Improving phytophthora resistance through manipulation of arachidonic acid responses"

9:15-9:30am Geoffrey Benn, Dehesh Laboratory, UC Davis
"Identifying the biochemical and molecular components of plant primary stress response networks"

9:30-9:45am Mitch Harkenrider, Ronald Laboratory, UC Davis
"Identifying the genetic basis of stress response in rice"

9:45-10:00am Erika Vonasek, Nitin Laboratory, UC Davis
"Encapsulation of bacteriophages in biopolymers for agricultural and food applications"

10:00-10:15am Cui Jing "Tracy" Zeng, Liu Laboratory, UC Davis
"Rapid hyphal tip growth is dependent on proteins tracking at the polymerizing plus ends of microtubules in the fungus aspergillus nidulans"

10:15-10:30am Coffee Break

10:30-10:45am Dominique Gales, Yates Laboratory, Tuskegee University
"The role of sweet potato green extract on microRNA expression using human prostate cancer cell line"

10:45-11:00am Mark Lemos, Dehesh Laboratory, UC Davis
"Rechanneling starch to oil"

11:00-11:15am Steven Samuels, Egnin Laboratory, Tuskegee University
"Development of transgenic sweetpotato [ipomoea batatas (l. Lam)] expressing synthetic lytic peptide genes jc41n and jc41nd as a plant-based treatment regimen against hiv replication"

11:15-11:30am	Natasha Worden, Drakakaki Laboratory, UC Davis <i>"Studying the endomembrane trafficking processes involved in cell wall deposition for biofuel improvement"</i>
11:30-11:45am	Hyrum Gillespie, Dandekar Laboratory, UC Davis <i>"Identifying small molecule therapeutics to combat high risk plant disease"</i>
11:45-12:10pm	Coffee Break
12:10-1:00pm	Distinguished Lecture by Dr. Vidadi Yusibov Executive Director, Fraunhofer USA Center for Molecular Biotechnology <i>"High Performance Production System for Vaccine and Therapeutics"</i>
1:00-2:30pm	Lunch and Poster Session (GBSF Lobby)
2:30-2:45pm	Patrick O'Dell, Jeoh Laboratory, UC Davis <i>"Cellulose investigation using atomic force microscopy – unraveling the world's most abundant renewable biopolymer"</i>
2:45-3:00pm	Steve Zicari, Zhang Laboratory, UC Davis <i>"Fermentation strategies for whole sugar beet to ethanol production and in-planta production of liquefaction enzymes in an integrated biorefinery approach"</i>
3:00-3:30pm	<i>Innovation and Entrepreneurship</i> Lucas Arzola and Mark Lemos, UC Davis
3:30-3:35pm	Closing Remarks – Prof. Karen McDonald

**IGERT: Collaborative Research and Education in
Agricultural Technologies and Engineering (CREATE)**
(NSF Award DGE0653984)



UC Davis P.I.s & Co P.I.s

Karen McDonald, Principal Investigator – UC Davis
Abhaya Dandekar, Co-Principal Investigator – UC Davis
Martina Newell-McGloughlin, Co-Principal Investigator – UC Davis
Pamela Ronald, Co-Principal Investigator – UC Davis
Jean VanderGheynst, Co-Principal Investigator – UC Davis
Denneal Jamison-McClung, Program Coordinator – UC Davis
Larry Joh, Program Engineer – UC Davis

Tuskegee University P.I.s & Co P.I.s

Luther Williams, Principal Investigator – Tuskegee University
Jesse Jaynes, Co-Principal Investigator – Tuskegee University
C.S. Prakash, Co-Principal Investigator – Tuskegee University
Deloris Alexander, Program Coordinator – Tuskegee University
Charnita Kanyi, Program Assistant – Tuskegee University

IGERT: Collaborative Research and Education in Agricultural Technologies and Engineering (CREATE)

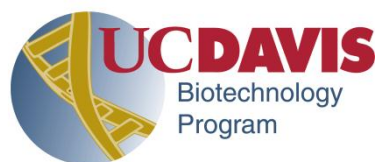
***NSF Award DGE-0653984
August 15, 2007 – July 31, 2012***

UC Davis has been awarded the multi-institutional IGERT: Collaborative Research and Education in Agricultural Technologies and Engineering (CREATE) grant from The National Science Foundation in the amount of \$599, 824. The grant is under the direction of Karen A. McDonald; Department of Chemical Engineering, with co-PIs: Abhaya M. Dandekar, Department of Plant Sciences; Jean S. VanderGheynst, Department of Biological and Agricultural Engineering; Martina Newell-McGloughlin, UC BREP; and Pamela C. Ronald, Department of Plant Pathology. The lead institution is the University of California at Davis, Davis, CA and collaborating institutions are Tuskegee University, Tuskegee, AL (Luther S. Williams, PI); National University of Ireland, Maynooth, Ireland (Dr. Phil Dix, PI); Teagasc Oak Park Research Centre, Carlow, Ireland (Dr. James Burke, PI).

The IGERT program, entitled Collaborative Research and Education in Agricultural Technologies and Engineering (**CREATE**), will provide a structured and well-integrated graduate research and educational training program focused on a **unifying theme of transgenic plants and *in-vitro* plant systems for the production of industrial non-food products and biopharmaceuticals**. Research focus areas are **1) Plant-Made Products, 2) Biofuels and Biorefineries, and 3) Environmental Sustainability**. Across the three broad focus areas, specific attention will be paid to **the scientific, engineering, environmental, regulatory, economic, intellectual property, societal and global issues** associated with plant biotechnology.

The **Project Objectives** for CREATE-IGERT are to:

1. CREATE a **framework for interdisciplinary graduate training** that will foster an environment for revolutionary breakthroughs at the interface of plant science, biotechnology, and engineering.
2. CREATE **new scientific knowledge**, engineering technologies, tools, methods, processes, and global understanding to advance the fields of plant science, biotechnology, engineering and areas at the interface of these disciplines, particularly those related to the underlying theme.
3. CREATE and cultivate the **integrative skill set** in graduate student trainees, faculty trainers, and postdoctoral scholar participants using the underlying theme as the focus.
4. CREATE a training program to **attract, retain, and graduate doctoral students from diverse backgrounds** who are not only top-rated scientists and engineers but also have the variety of skills and understanding to approach problems from integrated perspectives, allowing them to become the academic, industrial, national laboratory, and/or policy leaders in areas related to the unifying theme.
5. CREATE a **Masters to PhD Bridge Program** that strengthens research and graduate training linkages between UC Davis and Tuskegee University in areas related to plant biotechnology and provides a guided transition for MS students at Tuskegee into doctoral programs at UC Davis.



Designated Emphasis in Biotechnology Program (DEB)

Goals and Mission of the DEB

The Designated Emphasis in Biotechnology (DEB) is an inter-graduate group program that allows Ph.D. students to receive and be credited for training in the area of biotechnology. The DEB provides a nurturing interactive environment to promote integration of multiple disciplinary approaches to the conduct of research and to promote learning in biotechnology. The mission is to prepare well-educated students to approach problems with creativity and flexibility. The program will provide tools for the students to be leaders, visionaries, entrepreneurs, researchers and teachers in the broad area of biomolecular technology.

DEB Mission:

- To provide well-coordinated, cross-disciplinary training of graduate students in critical areas of biomolecular technology research.
- To promote interdisciplinary research environments that integrate basic biological science, engineering and computational disciplines.
- To allow cross-disciplinary training and trainee experience in a biotechnology company or cross-college laboratory.

Students come from a wide array of disciplines: Participating graduate programs currently include **29 programs**: Agricultural and Environmental Chemistry; Animal Biology; Applied Science; Biochemistry, Molecular, Cellular & Developmental Biology; Biological Systems Engineering; Biomedical Engineering; Biophysics; Chemical Engineering; Chemistry; Civil and Environmental Engineering; Comparative Pathology; Computer Science; Electrical & Computer Engineering, Entomology; Food Science Technology; Genetics; Horticulture & Agronomy; Immunology; Materials Science & Engineering; Mechanical and Aeronautical Engineering; Microbiology; Molecular, Cellular & Integrative Physiology; Neurosciences; Nutritional Biology; Pharmacology & Toxicology; Plant Biology; Plant Pathology; Soils & Biogeochemistry and Statistics. The DEB program supplements a student's Ph.D. curriculum and those completing the program will obtain an official designation on their diploma & transcript indicating a qualification in biotechnology. Example: **Doctoral Degree in Microbiology with a Designated Emphasis in Biotechnology**

***CREATE-IGERT Trainees must be enrolled in the DEB**



Oral Presentations

IMPROVING PHYTOPHTHORA RESISTANCE THROUGH MANIPULATION OF ARACHIDONIC ACID RESPONSES

Trainee: Marta Bjornson

Faculty Trainer: Katayoon Dehesh

Campus: UC Davis

Marta Bjornson^{1,2}, Geoffrey Benn¹, and Katayoon Dehesh¹

1. Department of Plant Biology, University of California, Davis

2. Department of Plant Sciences, University of California, Davis

Diseases caused by *Phytophthora* species are among the most devastating and economically important plant diseases worldwide. I am attempting to engineer increased resistance to these diseases using plant responses to arachidonic acid. This fatty acid is not present in vascular plants, is released by *Phytophthora* spp. upon infection, and is capable of inducing plant defense responses when exogenously applied to plants. Transgenic plants engineered to produce arachidonic acid display greater resistance to certain classes of pathogens, including *Phytophthora* spp., due in part to transcriptional reprogramming of selected defense-related genes. I will investigate the molecular mechanisms regulating this response with the ultimate goal of devising a genetic tool box instrumental in replication of this enhanced resistance without engineered arachidonic acid production. Specifically, I will employ an affinity purification method aimed at the identification of plant transcriptional regulators responsible for altered expression of arachidonic acid responsive genes. These proteins, as well as protein products of genes induced in response to arachidonic acid, will then be studied as follows: the model plant *Arabidopsis* genetically engineered to up- or down-regulate expression of the gene encoding each of these proteins will allow me to discern the function of the respective protein, and to screen for those which affect infection by *Phytophthora* spp. Those gene constructs most successful at reducing disease severity will be selected for generation of transgenic tomato plants, for validation in this important crop species. Reduced disease susceptibility in tomato will form the groundwork for a novel strategy aimed at enhancing resistance to *Phytophthora* spp. in a wide range of crop plants.

IDENTIFYING THE BIOCHEMICAL AND MOLECULAR COMPONENTS OF PLANT PRIMARY STRESS RESPONSE NETWORKS

Trainee: Geoffrey Benn

Faculty Trainer: Katayoon Dehesh

Campus: UC Davis

Geoffrey Benn^{1*}, Marta Bjornson^{1, 2*}, and Katayoon Dehesh¹

1. Department of Plant Biology, UC Davis.

2. Department of Plant Sciences, UC Davis.

Plants have evolved specialized perception and regulatory signaling networks to respond specifically to different biotic and abiotic stresses in their environments. However, given that many of these diverse stresses share common features, such as damage to membranes and other macromolecular structures, it was predicted that there should be a core set of genes that respond rapidly to a wide range of stresses. In order to identify these core plant stress-responsive genes, our lab chose to use mechanical wounding of *Arabidopsis* as a model system. A microarray-based approach identified 162 genes as being rapidly (within five minutes) and transiently up-regulated in response to wounding. Subsequent analysis determined that a novel *cis*-regulatory element, the rapid stress response element (RSRE), was overrepresented in promoters of the rapid wound response genes. The RSRE is sufficient to confer a transcriptional response to a variety of stressors, including wounding, cold, insect herbivory, and infection by the fungal pathogen *Botrytis cinerea*.

The goal of my research is to understand the biochemical and molecular events that occur prior to the induction of the RSRE in the rapid stress response. Initial experiments using transgenic *Arabidopsis* expressing the luciferase reporter under the control of the RSRE indicate that signaling by calcium and reactive oxygen species are involved in the induction of the *cis*-element in response to stress. Genetic approaches have determined that CAMTA3, a transcription factor (TF), is required for RSRE induction by cold and contributes to RSRE induction by wounding. Further genetics work will determine the role of other CAMTA TFs in RSRE induction. In order to identify upstream signaling components and develop a yeast one hybrid (Y1H) system, a screen of the yeast deletion array (collection of all non-lethal single mutants in yeast) was performed. This screen identified STE11 and NUP60 as required components of RSRE induction in yeast, suggesting involvement of a MAP kinase cascade and nuclear import machinery, respectively. These results are being followed up genetically in *Arabidopsis*. One of the yeast deletion lines will be used as a background for a Y1H screen of cDNA libraries derived from wounded and unwounded plants. This screen will complement our targeted genetic approaches by identifying additional RSRE-regulating TFs.

IDENTIFYING THE GENETIC BASIS OF STRESS RESPONSE IN RICE

Trainee: Mitchell Harkenrider
Faculty Trainer: Pamela Ronald
Campus: UC Davis, Davis, CA

Mitchell Harkenrider, Rita Sharma, Manoj Sharma, Young Su Seo, Pamela Ronald
Department of Plant Pathology, UC Davis, Davis, CA

Rice (*Oryza sativa*) is a staple food for more than half the world and a model for studies of monocotyledonous species, which include cereal crops and candidate bioenergy grasses. A major limitation of crop production is imposed by a suite of abiotic and biotic stresses resulting in 30%–60% yield losses globally each year. To elucidate stress response signaling networks, an interactome of 100 proteins was constructed by yeast two-hybrid (Y2H) assays around key regulators of the rice biotic and abiotic stress responses. We validated the interactome using protein–protein interaction (PPI) assays, co-expression of transcripts, and phenotypic analyses. Several lines of evidence support cross-talk between biotic and abiotic stress responses. From these experiments, several candidate genes were identified for in-depth characterization. The most promising candidates for further study are WAK25, a wall-associated kinase, and MPK12, a member of the mitogen-activated kinase (MAPK) protein family. MPK12 is induced in response to fungal and wounding stresses and activates transcription factors via phosphorylation in the cell nucleus. My research focuses on characterizing and expanding the WAK25 and MPK12 pathways and discover their role within the framework of Xa21-mediated immunity.

