

20th Annual CSU Biotechnology Symposium Program

THURSDAY, 10 JANUARY

7:00 – 10:00 PM **Registration, Jewett Foyer**

FRIDAY, 11 JANUARY

7:00 – 9:00 AM **Continental Breakfast, Jewett Foyer**

7:00 AM –
10:00 PM **Registration, Jewett Foyer**

7:00 AM –
8:00 PM **Poster Setup for Poster #1-108, Exhibit Hall West**
All posters numbered #1-108 should be displayed by noon. Posters #1-108 will remain posted through 10:00 P.M. on Friday, 12 January. Posters #23-108 need to be removed between 10:30-11:00 P.M. on Friday, 12 January. *Please see the "List of Posters" (page 56) to determine your poster number.*

10:00 AM–
10:00 PM **Exhibitor and Recruiting Booths Open, Exhibit Hall West**

Special Session, Jewett Ballroom

9:00 AM–
12:25 PM **Interfacing Computer Science and Biotechnology**

Introduction: *Susan Baxter*, Executive Director, CSUPERB

9:15-10:00 AM **Computational Thinking and Thinking about Computing**
Jeannette Wing, Assistant Director, Directorate for Computer Information, Science and Engineering (CISE), National Science Foundation

Abstract: My vision for the 21st Century: Computational thinking will be a fundamental skill used by everyone in the world. To reading, writing, and arithmetic, let's add computational thinking to every child's analytical ability. Computational thinking has already influenced other disciplines, from the sciences to the arts. The new NSF Cyber-enabled Discovery and Innovation initiative in a nutshell is computational thinking for science and engineering. Realizing this vision gives the field of computing both exciting research opportunities and novel educational challenges.

The field of computing is driven by technology innovation, societal demands, and scientific questions. We are often too easily swept up with the rapid progress in technology and the surprising uses by society of our technology that we forget about the science that underlies our field. In thinking about computing, I have started a list of "Deep Questions in Computing," with the hope of encouraging the community to think about the scientific drivers of our field.

10:00-10:45 AM Computational Multi-scale Modeling in Protein-ligand Docking

Michela Taufer, Assistant Professor, Department of Computer and Information Sciences, University of Delaware

In biological systems, the binding of small molecule "ligands" to proteins is a crucial process for almost every aspect of biochemistry and molecular biology. Understanding the 3D atomic details of specific protein-ligand interactions has become increasingly important in the development of novel pharmaceuticals. Because a conventional experimental approach is very expensive (time, money, people, resources), a theoretical/computational method known as "protein-ligand docking" is increasingly used to augment the experimental approach. Computationally expensive docking models may be optimized for accuracy for difficult test cases, but may not improve results for simple test cases.

In this talk we will present a multi-scale approach to protein-ligand docking in which increasingly sophisticated *docking models* can be constructed along three scales of docking assumptions: (1) representation of the protein and ligand (potential energy function and flexibility of protein and ligand); (2) representation of the effect of solvent; and (3) sampling strategy. We will show how the overall efficiency of protein-ligand docking simulations can be increased by considering dynamic adaptations of the models along these multiple scales. Using classifications of protein-ligand complexes based on the flexibility of protein and ligand, docking models can be dynamically adapted for better accuracy when more expensive models are required. These classifications can be used to start an iterative search for adaptive docking models that optimize accuracy and minimize time to solution.

The proposed computational approach is being used to develop a Dynamically Adaptive Protein-Ligand Docking System (DAPLDS), which is able to dynamically adapt to an appropriate docking model for new protein-ligand complexes or a large series of ligands. An exploration of the proposed multi-scale parameter space requires an enormous amount of computer resources. We meet this computational challenge by means of the immense idle computing power that can be harnessed through the Internet: our project Docking@Home uses the "volunteer computing" resources owned by the general public for the protein-ligand docking simulations. Given a variety of docking tasks, dynamic scheduling policies can select available resources based on computational expense to improve project throughput. We will present results that demonstrate the effectiveness of our approach.