ENCAPSULATION OF BACTERIOPHAGES IN BIOPOLYMERS FOR AGRICULTURAL AND FOOD APPLICATIONS

Trainee: Erica Vonasek

Faculty Trainer: N. Nitin

Campus: University of California, Davis

Erica Vonasek¹, Ping Liu², You-Lo Hsieh², N. Nitin^{1,3}

¹Department of Agricultural and Biological Engineering

²Department of Textiles and Clothing

³Department of Food Science & Technology

There is a need to develop sustainable antimicrobial solutions that can be highly specific for target pathogens and can be delivered in diverse environments including agricultural products, food processing, and packaging. Current antimicrobial materials lack specificity for target pathogens and non-discriminate use of many of the broad spectrum antimicrobials significantly increases the risk of developing resistant pathogens. In recent years, phage therapy has been gaining attention as a method to control bacterial pathogens in the food system. Phage therapy takes advantage of bacteriophages' extreme host specificity, ability to replicate and regenerate, and natural ability to co-evolve with the host bacterium to defeat host defense mechanisms. One of the significant barriers limiting application of phages in diverse environments is the limited shelf life of these viral particles in ambient storage conditions. The current formulations of phages need to be refrigerated and stored in dark containers. In our research, we have specifically evaluated formulations of phages using agricultural by-products (e.g. whey protein from milk processing) to form shelf stable materials. The results of our research have demonstrated that these compositions can significantly enhance the shelf life of phages without requiring any refrigeration and also provide controlled release of these phages in diverse plant and food materials. Future aims include developing thin film coating and lipid platform assemblies.

RAPID HYPHAL TIP GROWTH IS DEPENDENT ON PROTEINS TRACKING AT THE POLYMERIZING PLUS ENDS OF MICROTUBULES IN THE FUNGUS *ASPERGILLUS NIDULANS*

Trainee: Cui Jing (Tracy) Zeng

Faculty Trainer: Bo Liu

Campus: UC Davis

Cui Jing Zeng and Bo Liu

Microbiology Graduate Group and Department of Plant Biology, UC Davis.

Filamentous fungi grow via polarized extension of hyphal tip cells. As a result, hyphae grow into tough substrates like woods and feed on organic compounds like complex carbohydrates while secreting hydrolytic enzymes. Hyphal tip growth depends on the cytoskeleton. Among the cytoskeletal networks, microtubules (MTs) undergo rapid polymerization and depolymerization and act as a rate-limiting factor for hyphal tip growth. It remains unclear how the dynamic properties of MTs are coupled with hyphal tip growth. Using the genetically tractable fungus *Aspergillus nidulans* as a model system, we aimed to understand how the dynamics of MT plus ends were coupled with tip growth. We report the functions of two MT plus-end-tracking proteins, EBA and CLIPA in hyphal apical cells. Both proteins are required for the cells to sustain unidirectional growth because the null *ebaΔ* and *clipaΔ* mutations led to wavy growth patterns. To elucidate how the functions of these two proteins were linked to robust extension of hyphal tips, we assayed the dynamic properties of MTs in the absence of either or both proteins when compared to those in the control cells. It was found that EBA played a central role in regulating CLIPA and other MT plus-end-tracking proteins to “surf” at MT plus ends. EBA and CLIPA regulate robust generation of new MTs in hyphal tip cells and contribute quantitatively to unidirectional tip growth. We conclude that MT plus-end-tracking proteins form a regulatory network that allows MTs to rapidly polymerize towards newly formed hyphal tips in order to sustain polarized growth.

THE ROLE OF SWEET POTATO GREEN EXTRACT ON MICRORNA EXPRESSION USING HUMAN PROSTATE CANCER CELL LINE

Trainee: Dominique N. Gales

Faculty Trainer: Clayton Yates

Campus: Tuskegee University, Tuskegee, AL

Dominique N. Gales^{1*}, Leah O'Neal¹, Ritu Aneja², Dr. Timothy Turner¹, and Dr. Clayton Yates¹

Department of Biology and Carver Research Foundation¹, Tuskegee University, Tuskegee, AL

Prostate cancer is the most commonly diagnosed and the second most cause of death in men; it affects African Americans higher than any other ethnic group. According to recent studies, dietary habits exhibit a strong correlation between prostate cancer incidence and mortality (Bostwick D. et al., 2004; ACS 2009). Furthermore, Shikany et al (2010) report that African Americans do not consume the daily-recommended values of fruits and vegetables; however they do consumed diets that are high in fat. It is strongly suggested that high fat diets have been the culprit that targets African Americans to health disparities. Sweet Potato leaves (SPGE) are an excellent source of dietary polyphenols. Recent evidence indicates that dietary factors play an important role in the process of carcinogenesis through modulation of microRNA (miRNA) expression, though such studies are lacking in regards to prostate cancer. It has been proposed that dietary modulation of miRNA expression may contribute to the cancer-protective effects of dietary components. We hypothesize that dietary polyphenols could modulate miRNA expression or biogenesis to influence prostate cancer biology. Therefore, we aim to identify the expressions of miRNAs, which are regulated by SPGE. To address this, cellular proliferation was determined by MTT [3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide] assay. The IC₅₀ using MTTT with SPGE for PC3 and DU-145 cells were 2.0 mg/mL (inhibiting cell growth by 50%). We also investigated the effects of SPGE on miRNA expression levels. To obtain the miRNA expression profiles, they conducted microarray analysis in prostate cancer cells treated with SPGE. We found that SPGE altered miRNA expression with up-regulation of miR-200c, miR-29b, and miR-30c.

RECHANNELING STARCH TO OIL

Trainee: Mark Lemos

Faculty Trainer: Katayoon Dehesh

Campus: University of California Davis

Mark Lemos^{1,2*}, Changquan Wang¹, and Katayoon Dehesh¹

¹ Department of Plant Biology, University of California Davis

² Department of Chemical Engineering and Materials Science, University of California Davis

Biofuels offer a renewable source of liquid fuel. Oil based biofuels offer favorable economic and energy content over starch to ethanol produced biofuels. The goal of the project is to identify the regulatory genetic switches that determine the carbon flux to starch and oil biosynthetic pathways, with the ultimate goal of re-directing the reduced carbon to oil biosynthesis in plants. Using global transcriptomic analyses platform obtained from oil accumulating endosperms of two closely related oat cultivars, one a low-oil containing variety Freja and the other a high-oil containing variety Matilda, a number of candidate genes with potential key regulatory functions in enhancing the carbon flux towards oil biosynthesis were identified. Several full length cDNAs for these candidates' genes have been cloned using Rapid Amplification of cDNA Ends (RACE). These cDNAs will be overexpressed and/or downregulated in *Arabidopsis thaliana* and *Setaria* to determine their impacts on rechanneling of starch to oil.

Of the candidate genes, a cistronic cDNA that is highly upregulated in the high oil producing oat cultivar was identified. These cistronic genes are most homologous with heat shock proteins and voltage dependent anion channels. Agrobacterium containing destination vectors with the full-length cistronic cDNA and individual genes were used to transform *Arabidopsis thaliana*. Homozygous *Arabidopsis* transgenic lines expressing the putative voltage dependent anion channels grow larger and bolt earlier than the corresponding wild type plant. This increase in biomass is an indication of direct and/or indirect involvement of this gene in enhancing the metabolic efficiency of plants through either elevating photosynthetic capacity and/or increasing the efficiency of TCA cycle, thereby generating more energy and reducing power improving plant growth and development. In order to determine the localization, and hence the site of function of these genes, we are assembling destination vectors containing the above mentioned cDNAs fused to GFP to be used for plant transformation. Subsequent to localization studies, we will perform metabolic profiling to determine the function of these genes in metabolic processes. Finally, to assess the role of this gene in directing the carbon flux from starch to oil, we will transform plants with a binary construct combining our gene of interest with those directly involved in oil production.

**DEVELOPMENT OF TRANSGENIC SWEETPOTATO [*IPOMOEA BATATAS* (L. LAM)]
EXPRESSING SYNTHETIC LYTIC PEPTIDE GENES *JC41N* AND *JC41ND* AS A PLANT-BASED
TREATMENT REGIMEN AGAINST HIV REPLICATION.**

Trainee: Steven Samuels
Faculty Trainer: Marceline Egnin
Campus: Tuskegee University

S. Samuels*, M. Egnin, and J. Jaynes

Department of Agricultural and Environmental Sciences, Tuskegee University, AL

Epidemic diseases such as AIDS caused by human immunodeficiency (HIV) virus are responsible for millions of deaths annually and have surpassed other pathogens to become the world's leading infectious cause of adult death. HIV plagues both developing and industrialized countries, with 90% of deaths occurring in developing countries, while new antiretroviral therapies have only help in the drop in AIDS deaths in industrialized countries. With the advances in biotechnology, new discoveries, development, and commercially available products offer promise of combating large scale epidemics with low input and easy management. Powerful biotech principals coupled with a wave of new novel peptides that are being developed and are capable of combating a wide range of diseases, a new revolution of plant-based therapeutic treatments are being developed. At Tuskegee University two novel synthetic lytic antiviral peptides JC41N and JC41ND, have been developed and are capable of inhibiting HIV progression. Expression of the peptides in *planta* has been achieved by cloning gene constructs of *jc41N* and *jc41ND* into the T-DNA borders of binary plasmid, pGPTV-kan, containing a kanamycin resistance gene. *Escherichia coli* (*E. coli*) DH5 α cells were transformed with recombinant plasmid pGPTV/*jc41N* and pGPTV/*jc41ND*. Recombinant plasmids were mobilized in disarmed *Agrobacterium tumefaciens* strain EHA105, and confirmed via PCR for use in sweetpotato transformation. Through three transformation events with *jc41N*, kanamycin resistance embryos were regenerated at frequencies of 16%, 45% and 25% respectively. Similar frequencies (4%, 58%, and 29%) of putative transgenic embryos were also recovered from three transformation events with *jc41ND*. Optimal regeneration time varied among events ranging from 20 to 50 days on Embryo Production media. Fifty-five (55) kanamycin resistance embryos of D-3 transformed with *jc41N* and *jc41ND* genes were germinated on MM supplemented with Timetin 100mg/l and Kanamycin 12.5mg/l, resulting in fifteen (15) well rooted putative transgenic plantlets. Primers specific to CaMV 35S promoter and NOS-T terminator as primers were used to amplify the presence of the transgene. Nine out of the 15 plantlets tested positive for presence of the *jc* genes, four with *jc41N*, and five with *jc41ND*. As a plant-based system this treatment is an integrated manner that is affordable and universally accessible especially in developing countries where they need them the most. Research funded by NIH/EXPORT, USDA-CSREES, the Evans-Allen program and CREATE-IGERT.

STUDYING THE ENDOMEMBRANE TRAFFICKING PROCESSES INVOLVED IN CELL WALL DEPOSITION FOR BIOFUEL IMPROVEMENT

Trainee: Natasha Worden

Faculty Trainer: Georgia Drakakaki

Campus: UC Davis

Natasha Worden and Georgia Drakakaki

Department of Plant Sciences, University of California, Davis

In order to better understand the plant cell wall and improve biofuel feedstocks, we need to understand the endomembrane processes involved in cell wall deposition. The cell wall is an interwoven meshwork of polysaccharides that surrounds the plant cell, functioning in cell growth and pathogen protection. It is composed of cellulose, hemicellulose, pectins and glycoproteins. Endomembrane trafficking is the transport of proteins and other compounds through a vesicular network known as the endomembrane system. Although cell wall structure and polysaccharide biosynthesis are generally understood, the transport processes of cell wall components to the periplasmic space, which play critical regulatory roles on the cell wall (2), are unknown.

I am studying the trafficking of cell wall polysaccharides using chemical genomic screens, a revolutionary approach that involves the use of small molecules, rather than mutations to inactivate proteins. I am using a library of cell permeable molecules that disrupt endomembrane trafficking (3), to elicit changes in xyloglucan in *Arabidopsis thaliana*. Xyloglucan is a hemicellulose and serves as scaffold within the cell wall that other cell wall components build upon (1). I have tested this chemical library against a xyloglucan deficient mutant *xxt1/xxt2* (5). Selected small molecules lead to either hypersensitivity or resistance in the *xxt1/xxt2* double mutant when compared to the wild type. I **hypothesize** that resistance of *xxt1xxt2* under chemical treatment is targeting a pathway involved in xyloglucan deposition, while mutant hypersensitivity is targeting a compensatory mechanism developed from a lack of xyloglucan. By studying the effect of these chemicals, I can determine details about xyloglucan deposition dependent pathways that are unidentifiable using classical genetics.

IDENTIFYING SMALL MOLECULE THERAPEUTICS TO COMBAT HIGH RISK PLANT DISEASE

Trainee: Hyrum Gillespie

Faculty Trainer: Abhaya Dandekar

Campus: UC Davis

Hyrum Gillespie* and Abhaya Dandekar

Department of Plant Sciences, UC Davis

Why is orange juice so expensive? One big reason: Huanglongbing (HLB), an insect-borne disease, is decimating citrus production groves in Florida and Brazil and now Texas. Brazil, the world's largest sweet orange producer, and Florida, the largest U.S. domestic producer, supply approximately 85% of the world's orange juice. Currently, HLB management consists primarily of pesticide application and—after visual confirmation—elimination of entire orchard blocks. This has proven economically destructive and ineffective. New short-term therapeutic methods need to be developed to combat this and other high-risk plant pathogens during the development and regulatory approval of disease resistant plant varieties. These tools will help growers decrease their dependence on pesticides, and lead to more effective and more environmentally stable management strategies.

Bacterial quorum sensing is a new area of research with potential application in disease management. Quorum sensing (QS) is a bacterial system for cell to cell communication. This system is believed to be used by bacteria to “sense” their own community size. Quorum sensing has a role in the induction of virulence in plant pathogens and has been shown to regulate many bacterial functions, including biofilm formation, microbial movement, and plant-microbe interaction. AntiQS compounds, or compounds found to block QS activity, have been found naturally in many forms of life and have been created synthetically. As of yet, no high-throughput system has been developed for identifying compounds with anti-QS activity, however, we present progress in the development of such a system through the use of three bacterial strains with phenotypic color changes in the presence or absence of quorum sensing signals.



Distinguished Lecture

NSF CREATE-IGERT 2011-2012 Distinguished Lecture

Dr. Vidadi Yusibov

Executive Director, Fraunhofer USA Center for
Molecular Biotechnology

**“High Performance Production System for Vaccine and
Therapeutics”**



Friday, February 3, 2012

1005 Genome & Biomedical Sciences Facility, UC Davis

12:00 – 1:00 pm

The UC Davis NSF CREATE-IGERT program is honored to host Dr. Vidadi Yusibov, the Executive Director of Fraunhofer USA Center for Molecular Biotechnology.

As Executive Director of Fraunhofer USA, Dr. Yusibov is responsible for the oversight of all plant-based vaccine and therapeutic development programs. For over twenty years, Dr. Yusibov has been involved in a variety of aspects of plant molecular biology, with a major focus on using plants as a means for biomanufacturing. Prior to joining Fraunhofer USA Center for Molecular Biotechnology, Dr. Yusibov was an Assistant Professor at Thomas Jefferson University, where he was part of a team that developed a plant virus-based experimental vaccine against rabies, which was transitioned into clinical trials. Previously, Dr. Yusibov held a research position at Purdue University.





*Oral Presentations
Continued...*

CELLULOSE INVESTIGATION USING ATOMIC FORCE MICROSCOPY – UNRAVELING THE WORLD'S MOST ABUNDANT RENEWABLE BIOPOLYMER.

Trainee: Patrick O'Dell

Faculty Trainer: Tina Jeoh

Campus: UC Davis

Patrick O'Dell, Tina Jeoh, Nadrapee Karuna

Department of Biological and Agricultural Engineering, University of California Davis

Lignocellulosic biomass has long been touted as a source for next-generation biofuels. Cellulose microfibrils make up around one third to one half of the energetic portion of lignocellulosic materials. This study looks into the structure of cellulose microfibrils using atomic force microscopy (AFM). Our cellulose, harvested from the bacteria, *Gluconacetobacter xylinus*, is washed and bleached to remove protein from the culturing step. Next, the cleaned cellulose is immobilized onto a flat, hydrophobic surface. Since cellulose microfibrils also have surfaces with hydrophobicity, the cellulose adheres to the surface. We present results demonstrating changes in cellulose microstructure due to sonication, and consequent impacts on the kinetics of hydrolysis and binding by the cellulase *Trichoderma reesei* Cel7A. Understanding the effects of pretreatments on the molecular structure of lignocellulosic materials will increase the fraction of biomass that can successfully be converted into biofuels or other products. In addition, a better understanding of the mechanisms behind enzymatic hydrolysis of lignocellulosic materials will lead to improvements in the saccharification process.

FERMENTATION STRATEGIES FOR WHOLE SUGAR BEET TO ETHANOL PRODUCTION AND IN-PLANTA PRODUCTION OF LIQUEFACTION ENZYMES IN AN INTEGRATED BIOREFINERY APPROACH

Trainee: Steve Zicari

Faculty Trainers: Ruihong Zhang, Karen McDonald, Jean VanderGheynst

Campus: UC Davis

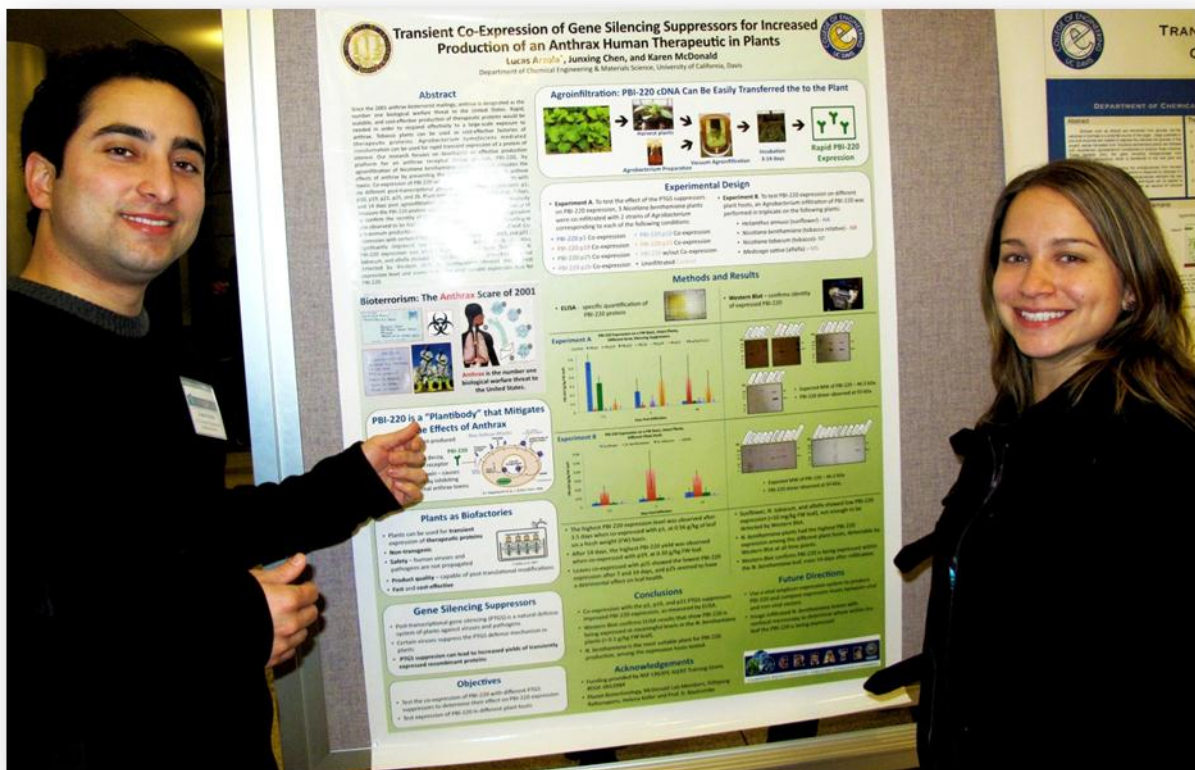
Steve Zicari^{1*}, Natthiporn Aramruang¹, Chang Chen¹, Jean VanderGheynst¹, Karen McDonald², Ruihong Zhang¹

¹ Department of Agricultural and Biological Engineering, University of California, Davis

² Department of Chemical Engineering and Materials Science, University of California, Davis

Supplying almost 1/3 of world sugar production, sugar beets are a large industrially relevant crop. Due to increased demand for biofuels, several European sugar manufacturers are co-producing ethanol from sugar processing intermediates as a means to adjust to fluctuating market demands and sugar beet leaves are being used by producers for methane generation in anaerobic digesters. Renewable fuel mandates in the US allowing sugar-based crop fuels to be eligible for Advanced Biofuel classification might pave the way for significant biofuel production from beets in the near future. As such, the opportunity exists to leverage this momentum through improved bioprocess design and high value co-product recovery employing an integrated biorefinery approach.

Specifically, our research on improving bioprocess design for conversion of whole beets to ethanol includes several strategies; Fermentation of whole beets, rather than processed sugar streams, may reduce costs dependent on identifying rapid and efficient enzymatic liquefaction conditions for the largely pectin components. Loadings of commercially available enzymes containing cellulases, hemicellulases, pectinases, and β -glucosidases are being investigated to determine optimum liquefaction and hydrolysis parameters. Secondly, fermentation designs employing both traditional *Saccharomyces cerevisiae* and engineered organisms for arabinose and uronic acid utilization (including *E. coli* KO11) are being evaluated. Lastly, due to the expected need for significant quantities of cell wall degrading enzymes, *in-planta* production methods for expression of cell wall degrading enzymes in sugar beet are being explored.



Poster Session

Focus Area: Plant-Made Products

EFFECT OF IL-12 ON NEGATIVE SELECTION IN THE TNC MICROENVIRONMENT

Trainee: Sonni-Ali Miller

Faculty Trainer: Marcia Martinez

Campus: Tuskegee University

Sonni-Ali Miller¹, Sheryce C. Henley¹, Floyd R. Davis¹, Rita H. Lewis¹, Gregory C. Bernard¹, Steven Samuels¹, Marcia T. Martinez¹.

Department of Biology, Tuskegee University, Tuskegee Institute, AL

Thymic nurse cells (TNCs) are cortical epithelial cells of the thymus that appear to be significant participants in the negative selection of thymocytes. TNCs express both class I and class II major histocompatibility (MHC) proteins on their cell surfaces. TNCs internalize thymocytes that are CD4⁺CD8⁺TCR^{lo} (triple positive) into cytoplasmic vacuoles. These thymocytes are at the developmental stage where they undergo MHC restriction. In addition to thymocytes, TNC vacuoles also contain macrophages that interact intimately with the thymocyte subset. Greater than 95% of the TNC-interactive thymocyte population has been reported to undergo apoptosis within TNC vacuoles suggesting a strong role for TNCs in the negative selection of thymocytes. Triple positive thymocytes are reported to be non-responsive to a variety of cytokines including IL-6, IL-7, IL-10, IL-15 and IFN- γ . However, these thymocytes were found to be responsive to IL-12. Although IL-12 promotes pro-inflammatory responses in the periphery it was shown to significantly influence the deletion of the triple positive thymocyte subset in the thymus. We therefore hypothesized that within the TNC microenvironment IL-12 can safely facilitate negative selection. We used cOVA-TCR transgenic (Tg), D011.10 mice that recognize the cOVA 323-339 peptide to analyze negative selection within the TNC microenvironment. The Tg mice were injected with different combinations of anti-IL-12 antibody or rat IgG2a antibody and/or cOVA peptide over a four day period. TNCs and thymocyte populations were harvested and analyzed for apoptosis using Annexin V with flow cytometry and TUNEL with fluorescent microscopy. Unexpectedly, there were no observable differences in thymocyte apoptosis within the TNCs of mice injected with rat-IgG2a, anti-IL-12, or those that were not injected. These data suggest that IL-12 does not play a role in negative selection within the TNC microenvironment.

Focus Area: Biofuels & Biorefineries

DUCKWEED AS A BIOMASS AND CELLULASE SOURCE FOR BIOFUEL PRODUCTION

Trainee: Mark Lemos

Faculty Trainer: Karen McDonald

Campus: University of California Davis

Mark Lemos^{*1,2}, Steve Zicari³, SangKyu Jung², and Karen McDonald²

¹ Department of Plant Biology, UC Davis

² Department of Chemical Engineering and Materials Science, UC Davis

³ Department of Biological & Agricultural Engineering, Biological Systems Engineering, UC Davis

Available cellulosic biofuel feedstocks are estimated to be over 1 billion dry tons per year in the United States, which could replace an estimated 30% of current transportation fuels. Production of cellulosic biofuels is currently limited by the availability and high cost of required enzymes. It is estimated that 15-25 kilograms of cellulase per ton of biomass are needed to produce 84 gallons of ethanol.

Therefore, meeting production targets of 21 billion gallons of “advanced biofuels” from cellulosic sources using fungal fermentation would create a market demand of over 3.75 million tons of cellulase enzymes in the United States alone. The scale, cost, and speed required to meet cellulase demands cannot be met using current technologies such as fungal fermentation.

One approach is to engineer plants to behave as bioreactors to produce the necessary cellulase enzymes. Duckweed is a small aquatic plant with a 2-3 day doubling time, low lignin content, high starch content, minimal need for pretreatment and the ability to be grown on non-arable land. This positions duckweed well as a non-food based source of biomass and industrial quantities of cellulase enzymes needed for cellulosic biofuels. The goal of the project is to transform duckweed using chloroplast transformation to express high levels of cellulase enzymes endoglucanase E1 and endo-1,4-beta-xylanase from *Acidothrmus cellulolyticus*. We are currently screening 10 strains of duckweed under a range of conditions to identify a candidate with high biomass productivity and composition well suited for industrial applications. Once we identify a candidate, we will develop methods for chloroplast transformation in the duckweed strain.

Focus Area: Biofuels & Biorefineries

INVESTIGATING CELLULOSE MICROFIBRILS USING ATOMIC FORCE-MICROSCOPY TO DETERMINE THE EFFECTS OF SONICATION ON CELLULOSE STRUCTURE AND ENZYME ACCESSIBILITY

Trainee: Patrick O'Dell
Faculty Trainer: Tina Jeoh
Campus: UC Davis

Patrick O'Dell, Tina Jeoh, Nadrapee Karuna

Department of Biological and Agricultural Engineering, University of California Davis

The current state-of-art technologies for the conversion of lignocellulosic biomass into biofuels generally require high severity pretreatments (ie. high temperature and pressure, or harsh chemicals) to improve enzymatic digestibility. This study looks into the structure of cellulose microfibrils using atomic force microscopy (AFM), and relates the microstructure of cellulose with cellulase accessibility. Our cellulose, harvested from the bacteria, *Gluconacetobacter xylinus*, is washed thoroughly with alkali and bleached with acid-chlorite to remove all protein from the culturing step. The cellulose microfibrils are then dispersed by ultrasonication, which has been observed to impact microstructure and length of the cellulose microfibrils. Methyltrimethoxysilane is used to create a hydrophobic surface on flat, cleaned glass. The glass surface then adheres dispersed cellulose via hydrophobic interactions. We present results demonstrating changes in cellulose microstructure due to sonication, and consequent impact on the kinetics of hydrolysis and binding by the cellulase *Trichoderma reesei* Cel7A. Additionally, the extent of oxidation of the sonicated cellulose is determined. Understanding the effects of pretreatments on the molecular structure of lignocellulosic materials will increase the fraction of biomass that can successfully be converted into biofuel or other products. In addition, a better understanding of the mechanisms behind enzymatic hydrolysis of lignocellulosic materials will lead to improvements in the saccharification process.

Focus Area: Environmental Sustainability

IMPROVING PHYTOPHTHORA RESISTANCE THROUGH MANIPULATION OF ARACHIDONIC ACID RESPONSES

Trainee: Marta Bjornson

Faculty Trainer: Katayoon Dehesh

Campus: UC Davis

Marta Bjornson^{1,2}, Geoffrey Benn¹, and Katayoon Dehesh¹

1. Department of Plant Biology, University of California, Davis

2. Department of Plant Sciences, University of California, Davis

Diseases caused by *Phytophthora* species are among the most devastating and economically important plant diseases worldwide. I am attempting to engineer increased resistance to these diseases using plant responses to arachidonic acid. This fatty acid is not present in vascular plants, is released by *Phytophthora* spp. upon infection, and is capable of inducing plant defense responses when exogenously applied to plants. Transgenic plants engineered to produce arachidonic acid display greater resistance to certain classes of pathogens, including *Phytophthora* spp., due in part to transcriptional reprogramming of selected defense-related genes. I will investigate the molecular mechanisms regulating this response with the ultimate goal of devising a genetic tool box instrumental in replication of this enhanced resistance without engineered arachidonic acid production. Specifically, I will employ an affinity purification method aimed at the identification of plant transcriptional regulators responsible for altered expression of arachidonic acid responsive genes. These proteins, as well as protein products of genes induced in response to arachidonic acid, will then be studied as follows: the model plant *Arabidopsis* genetically engineered to up- or down-regulate expression of the gene encoding each of these proteins will allow me to discern the function of the respective protein, and to screen for those which affect infection by *Phytophthora* spp. Those gene constructs most successful at reducing disease severity will be selected for generation of transgenic tomato plants, for validation in this important crop species. Reduced disease susceptibility in tomato will form the groundwork for a novel strategy aimed at enhancing resistance to *Phytophthora* spp. in a wide range of crop plants.

Focus Area: Environmental Sustainability

QUANTITATIVE PROTEOMICS REVEALS DYNAMIC CHANGES IN THE PLASMA MEMBRANE PROTEOME DURING ARABIDOPSIS IMMUNE SIGNALING

James Mitch Elmore^{1,2}, Jun Liu^{1,2}, Barrett Smith^{1,3}, Brett Phinney^{1,3}, and Gitta Coaker^{1,2}

¹University of California at Davis

²Department of Plant Pathology

³Genome Center Proteomics Core Facility

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Most classes of plant pathogens remain outside the host cell membrane during their lifecycle. As a result, the plant plasma membrane mediates critical aspects of plant immunity including pathogen recognition, signal transduction, and downstream defense responses. Investigating how the plasma membrane proteome changes during these events will lead to a better understanding of plant immune signaling and identify novel components of plant disease resistance. We have used label-free shotgun proteomics to investigate plasma membrane dynamics during effector-triggered immunity (ETI). Transgenic *Arabidopsis* plants expressing the bacterial effector AvrRpt2 under the control of a dexamethasone(Dex)-inducible promoter were used to initiate ETI. Expression of the AvrRpt2 protease results in RIN4 cleavage and activation of the disease resistance (R) protein RPS2. Plasma membrane vesicles were isolated 6 hours post-Dex treatment and subjected to gel-enhanced liquid chromatography tandem mass spectrometry (Gel LC-MS/MS) for protein identifications. Label-free spectral counting was employed to quantify relative protein abundance between different treatment samples. More than 2300 proteins were identified in total with 1353 proteins reproducibly quantified across multiple replications. Over 20% of upregulated proteins have known roles in plant immune responses. Proteins that are up-regulated at the plasma membrane during ETI include those involved in calcium and lipid signaling, membrane transport, primary and secondary metabolism, protein phosphorylation, redox homeostasis, and vesicle trafficking. A subset of differentially regulated proteins was independently validated during bacterial infection. These experiments provide a framework for understanding global plasma membrane proteome dynamics during plant immune responses.

Focus Area: Environmental Sustainability

NEMATODE RESISTANT GENE DISCOVERY AND UTILIZATION IN SWEETPOTATO CULTIVAR IMPROVEMENT

Trainee: Gregory C. Bernard

Faculty Trainers Marceline Egnin, Conrad Bonsi, Desmond Mortley, Jesse Jaynes

Campus: Tuskegee University

A major constraint in sweetpotato production is attributed to the destructive effects of plant parasitic nematodes. An estimated 125 million dollars is lost globally due to the devastating effects of nematode infections. Sweetpotato is an economically important crop and valuable staple food source in many countries. The reniform nematode *Rotylenchulus* and root knot nematode *Meloidogyne incognita* are commonly occurring nematodes species in the southern United States. *M. incognita* spp. are responsible for the majority of reductions in crop yields, and is a significant plant pathogen to sweetpotatoes. Sweetpotato resistance to root knot nematode has been largely considered to be multigenic, and may confer qualitative resistance against only specific nematode genotypes. Genetic characterization of sweet potato varieties is important for developing molecular markers tagged to nematode resistance. Genes differentially expressed in nematode resistant plants are ideal targets for amplification and identification of sweetpotato homologs. The intent of this research is to identify nematode resistance genes in sweetpotato cultivars in efforts to develop transgenic disease resistant plants and introduce resistance to naturally susceptible varieties. Additionally, a synthetic protein gene (*asp-1*, Artificial Storage Protein) will be co-introduced to increase endogenous protein levels and raise the value. The overall reduction of disease incidence and increase of protein levels in transgenic lines will benefit producers and consumers and hopefully help to elucidate nematode resistance pathways in sweetpotato. Work supported by Tuskegee University USDA Evans-Allen GWACES and CREATE-Igert.

Focus Area: Environmental Sustainability

THE ROLE OF SPGA IN SEPTATION IN THE FUNGUS *ASPERGILLUS NIDULANS*

Trainee: Cui Jing Zeng

Faculty Trainer: Bo Liu

Campus: University of California, Davis

Cui Jing Zeng, Hye-Ryun Kim, and Bo Liu

Department of Plant Biology, UC Davis.

Filamentous ascomycetes form mycelia of multinucleate hyphal cells. It is unclear how cytokinesis/septation is temporally regulated in these fungi. In *Aspergillus nidulans*, the kinase cascade of the septation initiation network (SIN) triggers the assembly and contraction of the actomyosin ring contraction at the septation site during cytokinesis. The *spgA* gene encodes a homolog of the small GTPase Spg1p which turns on the SIN pathway in fission yeast. Surprisingly, the null $\Delta spgA$ mutation did not cause an obvious cytokinetic phenotype. In order to test whether SPGA acted as a trigger of cytokinesis, mutant forms of SPGA were expressed in the null $\Delta spgA$ background. Over-expression of two constitutively active forms of SPGA, SPGAQ135L and SPGAD191A, did not cause an obvious phenotype in colony growth or conidiation when compared to wild type. But over-expression of the dominant negative form of SPGA, SPGAT108A, almost completely abolished conidiation. SPGAT108A and SPGAQ135L localized to spindle pole body (SPB) as the wild type form, but SPGAD191A sometimes appeared at the plasma membrane. The two constitutively active SPGA forms induced cytokinesis to take place more frequently than wild type. When the dominant negative SPGAT108A was over-expressed, the SIN components were no longer detected at the spindle pole body and the septation site. Our results suggest that SPGA forms part of the trigger regulating the SIN pathway, and at least another small GTPase acts in parallel with SPGA.



CREATE-IGERT

Trainee Biographies



BIOGRAPHICAL SKETCH

Lucas Arzola
Professor Karen McDonald Laboratory
Email: larzola@ucdavis.edu

NAME Lucas Arzola	P.I.(s): Prof. Karen McDonald
GRADUATE GROUP (i.e. Plant Biology) Chemical Engineering	TITLE OF DISSERTATION ON RESEARCH: Transient Expression of High-Value Therapeutic Proteins in Tobacco Plants
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>	

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Puerto Rico, Mayaguez University of California, Davis	B.S. M.S.	05/07 06/09	Industrial Biotechnology Chemical Engineering

A. Research Focus

The constant threat of bioterrorism and the recent H1N1 flu pandemic highlight the importance of developing the rapid, scalable, and cost-effective production of therapeutic agents. Recent advances in the field of plant biotechnology have made possible the use of plants as cost-effective biofactories of therapeutic proteins. Lucas' research focuses on the development of a plant based transient expression system in tobacco plants, for the production of an anthrax receptor decoy protein that can mitigate the effects of anthrax.

B. Honors and Awards

Positions and Employment

2011 Fellow, 2011 NSF Innovation Corps Program
2011 E-Team Grantee, National Collegiate Inventors and Innovators Alliance (NCIIA)

Professional Experience (TAing/Research Internships)

2011	TA, ECH 155B: Chemical Engineering Laboratory, Winter Quarter
2011	Visiting Scientist, Research Internship at National University of Ireland Maynooth, Summer

C. Publications and Patents

Arzola L., Chen J., Rattanaporn K., Maclean J.M., & McDonald K.A. (2011). Transient Co-Expression of Post-Transcriptional Gene Silencing Suppressors for Increased *in Planta* Expression of a Recombinant Anthrax Receptor Fusion Protein. International Journal of Molecular Sciences, 12(8):4975-4990.

Additional posters and presentations


2011	December 14, NSF Innovation Corps Closing Event, Oral Presentation, Palo Alto, CA
2011	August 30, NCIIA VentureLab Final Presentation, Cambridge, MA

Outreach Activities

2011	UC Davis Recruiter, University of Puerto Rico Rio Piedras and UPR Mayaguez
2010	Presenter, Big Bang Kickoff, MCB 294 Seminar
2010	Graduate Student Panelist, UC Davis UC LEADS Preview Day
2009	E-Mentor, Sheldon High Biotech Academy
2009	Graduate Student Panelist, UC Davis STEM Preview Day
2009	Volunteer, Teen Biotech Challenge

University Service

2009-2010	Graduate Student Representative, Chancellor's Blue Ribbon Committee on Research
2010	NSF CREATE-REU Summer Research Mentor
2010-2011	Member, Chancellor's Graduate and Professional Student Advisory Board
2011-	Chancellor's Ambassadors Program

	BIOGRAPHICAL SKETCH		
	Geoffrey Benn Professor Katie Dehesh Laboratory Email: gkbenn@ucdavis.edu		
GRADUATE GROUP (i.e. Plant Biology) Plant Biology	P.I.(s): Katayoon Dehesh TITLE OF DISSERTATION ON RESEARCH: Identifying the biochemical and molecular components of plant primary stress response networks		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residence if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
University of Illinois at Urbana-Champaign	B.S.	05/08	Crop Sciences

A. Research Focus

The goal of my research is to understand plant stress perception and subsequent early signal transduction events, specifically those involved in the plant response to diverse stresses. In a more general sense, I am interested in applying genomic, bioinformatic, and systems biological approaches to understanding plant interactions with other organisms.

B. Honors and Awards

2011 Monsanto Endowed Student Fund in Agricultural Biotechnology award

Professional Experience (TAing/Research Internships)

2011 TA, PLB 111, Fall Quarter

C. Publications and Patents

N/A

Additional posters and presentations

2012 February 3, CREATE-IGERT Symposium, "Identifying the biochemical and molecular components of plant primary stress response networks," Davis, CA

Outreach Activities

2012 Mentored student through the Biotechnology Academy E-Mentoring program at Vallejo High School

2012 Gave lab tour and discussed biotechnology and CREATE-IGERT project with students from two Solano County high schools

2011 Gave lab tour and discussed biotechnology and CREATE-IGERT project with visiting undergraduate students from Kyushu University in Japan.

2011 Gave one hour overview presentation of Dehesh lab research to representatives from the Gates foundation.


2011 Gave lab tour and discussed CREATE-IGERT project with students in the Forensics Academy at James Enochs High School in Modesto, CA

2011 Developed experiment and accompanying forensics mystery activity for the DEB exhibit at UC Davis's Picnic Day (campus-wide open house)

University Service

2011 Plant Biology Graduate Student Association Social Activities Co-Chair

2011-2012 Plant Biology Graduate Student Association Recruitment Co-Chair

	BIOGRAPHICAL SKETCH Gregory Christopher Bernard Professor Marceline Egnin & Professor Jesse Jaynes Laboratories Email: gbernard4673@mytu.tuskegee.edu
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NAME Gregory Christopher Bernard	P.I.(s): Jaynes and Egnin
GRADUATE GROUP (i.e. Plant Biology) Integrative Biosciences, Plant Biotechnology and Genomics Research Lab. College of Agricultural, Environmental and Natural Sciences. Tuskegee University, Tuskegee AL.	TITLE OF DISSERTATION ON RESEARCH: Genetic characterization of nematode resistance genes in sweetpotato and the development of transgenic nematode resistant plants.

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
North Carolina A&T State University	B.S.	1999	Animal Science
North Carolina A&T State University	M.S.	2004	Animal Health
Virginia Polytechnic University		2005	Animal Science
Post Baccalaureate Research		2010	Plant Pathology
North Carolina State University	M.S.		
Tuskegee University	Ph.D.	2010-	Integrative Biosciences /Plant Biotechnology

A. Research Focus

Infection of plants by plant parasitic nematodes results in devastating losses in crop production. The sweetpotato is an economically important crop and a staple food in most countries.

The objective of this research is aimed at functional and structural characterization of nematode resistance genes in sweetpotatoes in efforts to develop transgenic disease resistant plants, and enhance resistance in normally susceptible cultivars. Additional research will involve the co-introduction of a synthetic storage gene (*asp-1*, Artificial Storage Protein) into nematode resistant transformants to increase protein concentrations. Overall, the elucidation of nematode resistance gene function will be demonstrated in efforts to reduce disease incidence and increase sweetpotato yields for producers and consumers and hopefully help elucidate nematode resistance pathways in sweetpotato.

B. Honors and Awards

- Department of Animal Science at N.C. A&T Scholarship Recipient
- 2003 Awarded Scholarship and Completed Summer Institute in Statistical Genetics at North Carolina State University
- 2004 Awarded NIH Minority Fellowship at Virginia Polytechnic and State University
- Completed A Field Guide to GenBank and NCBI Molecular Biology Resources Lecture and Workshop
- 2008/2009 Nominated as one of 2000 Outstanding Scientists by the International Biographical Center
- Outstanding Volunteer- 2008 APS meeting
- 2010 North Carolina Plant Pathology Student Representative

Positions and Employment

2001-2004	Graduate Research Assistant	N.C. A&T SU
2004-2005	Post Baccalaureate Research Assistant	Virginia Tech
2005-2010	Graduate Research Assistant	NCSU
2010-	IBS Doctoral Fellow	Tuskegee University

Professional Experience (TAing/Research Internships)

2008-2010 SCIBLS Teaching Assistant- assisted Dr. Sivamani in teaching and laboratory experiments for high school students in the Summer College In Biotechnology and Life Sciences program.

Completed Teaching Assistant requirements for graduate programs at N.C A&T and NCSU

C. Publications and Patents

- Jesse M Jaynes, and Gregory C. Bernard (2011). Structure /Function Link Between Cytokine Domains and Natural and Designed Lytic Peptides: The Medical Promise. *ACS Books* Accepted with Revision 10/11
- Abstract published, Bernard, Gregory C. (2009). Bernard, Gregory, C. , Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2008). Presented poster entitled "Functional Characterization of 3 transcription factors involved in virulence in *M. oryzae*
- Abstract published. Poster Presentation. Bernard, Gregory, C. , Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2008). "Virulence of *M. oryzae* is regulated through specific transcription factors". at International Plant-Microbe Interaction Congress in Quebec City, Canada.
- Bernard, Gregory C., Worku, Mulumebet., Ahmedna, Mohammed. (2009). The Effects of *Diatomaceous* Earth on Parasite Infected Goats. *BULLETIN OF THE GEORGIAN NATIONAL ACADEMY OF SCIENCES*, vol. 3, no. 1.

- 2008 APS Meeting , Abstract published, 2008 presented poster Bernard, Gregory, C. , Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2008). “Functional Characterization of 3 transcription factors involved in virulence in *M. oryzae*”
- Wu, Miazong, Aihua Wang, Bernard, Gregory C., Hall, John B., Beal, William E., Akers, Micheal R., Boisclair, Yves R., Jiang, Honglin. (2008.) Increased degradation of insulin-like growth factor –I in serum from feed-deprived steers. *Domestic Animal Endocrinology* 35 (2008) 343–351.
- 2007. Abstract published 4th IRBC- Rice Blast Conference 2007, Changsha, China. Presented Poster, Bernard, Gregory, C., Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2008). “Functional characterization of a transcription factor putatively involved in the pathogenicity of *Magnaporthe grisea*”
- 2007. Abstract published. APS meeting 2007, Presented Poster Bernard, Gregory, C. , Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2008). “Functional characterization of a transcription factor putatively involved in the pathogenicity of *Magnaporthe grisea*” SanDiego, California
- 2007.4th IRBC- Rice Blast Conference 2007, Changsha, China. Presented Poster Bernard, Gregory, C. Mitchell, TK, Marui, Junichiro, Dean, Ralph. (2007). “Functional characterization of a transcription factor putatively involved in the pathogenicity of *Magnaporthe grisea*”
- 2004 Annual Dairy and Animal Science Meeting presented abstract of thesis work, (2004) Bernard, Gregory C. Ahmedna, Mohammed, Worku, Mulumebet. ” Evaluation of Diatomaceous Earth as an alternative anthelmintic in meat goats”.

Additional posters and presentations

2009	Presented PhD proposal seminar on Functional characterization of a transcription factors and proteomics involved in the pathogenicity of <i>Magnaporthe oryzae</i> . North Carolina State University, Raleigh N.C.
2008	Genetic seminar and taught experimental procedures to youth group for neighboring Community center
2008	Presented in lab genetic seminar and experiments involving bacterial pathogens for Boys Scouts
2007, 2008	Provided genetic seminar and experimental analysis for youths at Compassionate Tabernacle of Faith Missionary Baptist Church.
2008	Presented workshop at Fayetteville State University on functional genomics.
2004	Presented thesis work at Biotechnology Symposium held at N.C. A&T held by mentor Dr. Mulumebet Worku.
2004	Presented information to existing and prospective meat goat producers on meat goat health husbandry at the Franklin County, N.C. Meat Goat Extension Meeting.

Outreach Activities

2007-2008	Big Brother Program
2008-2009	American PhytoPathology Society Member
2009	Member of International Plant Microbe Interactions Congress

Executive Board Member of Biodiversity and Conservation Research Trust (founded by Dr. Malali Gowda) where assisted in the writing a proposal to preserve the Indian Elephant and resolve human-animal conflict through public awareness campaigns and tree-based farming.

University Service

2011	Judge for Professional Agricultural Workers Conference, Tuskegee,AL.
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BIOGRAPHICAL SKETCH

Marta Bjornson

**Professor Abhaya Dandekar & Professor Katie Dehesh
Laboratories**

Email: marta.l.bjornson@gmail.com

NAME Marta Bjornson

P.I.(s): Abhaya Dandekar and Katie Dehesh

GRADUATE GROUP (i.e. Plant Biology)
Horticulture and Agronomy

TITLE OF DISSERTATION ON RESEARCH:
Improving Phytophthora resistance through
manipulation of arachidonic acid responses

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Rice University. Houston, TX	BS	05/09	Bioengineering

A. Research Focus

Marta is looking at the potential signaling role of arachidonic acid in eliciting plant-stress responses. Recently it has been demonstrated that this fatty acid modulates plant responses to a range of pathogens through alteration of jasmonic acid and salicylic acid stress responsive pathways. Marta's project will elucidate various components of arachidonic acid-mediated plant stress perception and response networks. Her findings have the potential of discovering novel strategies to enhance plant resistance to pests.

B. Honors and Awards

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

N/A

Additional posters and presentations

Woodward, A., Ratzel, S., Lingard, M., Bjornson, M., Ornelas, A., Vasquez, V., Gill, M., Strader, L., Bartel, B. (2011 August) Screening for Arabidopsis mutants requiring exogenous fixed carbon and displaying indole-3-butyric acid resistance reveals novel alleles of peroxisome function genes. Poster session presented by Woodward, A. at the annual American Society of Plant Biologists meeting, Minneapolis

Outreach Activities

2012	(2011, before reporting period) Sheldon High School e-mentor
2011	Teen Biotech Challenge

University Service

2011	Horticulture and Agronomy Journal Club Coordinator
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BIOGRAPHICAL SKETCH

Timothy Butterfield
Professor Abhaya Dandekar Laboratory
Email: tsbutterfield@ucdavis.edu

NAME	P.I.(s): Abhaya Dandekar		
Timothy Butterfield	TITLE OF DISSERTATION ON RESEARCH: Regulation of the hydrolysable tannin pathway in walnut, and the activities of hydrolysable tannins as defense compounds.		
GRADUATE GROUP (i.e. Plant Biology)			
Plant Biology			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
The University of Texas at Austin	B.S.	05/2004	Biology; Plant Biology
The University of Texas at Austin	M.A.	08/2007	Plant Biology
The University of California, Davis	Ph.D.	12/2013?	Plant Biology

A. Research Focus

Tim is pursuing research that will lead to new strategies for agronomic crop improvement in walnut and alfalfa. Specifically, he is exploring the biosynthesis and utility of phenolic compounds, in particular a class of polyphenolics known as the hydrolysable tannins. To pursue these studies, we have cloned several genes in the hydrolysable tannin pathway from walnut. These cloned genes have been used to generate transgenic walnut trees and alfalfa plants exhibiting altered expression (walnut) of native polyphenol biosynthetic genes or expressing these genes in a crop species, alfalfa, which lacks these genes and specific class of metabolites.

We are using these transgenic plants to study both the regulatory relationships between the shikimic acid and phenylpropanoid pathways in and to understand the role of hydrolysable tannins as natural defense compounds against common agricultural pests. This knowledge has the potential to be leveraged as pest control alternatives, potentially reducing pesticide applications in California

agricultural fields, thereby improving farm worker safety, safeguarding water supplies, and reducing the death of non-target insect species.

B. Honors and Awards

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

2011	TA, BIS 2C, Winter Quarter TA, BIS 2C, Spring Quarter TA, BIS 2C, Fall Quarter
2012	TA, BIS 2C, Winter Quarter

C. Publications and Patents

Butterfield, T., (2007). The Effects of Extracellular ATP on Growth in *Arabidopsis thaliana*. Master's Thesis. Plant Biology Program. School of Biological Science. The University of Texas at Austin.

Wu J, Steinebrunner I, Sun Y, Butterfield T, Torres T, Arnold D, Gonzalez A, Jacob F, Reichler S, and Roux S. (2006). Apyrases (Nucleoside Triphosphate-Diphosphohydrolases) Play a Key Role in Growth Control in *Arabidopsis*. *Plant Physiology* 144 (2): 961-975.

Roux S, Song C, and Jeter C. (2006). Regulation of plant growth and development by extracellular nucleotides. In: *Communication in Plants* (Baluska F., Mancuso S., and Volkmann D. eds.), Springer, New York, pp. 221-234. (Contributed a figure; acknowledged).

Song CJ, Steinebrunner I, Wang XZ, Stout SC, Roux SJ. (2006). Extracellular ATP induces the accumulation of superoxide via NADPH oxidases in *Arabidopsis*. *Plant Physiology* 140 (4): 1222-1232. (Contributed a figure; acknowledged).

Clark G, Cantero-Garia A, Butterfield T, Dauwalder M, and Roux S. 2005. Secretion as a Key Component of Gravitropic Growth: Implications for Annexin Involvement in Differential Growth. *Gravitational and Space Biology Bulletin* 18 (2): 113-114.

Jeter C, Tang W, Henaff E, Butterfield T, and Roux S. 2004. Evidence of a Novel Cell Signaling Role for Extracellular Adenosine Triphosphates and Diphosphates in *Arabidopsis*. *The Plant Cell* 16: 2652-2664.

Rubendall A and Butterfield T. 2003. Brownfield Redevelopment: East Austin Tank Farm—Austin, TX. Dissertation. Community and Regional Planning Program, School of Architecture, University of Texas.

Additional posters and presentations

2011 January 11. UC Davis CREATE-IGERT Symposium, Poster Title: "*Utilizing a Polyphenol Oxidase as an Antibiosis agent in Medicago sativa Pest Management*", Davis, CA

2009 November 20. UC Davis CREATE-IGERT Symposium, Talk Title: "Uncovering and Manipulating Biochemical and Regulatory Details of Phytochrome-Mediated Signaling in Plants", Davis, CA.

2009 November 20. UC Davis CREATE-IGERT Symposium, Poster Title: "Inducing phytochrome B signaling without activation of other phytochromes", Davis, CA.

2009 September 11. UC Davis Plant Cell Biology Training Grant Retreat, Talk Title: "Molecular Mechanisms of Phytochrome Signaling", Asilomar CA.

2009 July 30. 9th Annual International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms, Poster Title: "Inducing phytochrome B signaling without activation of other phytochromes", July 26-31 2009; Asilomar CA.

2009 April 4. UC Davis Biotechnology Training Retreat, Poster Title: "Manipulation of phytochrome-mediated signaling in transgenic plants", April 4 2009, Napa CA.

2008 October 16. CREATE-IGERT Symposium, Talk Title: "Manipulation of Phytochrome-Mediated Signaling in Transgenic Plants", Davis CA.

2008 September 16. UC Davis Plant Biology Graduate Group Colloquium, Talk Title: "Into the Light: Information, Signal Transduction & Response Regulation", Davis CA.

2007 March 4. American Society of Plant Biologists, Southern Section Meeting, Talk Title: "Search for a plasma membrane receptor of ATP, an exogenous regulator of growth", Mobile AL.

2006 May 18. Pan-American Plant Membrane Biology Workshop, Poster Title: "Growth effects of extracellular ATP: mediation by ethylene and the search for plasma membrane receptor(s)", South Padre Island, TX.

Outreach Activities

2010	Teen Biotech Challenge
2010	Biotech Program's Picnic Day Event
2009	Biotech Program's Picnic Day Event
2008	Biotech Program's Picnic Day Event

University Service

2008-2009	Plant Biology Graduate Student Assembly – GSA Representative
2009-2010	Plant Biology Graduate Student Assembly – Selection Committee
2011-2012	Plant Biology Graduate Group Executive Committee – Student Representative
2011-2012	Plant Biology Graduate Student Assembly - President



BIOGRAPHICAL SKETCH

Elenor Castillo

Professor Florence Negre-Zakharov & Professor Abhaya Dandekar Laboratories

Email: elecastillo@ucdavis.edu

NAME

Elenor Castillo

P.I.(s): Negre-Zakharov & Dandekar

GRADUATE GROUP (i.e. Plant Biology)
Plant Biology

TITLE OF DISSERTATION ON RESEARCH:

Investigating the Role of Sulfur Volatiles in Repelling Psyllids; A Crop Pathogen Vector

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Chabot College, Hayward, CA	A.A.	06/05	Biological Sciences
Mills College, Oakland, CA	B.S.	05/08	Biological Sciences

A. Research Focus

Elenor's project focuses on elucidating the metabolic pathways that underlie production of aromatic volatiles in fruits, which has direct commercial application in extending fruit shelf-life. On a broader scale, understanding the role of volatile chemical signals within and between plants in field populations may also play a part in increasing crop yields/biomass, engineering insect and pathogen resistance, and fine-tuning other agronomic and quality-related crop traits.

B. Honors and Awards

2008-2009	AGEP program (Alliance for Graduate Education and the Professoriate)
2007	Kaiser Foundation Medical Scholarship
2005, 2006	Mills Dean's Scholarship
2005	Chabot College Deans List, Fall
2005	Cal State, Hayward School of Science Summer Scholarship

Professional Experience (TAing/Research Internships)

TA, Chicano Studies

C. Publications and Patents

Rockwell, NC., Njuguna, SL., Roberts, L., Castillo, E., Parson, VL., Dwojak, S., Lagarias, JC., Spiller, SC. "A second conserved GAF domain cysteine is required for the blue/green photoreversibility of cyanobacteriochrome Tlr0924 from *Thermosynechococcus elongates*" Biochemistry. 2008, Jul 8; 47(27).

Additional posters and presentations

Castillo E, Dandekar A, Negre-Zakharov F (2009, November). Sulfur Volatile Compounds: An alternative to pesticides for the Citrus disease Huanglongbing. Research presented at the CREATE-IGERT Annual Symposium, Davis, CA.

Hampel D, Hjelmeland AK, Negre-Zakharov F, Ebeler SE (2009, May). Carotenoid Cleavage Dioxygenases in Grapes. Poster presented at the 1st Annual Grape RCN Conference, CA.

Wang M, Boo KH, Negre-Zakharov F (2009, June). Investigation of Branched-Chain Amino Acid Metabolism Involved in Aroma Formation in Melon. Poster presented at the Gordon Research Conference on Plant Metabolic Engineering, NH.

Outreach Activities

2009, 2010	Picnic Day, Biotechnology Program exhibit
2009	Teen Biotech Challenge
2009-2010	Women in Science and Engineering (WISE) mentor
2009	Picnic Day Volunteer, Plant Sciences Department

University Service

2009	Co-Chair, Latino Graduate Student Association (LGSA)
2010	NSF CREATE-REU Summer Research Mentor



BIOGRAPHICAL SKETCH

Dawn Chiniquy
Professor Pamela Ronald Laboratory
Email: dmchiniquy@ucdavis.edu

NAME Dawn Chiniquy	P.I.(s): Pamela Ronald		
GRADUATE GROUP (i.e. Plant Biology) Plant Biology	TITLE OF DISSERTATION ON RESEARCH: Characterizing glycosyltransferases involved in rice cell wall biosynthesis		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
UC Berkeley	BA	12/04	Integrative Biology

A. Research Focus

Gaining a greater understanding of the enzymes that build the plant cell wall may lead to improved feedstocks that make a cheaper, more efficient biofuel. Dawn focuses on characterizing genes in rice that build the cell wall and whether these genes could be altered for an improved feedstock for biofuels.

B. Honors and Awards

Positions and Employment

2010-2011 William G. & Kathleen Golden International Agricultural Fellowship
2010-2011 UC Davis Humanities Graduate Research Fellowship

Professional Experience (TAing/Research Internships)

2008 Teaching Assistant, BIS 101 Genetics, Fall Quarter

C. Publications and Patents

Dawn Chiniqy, Vaishali Sharma, Andrew Carroll, Edward Baidoo, Alex Schultink, Jesper Harholt, Markus Pauly, Jay D. Keasling, Henrik V. Scheller, and Pamela Ronald. (2012) XAXT1, a Grass Specific Xylan Xylosyltransferase in the Glycosyltransferase Family 61. *In prep.*

Additional posters and presentations

Analysis of Putative Feruloyltransferase Transcript Levels and Cell Wall Composition during Rice Development. Dawn Chiniqy, Laura Bartley, Jesper Harholt, Brian Conlin, Chithra Manisseri, Peijian Cao, Henrik Vibe Scheller, and Pamela Ronald. Cell Wall Biosynthesis and American Congress on Plants and Bioenergy, 2008

Identification Of Novel Promoters Useful For Crop Biotechnology Roger Thilmony, Mara E. Guttman, Dawn Chiniqy and Ann E. Blechl Plant & Animal Genomes XIV Conference, Jan 2006

Cereal Crop Promoters That Confer Organ-Specific Transgene Expression. Roger Thilmony, Mara E. Guttman, Dawn Chiniqy and Ann E. Blechl.

Outreach Activities

2008	Biotech Program's Picnic Day Event
2009	Art-Science Bioenergy in the Schools student teacher, Caesar Chavez Elementary School, Davis, CA
2011	Judge for teen biotech challenge

University Service

2008	Student representative on board of UC Davis Consortium for Women and Research
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BIOGRAPHICAL SKETCH

Mitch Elmore
Professor Gitta Coaker Laboratory
Email: jmelmore@ucdavis.edu

NAME		P.I.(s):	
James M. Elmore, "Mitch"		TITLE OF DISSERTATION ON RESEARCH: Quantitative Proteomics Analysis of Plant Immune Responses	
GRADUATE GROUP (i.e. Plant Biology)			
Plant Biology			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
St. Louis University, St. Louis, MO, USA University of California at Davis, Davis, CA, USA	B.S. PhD	05/2005 in progress	Biological Sciences Plant Biology

A. Research Focus

Innovative strategies for sustainable disease control in agriculture can be developed by understanding the molecular mechanisms underlying plant-pathogen interactions. Mitch's research uses a quantitative proteomics approach to identify novel components of plant immune responses with the ultimate goal of engineering plants to be more resistant to pathogens.

B. Honors and Awards

2011	Summer Graduate Student Researcher Award, UC Davis
2009-2011	NSF CREATE-IGERT Research Traineeship (DGE-0653984)
2008-2010	Golden Key International Honor Society Invitation
2005	Graduated <i>Magna Cum Laude</i> , St. Louis University

Positions and Employment

2007- Graduate Student Researcher, Department of Plant Pathology, University of California at Davis, Davis, CA
2005-2007 Research Technician, Donald Danforth Plant Science Center, St. Louis, MO

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

Elmore, J.M., Liu, J., Smith, B., Phinney, B., & Coaker, G. (2012). Quantitative Proteomics Reveals Dynamic Changes in the Plasma Membrane Proteome During *Arabidopsis* Immune Signaling. *Molecular and Cellular Proteomics*. *In press*.

Elmore, J.M.*, Lin, Z.D.*, & Coaker, G. (2011). Plant NB-LRRs: Upstreams and Downstreams. *Current Opinion in Plant Biology*. 14, 365-371. *co-first authors

Liu, J., Elmore, J.M., Lin, Z.D., & Coaker, G. (2011). A Receptor-like Cytoplasmic Kinase Phosphorylates the Host Target RIN4, Leading to the Activation of a Plant Innate Immune Receptor. *Cell Host & Microbe*. 9, 137-146.

Elmore, J.M., & Coaker, G. (2011). The Role of the Plasma Membrane H⁺-ATPase in Plant-Microbe Interactions. *Molecular Plant*. 4, 416-427.

Elmore, J.M., & Coaker, G. (2011). Biochemical Purification of Native Immune Protein Complexes. *Methods in Molecular Biology: Plant Immunity*. Humana Press, Inc. 712: 31-44.

Liu, J., Elmore, J.M., & Coaker, G. (2010). Proteomic Analysis of Plant Innate Immunity: Identification of the RIN4 complex and investigating dynamic changes in the plasma membrane proteome. *Biology of Plant-Microbe Interactions*. 7, 45-55.

Wilton, M., Subramaniam, R., Elmore, J.M., Felsensteiner, C., Coaker, G., & Desveaux, D. (2010). The type III effector HopF2Pto targets Arabidopsis RIN4 protein to promote *Pseudomonas syringae* virulence. *Proceedings of the National Academy of Sciences*. 107, 2349-2354.

Liu, J.*, Elmore, J.M.*, & Coaker, G. (2009). Investigating the functions of the RIN4 protein complex during plant innate immune responses. *Plant Signaling & Behavior*. 4, 1107-1112. *co-first authors

Liu, J., Elmore, J.M., Fuglsang, A.J., Palmgren, M.G., Staskawicz, B.J., & Coaker, G. (2009) RIN4 functions with plasma membrane H⁺-ATPases to regulate stomatal apertures during pathogen attack. *PLoS Biology*. 7, e1000139.

Govindarajulu, M., Elmore, J.M., Fester, T., & Taylor, C.G. (2008). Evaluation of constitutive viral promoters in transgenic soybean roots and nodules. *Molecular Plant-Microbe Interactions*. 21, 1027-1035 [front cover article].

Additional posters and presentations

2012 March, International Symposium of the Association of Biomolecular Resource Facilities
2012. Poster Title: *"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling"*. Orlando, FL.

2012 February, United States-Israel Binational Research & Development Fund (BARD)
Workshop: Microbial Virulence Determinants & Plant Innate Immunity. Oral Presentation Title:
"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling". Tel Aviv, Israel.

2012 February, NSF CREATE-IGERT Research Symposium. Poster Title: *"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling"*.
Davis, CA.

2011 June, 22nd International Conference on *Arabidopsis* Research. Poster Title: *"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling"*.
Madison, WI.

2011 April, Annual UC Davis Biotechnology Program Retreat. Poster Title: *"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling"*.
Davis, CA.

2011 January, NSF CREATE-IGERT Research Symposium. Oral Presentation Title:
"Quantitative Proteomics Reveals Dynamic Changes at the Plasma Membrane During Plant Defense Signaling". Davis, CA.

2010 March, Bay Area Microbial Pathogenesis Symposium XIII. Poster Title: *"Multiple Effectors from Phytopathogenic Bacteria Interact with Host Cyclophilins"*. San Francisco, CA.

2010 March, Keystone Symposia: Receptors and Signaling in Plant Development and Biotic Interactions. Poster Title: *"Quantitative Proteomics Reveals Dynamic Changes Occurring at the Plant Plasma Membrane During Defense Signaling"*. Tahoe City, CA.

2009 November, NSF CREATE-IGERT Research Symposium. Oral Presentation Title:
"Investigating Host-Mediated Activation of Bacterial Effector Proteins". Davis, CA.

2009 July, Meeting of the International Society of Molecular Plant-Microbe Interactions. Poster Title: *"Identification and characterization of bacterial effectors that interact with the plant protein folding catalyst cyclophilin"*. Quebec City, Quebec, Canada.

Outreach Activities

2011	Teen Biotech Challenge Awards Banquet
2009	Teen Biotech Challenge Awards Banquet
2008	Teen Biotech Challenge Awards Banquet

University Service

2011-2012	Educational Policy Committee, Plant Biology Graduate Group
2010	Admissions Committee, Plant Biology Graduate Group
2009-2010	Graduate Student Association Representative, Plant Biology Graduate Group
2006-2007	Safety Committee, Donald Danforth Plant Science Center



BIOGRAPHICAL SKETCH

Dominique Gales
Professor Clayton Yates Laboratory
Email: DNCGales31@gmail.com

NAME		P.I.(s): Dr. Clayton C. Yates	
Dominique N. Gales		TITLE OF DISSERTATION ON RESEARCH: The Role of Sweet Potato Leaf Extract on MicroRNA Expression Levels Using Human Prostate Cancer Cell Lines.	
GRADUATE GROUP (i.e. Plant Biology) Biology			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Tuskegee University, Tuskegee, AL	B.S.	08/05-05/09	Biology
Tuskegee University, Tuskegee, AL	M.S.	06/09-05/12	Biology

A. Research Focus

Prostate cancer is the most commonly diagnosed cancer among men in the US and the second most common cause of cancer death among men. It is estimated that about 1 in 6 men in the US will be diagnosed with prostate cancer during their lifetime and 1 in 36 will die from this disease. Metastasis, the uncontrollable spread of cells that invade other parts of the body, particularly the bones and lymph nodes makes it difficult to successfully treat patients in an effective manner after its occurrence. It is therefore vital to have early markers for prostate cancer. Recent reports have indicated that fruits and vegetables contain chemopreventive agents, which could have protective effects against cancer. Beta-Carotene fibers, Vitamins A, C and E, Iron, Calcium, Proteins and Zinc have recently been identified in the Sweet Potato greens as a potential anticancer component. It has also been shown that SPGE has an excellent source of which are classified as dietary polyphenols. It also believed that cancer progression are regulated by miRNA, which are believed to be key regulators in various biological and pathologic processes. MicroRNAs are short 21 to 23 nucleotide single-stranded non-coding RNA molecules that are endogenously expressed. This is an area that is largely underexplored, in particular in prostate cancer, and warrants further investigation. Therefore, the purpose of this study is to determine the role of SPGE on miRNA expression levels on human prostate cancer cell.

B. Honors and Awards

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

2009	TA, Human Biology Lecture, Summer Semester
2009	TA, Human Biology Lecture, Fall Semester
2010	TA, Human Biology Lecture, Spring Semester
2011	TA, Cell and Genetics Lab, Fall Semester
2012	TA, Cell Biology Lab, Spring Semester

C. Publications and Patents

N/A

Additional posters and presentations

Awards:

Annual 37th Sigma Xi Symposium Poster Presentation: 3rd Place. Spring, 2010
Title of Poster: Investigation of Sweet Potato Leaf Extract and its Role in Programmed Cell Death
Dominique N. Gales B.S., Shaniece Theodore M.S, PhD., Clayton Yates PhD, and Timothy Turner PhD. Tuskegee University Department of Biology and Carver Cancer Research, Tuskegee, AL.

Awarded by UNCF Scholarships Programs:

GlaxoSmithKline

Coca-Cola First Generation Scholarship

Presentations:

2012	First Bioethics Conference on Cancer Health Disparities Research, Spring 2012 (Abstract has been accepted)
2012	69 th Joint Meeting of BKX/BIS, Spring 2012 (Abstract has been accepted)
2011	JARS Annual Meeting
2011	68 th Joint Annual Meeting of the BKX/BIS
2011	CREATE-IGERT Annual Symposium
2010	Tuskegee University Annual School of Veterinary Medicine Symposium
2010	Annual 37 th Sigma Xi Symposium
2009	Clark Atlanta University Annual Prostate Symposium

Outreach Activities

2009-	S.T.E.P – Tuskegee University, Tuskegee AL Advisor: Dr. Roberta Troy
2009-	Graduate For Sure- Tuskegee University, Tuskegee AL, Department of Biology
2007-2009	YMCA – Tuskegee, AL
2006-	Tri-State Club – Tuskegee University, Tuskegee AL, Positions Held: Senate and President
2010-	Science On Saturdays – Montgomery, AL

University Service

2010-	Beta Kappa Chi National Scientific Honor Society
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BIOGRAPHICAL SKETCH

Hyrum Gillespie
Professor Abhaya Dandekar Laboratory
Email: hgillespie@ucdavis.edu

NAME Hyrum Gillespie

P.I.(s): Abhaya Dandekar

GRADUATE GROUP Genetics

TITLE OF DISSERTATION ON RESEARCH:

MOLECULAR MARKERS OF INFECTION AND
 IDENTIFYING SMALL MOLECULE THERAPEUTICS TO
 COMBAT HIGH RISK PLANT DISEASE

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Utah State University	BS	05/2010	Crop Science

A. Research Focus

Hyrum will be developing biomarkers for disease identification in vector-borne citrus diseases, Huanglongbing (HLB) and Citrus Variegated Chlorosis (CVC). In addition to developing robust methods of monitoring disease progression, he will develop a plant therapy using anti-quorum sensing molecules.

B. Honors and Awards

2011 Jastro Graduate Research Scholarship

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

2011 TA, BIT 160, Winter Quarter
 2012 TA, BIT 160, Winter Quarter

C. Publications and Patents

N/A

Additional posters and presentations

2011 April 2, Biotechnology Training Retreat, Poster Title: "Mediation of Huanglongbing and Citrus Variegated Chlorosis using Chimeric Antimicrobial Proteins," Napa, CA

2011 January, Distinguished Lecture and Symposium, Poster Title: "Mediation of Huanglongbing and Citrus Variegated Chlorosis using Chimeric Antimicrobial Proteins," Davis, CA.

Outreach Activities

2012 Tuskegee Student Host

University Service

2011 Organized Transportation of Homeless during Winter

2012 Organized Transportation of Homeless during Winter



BIOGRAPHICAL SKETCH

Tiffany Glavan
Professor Satya Dandekar Laboratory
Email: twglavan@gmail.com

NAME Tiffany Glavan	P.I.(s): Satya Dandekar
GRADUATE GROUP (i.e. Plant Biology) Microbiology	TITLE OF DISSERTATION ON RESEARCH: The role of toll-like receptor and cytokine expression in microbial translocation during SIV infection

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Tufts University	BA	06/01	Biology
California Polytechnic State University.	MS	06/06	Microbiology

A. Research Focus

Tiffany's project is focused on the development of plant-derived therapeutic proteins to treat gastrointestinal dysfunction through the regeneration and renewal of the epithelial layer of the gut mucosa. She is collaborating with multiple groups on campus in an effort to express the protein in *N.benthamiana* and evaluate its activity in epithelial cell culture.

B. Honors and Awards

Positions and Employment

Jan-Jun 2012 Research intern at Novozymes Inc, under the guidance of Dr.Howard Brody

Professional Experience (TAing/Research Internships)

Jan-Jun 2012 Research intern at Novozymes Inc, under the guidance of Dr.Howard Brody
Mar 2011 Presented a talk at the Conference on Retroviral and Opportunistic Infections, in Boston, MA

C. Publications and Patents

(Unpublished paper presented at a meeting)

Glavan, T., Sankaran-Walters, S., Raffetellu, M., Sandler, N., Douek, D., Baumler, A., Goulart, L., and Satya Dandekar (2011, March). SIV induces gut mucosal anergy through dysfunctional TLR and cytokine expression. Paper presented at the Conference of Retroviral and Opportunistic Infections, Boston, MA.

Additional posters and presentations

2011 March, Biotechnology Program Chalk Talk, Talk Title: Simian Immunodeficiency Virus induces gut mucosal anergy through dysfunctional TLR and cytokine expression

2011 February, Microbiology Graduate Group: Spotlight on Graduate Research Symposium, Talk Title: The Front Line in HIV Pathogenesis: Warfare at the Gut Mucosa.

Outreach Activities

2011 Judge for Teen Biotech Challenge: A Northern CA Website Competition

2011 Lab Tour for visiting Japanese students

University Service

2011-2012	Student representative to the Executive Committee for the Designated Emphasis in Biotechnology
2011	Student representative to the Education Policy Committee, Microbiology Graduate Group



BIOGRAPHICAL SKETCH

Mitchell Harkenrider
Professor Pamela Ronald Laboratory
Email: mharkenrider@ucdavis.edu

NAME

Mitchell Harkenrider

P.I.(s): Pamela Ronald

TITLE OF DISSERTATION ON RESEARCH:

Investigating the Biotic Stress Regulatory Network
 in Grasses

GRADUATE GROUP (i.e. Plant Biology)
 Plant Biology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Purdue University Columbus State Community College UC Davis	B.A.	05/05	Political Science Biological Sciences Plant Biology

A. Research

Mitch's research is focused on identification and characterization of genes responsible for biotic and abiotic stress response and resistance in rice and switchgrass, a crop for cellulosic biofuel feedstocks. Understanding these networks is a crucial step in order to optimize the crop for the field.

B. Honors and Awards

Positions and Employment

2011-2010 Event Co-chair of the Plant Biology Graduate Student Association

Professional Experience (TAing/Research Internships)

2012 TA, PLB 116, Winter Quarter

C. Publications and Patents

N/A

Additional posters and presentations

2012 February 3, CREATE-IGERT Symposium, Presentation Title: "Identifying the Genetic Basis of Stress Response in Rice." Davis, CA

2012 March 24, Biotechnology Training Retreat, Poster Title: "Identification of Genes Controlling Disease Resistance to Mitigate Disease Pressure of Bioenergy Crops", Napa, CA


Outreach Activities

2011 Teen Biotech Challenge Website Judge and Event Assistant

2011 Bay Area Science Festival

University Service

2011-2012 Plant Biology Graduate Student Association

	BIOGRAPHICAL SKETCH Rachel Kerwin Professor Dan Kliebenstein Laboratory Email: rekerwin@ucdavis.edu
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NAME Rachel Kerwin	P.I.(s): Kliebenstein
GRADUATE GROUP (i.e. Plant Biology) PBGG	TITLE OF DISSERTATION ON RESEARCH: Investigating the Importance of Natural Variation in the Glucosinolate Pathway Using the Model Organism <i>Arabidopsis thaliana</i> .

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Virginia Tech, Blacksburg , VA	B.S.	05/07	Biochemistry and Biology, minor in Chemistry with Biotechnology emphasis
UC Davis, Davis, CA	PhD	Expected Dec 2013	Plant Biology

A. Research Focus

Rachel is interested in natural intraspecific phenotypic variation, how the underlying genetic variation contributes to the phenotypes we see, why variation exists and how it is adaptive to a given species in different environments. Specifically, she is studying natural variation in the glucosinolate pathway in *Arabidopsis thaliana*. Glucosinolates are a class of plant-made defensive compounds produced in the order Brassicales, which includes Arabidopsis. There is significant glucosinolate variation among Arabidopsis accessions isolated from different environments. She is generating an *Arabidopsis thaliana* accession Col-0 population that duplicates all the glucosinolate variation observed in nature with a common genetic background. She will then perform field trials in both CA and WY, measuring a suite of traits to determine if the different genotypes are more or less adaptive in the different environments.

B. Honors and Awards

2011 Monsanto Endowed Student Fund in Agricultural Biotechnology
2009-2011 NSF CREATE-IGERT Traineeship Award
2009-2010 Henry A. Jastro Graduate Research Scholarship Award

Positions and Employment

2005-2007 Undergraduate researcher, Glenda Gillaspys Lab, Virginia Tech,
 Blacksburg, VA
2007- Graduate student, Daniel Kliebenstein's Lab, Plant Sciences, UC Davis,
 Davis, CA
Sept 2011-Feb 2012 Interning graduate student, Fiona Doohan's Lab, University College Dublin
 Dublin, Ireland

Professional Experience (TAing/Research Internships)

Summer 2007 TA, MCB120L, Upper Division Biochemistry Lecture + Laboratory Course
Summer 2007 TA, BIS 1C, Introduction to Biology: Plant Biology
Fall Qtrs 2008-2010 TA PLB111, Upper Division Plant Physiology Lecture

C. Publications and Patents

Kerwin, R.E., Jimenez-Gomez, J.M., Fulop, D., Harmer, S.L., Maloof, J.N., and Kliebenstein D.J. (2011) "Network Quantitative Trait Loci Mapping of Circadian Clock Outputs Identifies Metabolic Pathway-to-Clock Linkages in *Arabidopsis*" *The Plant Cell* Online.

Donahue, J.L., Alford, S.R., Torabinejad, J. Kerwin, R.E., Nourbakhsh, A., Ray, W.K., Hernick, M., Huang, X., Lyons, B.M., Hein, P.P., and Gillaspys G.E. (2010) "The *Arabidopsis thaliana* Myo-Inositol 1-Phosphate Synthase1 Gene Is Required for Myo-inositol Synthesis and Suppression of Cell Death." *The Plant Cell* 22(3):888-903.

Hansen, B.G., Kerwin, R.E., Ober, J.A., Lambrix, V.M., Mitchell-Olds, T., Gershenzon, J., Halkier, B.A. and D.J. Kliebenstein. (2008) "A novel 2-oxoacid dependent dioxygenases involved in the formation of the goiterogenic 2-hydroxybut-3-enyl glucosinolate and generalist insect resistance in *Arabidopsis thaliana*." *Plant Physiology* 148(4):2096-2108.

Additional posters and presentations

Presentation: December 8, 2011 Investigating the Importance of Natural Variation in the Glucosinolate Pathway using *Arabidopsis thaliana*. *SBES Post-Graduate Seminar Day 2011*.
Dublin, Ireland

Presentation: January 12, 2011, Investigating the Importance of Natural Variation in the Glucosinolate Pathway using *Arabidopsis thaliana*. *CREATE-IGERT Research Symposium 2011*.
Davis, CA

Presentation: August 5, 2010, Roundup Ready Alfalfa: A Journey in Plant Biotechnology. *UC Davis CREATE-REU summer research program*. Davis, CA

Presentation: November 21, 2009, Investigating the Importance of Natural Variation in the Glucosinolate Pathway using *Arabidopsis thaliana*. *CREATE-IGERT Research Symposium 2009*. Davis, CA

Outreach Activities

N/A

University Service

Sept 2010 - Aug 2011 Co-Recruitment Chair for the Plant Biology Graduate Group (PBGG)

Sept 2008 - Aug 2010 President of the Plant Biology Graduate Student Association (PBGSA)



BIOGRAPHICAL SKETCH

Mark Lemos

**Professor Katie Dehesh & Professor Karen McDonald
Laboratories**

Email: mslemos@ucdavis.edu

NAME Mark Shawn Lemos	P.I.(s): Katayoon Dehesh Karen McDonald
GRADUATE GROUP (i.e. Plant Biology) Plant Biology Graduate Group	TITLE OF DISSERTATION ON RESEARCH: Engineering plants for biofuels
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>	

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Nevada Reno (Reno, NV)	BS/MS	09/09	Biotechnology

A. Research Focus

My research involves genetic engineering of plants for biofuels. The two projects I am involved in include:

- Rechanneling starch to oil.
- Expression of cellulose degrading enzymes in duckweed.

Ultimately, I am interested in development of duckweed as a scalable biomass crop for the production of biofuels and high value plant-made products.

B. Honors and Awards

2011 E-Team Grantee, National Collegiate Inventors and Innovators Alliance (NCIIA)

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

N/A

Additional posters and presentations

N/A

Outreach Activities

Feb 2012	Will serve as a student host for prospective incoming class of plant biology graduate group.
Nov 2011	Led tour of STEM Transfer students through McDonald lab.
Sept 2011	Led tour for visiting students from Kyushu University (Japan) through McDonald lab.
Jun-Aug 2011	Served as a mentor for CREATE-REU student Debika Mitra (Georgia Tech).
May 2011	Volunteered time at the Teen Biotech Challenge awards ceremony.

University Service

2011	NSF CREATE-REU Summer Research Mentor
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BIOGRAPHICAL SKETCH

Sonni-Ali Miller

Professor Martinez & Professor Jesse Jaynes Laboratories

Email: Snorlax188@aol.com

NAME

Sonni-Ali Miller

P.I.(s): Dr. Martinez & Dr. Jaynes

TITLE OF DISSERTATION ON RESEARCH:

GRADUATE GROUP (i.e. Plant Biology)
Integrative Biosciences

Effect of IL-12 on Negative Selection in the TNC
microenvironment

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Tuskegee University—Tuskegee, AL 36088	M.S.	05/03	Food and Nutritional Sci.
Tuskegee University—Tuskegee, AL 36088	B.S.	05/00	Biology

A. Research Focus

Sonni is interested plant-made products and in multi-faceted research concerning interactions between nutrition and cytological behavior, specifically in energy nutrient metabolism. He is characterizing specific biomarkers in atherosclerosis as a result of differences in lipid metabolism. He is also investigating the efficacy of peptide fragments as treatments effecting plaque formation in various rodent models.

B. Honors and Awards

2011-2012	Member, American Society of Cell Biologists
2011-	Member, Golden Key International Honour Society
2003-2005	Member, Society of Automotive Engineers
2000-2003	Fellow, NASA/CFESH Research, Tuskegee University, Tuskegee, AL
1999-	Member, Beta Kappa Chi Scientific Honor Society

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

2010-2011 TA, BIOL 0368-Bioinformatics/Biotechnology, Fall Semester 2011& Spring Semester
2010 TA, BIOL 0111-General Biology, Spring Semester
2010 Instructor, BIOL 0250-Molecular, Cell, and Genetic Biology, Summer

C. Publications and Patents

N/A

Additional posters and presentations

S-A. Miller¹, S. C. Henley¹, F. R. Davis¹, R. H. Lewis¹, G. C. Bernard¹, S. Samuels¹ and M. T. Martinez¹. (Dec. 2011) "Effect of IL-12 on Negative Selection in the TNC microenvironment." Poster session presented at the annual meeting of the American Society of Cell Biologists, Denver, CO.

Outreach Activities

N/A

University Service

N/A



BIOGRAPHICAL SKETCH

Patrick O'Dell

Professor Tina Jeoh Zicari Laboratory

Email: pack21x@gmail.com

NAME

Patrick O'Dell

P.I.: Dr. Tina Jeoh Zicari

GRADUATE GROUP

Biological Systems Engineering

TITLE OF DISSERTATION ON RESEARCH:
Investigating cellulose structure and enzyme accessibility using atomic force-microscopy.

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Florida (Gainesville, FL)	B.S.	12/08	Chemical Engineering

A. Research Focus

Patrick's work concerns the molecular interactions between cellulose and cellulose-hydrolyzing enzymes. This research will use multiple types of high resolution microscopy, including confocal microscopy and atomic force microscopy, to study the kinetic mechanisms of cellulose hydrolysis by cellulases.

B. Honors and Awards

Positions and Employment

2010- Graduate Student Researcher, University of California, Davis. Davis, CA.
 2009-2010 Consultant Engineering Specialist Black & Veatch, Kansas City, MO.
 2007-2008 Undergraduate Student Researcher University of Florida. Gainesville, FL.
 Aug-Dec 2007 Chemical Engineering Intern, Citgo Petroleum Refinery, Lake Charles, LA.

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

N/A

Additional posters and presentations

2011 – May 2 – 5, 33rd Symposium on Biotechnology for Fuels and Chemicals: “Atomic Force Microscopy , Cellulose Microfibrils Interactions with Cellulases”, Seattle, WA.

2011 – April 2, Biotechnology Training Retreat: “Atomic Force Microscopy to study Cellulose Microfibrils Interactions with Cellulases”, Napa, CA

2011- February 17, CleanStart’s Powersurge Event: “Atomic Force Microscopy to study Cellulose Microfibrils Interactions with Cellulases”, Davis, CA

2011 – January 12 – 13, CREATE Symposium: “Atomic Force Microscopy to study Cellulose Microfibrils Interactions with Cellulases”, Davis, CA

Outreach Activities

2010, October 9, “Expanding Your Horizons” Event at California State University, Sacramento

University Service

2011 NSF CREATE-REU Summer Research Mentor



BIOGRAPHICAL SKETCH

Steven Samuels
Professor Marceline Egnin Laboratory
Email: ssamuels1822@yahoo.com

NAME: Steven Samuels	P.I.(s): Dr. Marceline Egnin TITLE OF DISSERTATION ON RESEARCH: Development of Transgenic Sweetpotato [<i>Ipomoea batatas</i> (L. lam)] Expressing Synthetic Lytic Peptide Genes <i>jc41N</i> and <i>jc41ND</i> as a Plant-based Treatment Regimen against HIV Replication
GRADUATE GROUP Integrative Bioscience	

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Fort Valley State University	BS	12/07	Plant Science/Biotech
Tuskegee University	MS	05/11	Plant and Soil Science

A. Research Focus

Steven is working on the development of transgenic sweetpotato lines expressing synthetic lytic peptides, for potential therapeutic uses. In addition to developing transgenic plants for the biomanufacture of drugs and vaccines in developing countries, Steven is interested in the use of transgenic plants to increase yields and nutrient levels of staple crops.

B. Honors and Awards

Positions and Employment

2009	Professional Agricultural Workers Conference, Tuskegee, AL, 1 st Place Oral Presenter
2011	Professional Agricultural Workers Conference, Tuskegee, AL, 1 st Place Oral Presenter
2011	16th Biennial Research Symposium of the Association of Research Directors, Atlanta, GA, 2 nd Place Oral Presenter

Professional Experience (TAing/Research Internships)

Jul. 2011 IGERT purification lab course
TA of APSC 540, Plant and Animal Biotechnology course

C. Publications and Patents

Samuels, S. Egnin, M. Jaynes, J. (2009). Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen Against HIV. Society for Invitro Biology Meeting. Charleston, SC June 2009. Invitro Cell and Dev. Journal 45 (4)

Samuels, S. Egnin, E. Scoffield, J. Bey, B. Traore, S. Prakash, C.S. Jaynes, J. Jackson, J. (2011). Embryogenesis and Genetic Transformation Of Multiple Sweetpotato [*Ipomoea batatas* L. (Lam)] Cultivars for Enhanced Productivity, Nutritional and Health Values. Proceeding of the National Sweetpotato Collaborators Group Progress Report

Additional posters and presentations

2009 Professional Agricultural Workers Conference, Oral Presentation Title: Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen against HIV Replication

2009 Invitro Biology Meeting, Poster Presentation Title: Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen against HIV Replication

2010 Professional Agricultural Workers Conference , Oral Presentation Title: Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen against HIV Replication

2010-2011 CREATE IGERT SYMPOSIUM, Oral Presentation Title: Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen against HIV Replication

2010 National Sweet potato conference, Oral Presentation

2011 Successful defense of Masters of Science in Plant and Soil Science

2011 16th Biennial Research Symposium of the Association of Research Directors Oral Presentation Title: Development of Transgenic Sweetpotato [*Ipomoea batatas* (L. lam)] Expressing Synthetic Lytic Peptide Genes *jc41N* and *jc41ND* as a Plant-based Treatment Regimen against HIV Replication

Outreach Activities

N/A

University Service

N/A



BIOGRAPHICAL SKETCH

Erica Vonasek
Professor Nitin Nitin Laboratory
Email: elvonasek@ucdavis.edu

NAME

Erica Vonasek

P.I.(s): N. Nitin, PhD

TITLE OF DISSERTATION ON RESEARCH:

GRADUATE GROUP (i.e. Plant Biology)
 Biological and Agricultural Engineering

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of California, Davis	BS	06/10	Biological Systems Engineering

A. Research Focus

Erica has expertise in biopolymer design for the controlled release of bacteriophages and is developing optical imaging systems to monitor the distribution of bacteria and viruses within plant tissues. Her work will have applications across all three focus areas, with emphasis on the use of bacteriophages as biocontrol agents in food and agricultural systems.

B. Honors and Awards

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents .

N/A

Additional posters and presentations

2011 April 21, UC Davis Interdisciplinary Graduate and Professional Symposium, Poster Title: "Encapsulation of Bacteriophages in Biopolymers to Control Food Pathogens in Food", UC Davis

2010 April 19, Undergraduate Research Conference, Poster Title: "Encapsulation of Bacteriophages in Edible Thin Protein Films and Protein Fibers", UC Davis

Outreach Activities

2012	Sheldon High School Biotech Academy Mentor Program
2011	UC Davis CREATE-REU Mentor
2011	Teen Biotech Challenge

University Service

2011	Department of Biological and Agricultural Engineering Holiday Party Planning Committee
2011	NSF CREATE-REU Summer Research Mentor
2012	Department of Biological and Agricultural Engineering Retirement Planning Committee



BIOGRAPHICAL SKETCH

Natasha Worden
Professor Georgia Drakakaki Laboratory
Email: nnworden@ucdavis.edu

NAME Natasha Worden	P.I.(s): Georgia Drakakaki
GRADUATE GROUP (i.e. Plant Biology) Plant Biology	TITLE OF DISSERTATION ON RESEARCH: Studying the Endomembrane Trafficking Processes Involved in Cell Wall Deposition
<small>EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</small>	

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
UC Davis, Davis, CA	Ph.D expected	06/2015	Plant Biology
Smith College, Northampton, MA	BA	05/2008	Biology

A. Research Focus

Natasha is studying the endomembrane trafficking processes involved in cell wall biosynthesis using a chemical genomics approach, which involves using small molecules to alter cell wall and trafficking phenotypes. Cell walls are important in the production of cellulosic ethanol and studying their biosynthesis can lead to improved biofuel feedstocks.

B. Honors and Awards

Positions and Employment

2011 GSR, Dept. of Plant Sciences

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

Worden, N, Girke, T and Drakakaki, G (2012). "Endomembrane Dissection Using Chemical Induced Bioactive Clusters." Methods Mol Biology: Chemical Genomics Protocols (Submitted).

Additional posters and presentations

Worden, N., Drakakaki, G. "Studying the Endomembrane Trafficking Processes Involved in Cell Wall Biosynthesis". Plant Cell Biology Training Program Retreat. September 23, 2011, Monterey, CA.

Worden, N., Drakakaki, G. "Using Chemical Genomics and Confocal Microscopy to Study Endomembrane Trafficking and Cell Wall Biosynthesis". Plant Biology Graduate Group Fall Colloquium. September 15, 2011, Davis, CA.

Worden, N. "Using Confocal Microscopy to Study Endomembrane Trafficking and Cell Wall Biosynthesis". CREATE-REU seminar. July 13, 2011. Davis, CA.

Drakakaki, G. Park, E., Worden, N. et al. Understanding endomembrane trafficking pathways involved in polysaccharide deposition. American Society of Plant Biologists. August 6-10, 2010, Minneapolis, MN.

Outreach Activities

2011	Organized PBGG Fall symposium
2011	CREATE-REU summer internship mentor
2011	Established mentorship program for new students in PBGG department
2011	Gave lab tour to visiting students from Japan

University Service

2011	NSF CREATE-REU Summer Research Mentor
2011-2012	Plant Biology Graduate Group Events Coordinator



BIOGRAPHICAL SKETCH

Tracy Zeng
 Professor Bo Liu Laboratory
 Email: cjzeng@ucdavis.edu

NAME	P.I.(s): Prof. Bo Liu
Cui Jing (Tracy) Zeng	TITLE OF DISSERTATION ON RESEARCH: Cellularization mechanisms in the filamentous fungus <i>Aspergillus nidulans</i>
GRADUATE GROUP (i.e. Plant Biology) Microbiology	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
City College of San Francisco, SF, CA	AA	May 04	Biology
University of California, Davis, CA	BS	June 06	Biochemistry and Molecular Biology

A. Research Focus

My research focuses on identifying components that are important for triggering the onset of cell wall formation using *Aspergillus nidulans* as a model organism. The goal of my studies is to design novel approaches aimed at manipulating filamentous fungi better suited for applications like fermentation and bioremediation.

B. Honors and Awards

Positions and Employment

N/A

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

Ho, C. M., Hotta, T., Kong, Z., Zeng, C. J., Sun, J., Lee, Y. R., & Liu, B. (2011) Augmin plays a critical role in organizing the spindle and phragmoplast microtubule arrays in Arabidopsis. Plant Cell: 23, 2606-18.

Tatebe, H, Morigasaki, S, Zeng, C. J., & Shiozaki, K. (2010) Rab-family GTPase regulates TOR complex 2 signaling in fission yeast. Current Biology: 20, 1975-82.

Kim, J-M*, Zeng, C. J.*, Nayak, T, Shao, R, Huang, A-C, Oakley, B. R., & Liu, B. (2009) Timely septation requires SNAD-dependent spindle pole body localization of the septation initiation network components in the filamentous fungus *Aspergillus nidulans*. Molecular Biology of the Cell: 20, 2874-84. (*Equal contribution)

Zeng, C. J., Lee, Y-R, & Liu, B. (2009). The WD40 repeat protein NEDD1 plays a role in microtubule organization during mitotic cell division in Arabidopsis thaliana. Plant Cell: 21, 1129-40.

Additional posters and presentations

2011 April 2, Biotechnology Training Retreat, Poster Title: "*The Small GTPase SPGA Plays a Critical Role in Septation in the Filamentous Fungus Aspergillus nidulans*", Napa, CA

Kim, H-R, Zeng, C. J., & Liu, B. (2011, March). The small GTPase SPGA plays a critical role in septation in the filamentous fungus *Aspergillus nidulans*. Poster session presented at the 26th Fungal Genetics Conference at Asilomar, Pacific Grove, CA.

Outreach Activities

2011 Bay Area Science Festival

2012 Mentor for high school students in the Hogan High School Biotechnology Academy Program

University Service

N/A



BIOGRAPHICAL SKETCH

Steve Zicari
Professor Ruihong Zhang Laboratory
Email: szicari@ucdavis.edu

NAME

Steve Zicari

P.I.(s): Dr. Ruihong Zhang

TITLE OF DISSERTATION ON RESEARCH:

GRADUATE GROUP (i.e. Plant Biology)
 Biosystems Engineering

Bioenergy production from sugar beets employing
 an integrated bioenergy platform

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Cornell University, Ithaca N.Y.	BS	5/99	Agricultural and Biological Engineering
Cornell University, Ithaca N.Y.	MS	1/03	Biological and Environmental Engineering

A. Research Focus

Steve's research aims to better characterize Energy Beet non-sucrose compositions, study their effects on conversion to fuels and optimize downstream processing steps. Opportunities for upstream genetic plant modifications will also be identified. Steve's research will be conducted as a larger collaborative UCD research effort lead by Dr. Ruihong Zhang aimed at developing advanced biomass and conversion systems for producing biofuels and coproducts with Energy Beets and saline tolerant crops as core feedstocks

B. Honors and Awards

Positions and Employment

2010-2012 Trainee, NSF CREATE-IGERT program, University of California, Davis, Davis, CA
2010-2011 PhD Student, Biosystems Engineering, Agricultural and Biological Engineering,
University of California, Davis, Davis, CA

Professional Experience (TAing/Research Internships)

N/A

C. Publications and Patents

N/A

Additional posters and presentations

2012 Bioenvironmental Engineering Group Meeting, Presentation Title: "Sugar beet to ethanol literature review and preliminary fermentation data results", Davis, CA

Outreach Activities

2011 Tour Leader, Japanese Student Engineering Group, University of California, Davis
2010-2011 Cyber-Buddie Program Mentor, Cordova High-School Polytechnic Academy,
Cordova, CA

University Service

2011 UC Davis Biogas Energy Plant, Tour Guide (Various occasions), University of
California, Davis