10:45-11:00 AM Morning Break**11:00-12:25 PM CSU Perspectives:**

Katherine Kantardjieff, California State University, Fullerton

Computing for Life Sciences at SFSU

Dragutin Petkovic, Christopher Smith & Mike Wong, San Francisco State University

Nicholas Kioussis, California State University, Northridge

Cyberinfrastructure for Interdisciplinary Research

William Thiebault, California State University, East Bay

Poster Preview

12:00-10:00 PM Posters #1-108 are Available for Preview, Exhibit Hall West

12:30-1:45 PM Lunch, Exhibit Hall East

Afternoon PSM Workshop, Calvin Simmons Ballroom**2:00–5:15 PM Professional Science Master’s (PSM) Workshop: What is a PSM, What is the Role of the PSM in California, and What are the Keys to Success of these Innovative Master’s Degree Programs in the Sciences?**

The purpose of the workshop is to provide a thorough overview of the Professional Science Master's degree, its role in California, and the keys to success in implementing these innovative Master's degree programs in the sciences. Presenters will describe the distinctive attributes of PSM programs and their objectives of offering rigorous preparation in the sciences that prepares graduates for the high growth industrial sectors in California, with particular attention to their role in biotechnology and related fields. Effective practices in program development, employer partnerships, candidate recruitment, and internships will be discussed. In addition, challenges faced in establishing programs and best practices for addressing these challenges will be explored. Perspectives from CSU and the Keck Graduate Institute will be provided, as well as a national perspective by one of the architects of the PSM, who has worked with the Alfred P. Sloan Foundation in advancing these programs.

Moderator: *Beth Ambos*, Assistant Vice Chancellor for Research and Partnerships, CSU Office of the Chancellor

Presenters:

Greg Dewey, Director, PSM Programs, Keck Graduate Institute

Ching-Hua Wang, Director, PSM, Biotechnology, California State University, Channel Islands

Shirley Kovacs, Director, PSM, Biotechnology (Agriculture), California State University, Fresno

Stephen Crothers, Director, PSM, Clinical Trials Management, San José State University

Responders:

Bob Koch, Director, PSM, Biotechnology, California State University, Fullerton

Faramarz Valafar, PI, CSU System-wide Professional Science Master’s Project

Sheila Tobias, Consultant on PSM System Adoptions, Alfred P. Sloan Foundation

Afternoon Student Career Networking Session, Jewett Ballroom**2:00–5:15 PM Student Career Networking Session: What Career Paths in Biotechnology are Available to You with Your Bachelors’ or Master’s Degree?**

MC: *Sherri Petro*, President, VPI Strategies

Stephen Betz, Associate Director, Endocrinology and Metabolism, Neurocrine Biosciences

Bonnie Black, Career Counselor, Career Development Center, California State University, East Bay
Georgette Castanedo, Senior Research Associate, Genentech
Marshall Cool, Associate Director of Clinical Development, Abbott Vascular
Jennifer Cygan, Senior Manager, Business Development, Genentech.
Roberto Espinosa, Amgen
Simon Forder, Vice President of Business Development and Strategic Planning, JM Hyde Consulting, Inc.
Judith Kjelstrom, Director, Biotechnology Program, and Advanced Degree Program, Co-Director, HHMI-Integrating Medicine into Basic Science (IMBS) Training Program, and Program Coordinator, Designated Emphasis in Biotechnology & NIH Training Program in Biomolecular Technology, University of California, Davis
Cris McReynolds, President and CEO, Satoris, Inc.
Susana Moraga, Career Counselor, Career Development Center, California State University, East Bay
Scott Mortimer, Director of Marketing, PDL BioPharma, Inc.
John O'Banion, Managing Partner, O'Banion & Ritchey LLP
Guido Palermo, Senior Manager, Downstream Operations, Amgen
Jim Ritchey, J. D., Ph.D., Biochemistry Professor and Patent Attorney, CSU, Sacramento
Clay Seese, Mechanical Engineer, CRB Partners
Joel Schneider, Associate Professor, Department of Chemistry and Biochemistry and Department of Materials Science and Engineering, University of Delaware
Declan Shehan, General Manager Western Region, CRB Partners
Shannon Stoddard, Vice President Clinical Services and Data Management, Promedica International
Michelle Youngers, President and CEO, SCIENCEMEDIA.
Margaret Wong, Recruiter, Abbott Vascular

3:30–4:00 PM ***Mid-afternoon Break, Exhibit Hall West***

5:30–6:45 PM ***Dinner, Exhibit Hall East***

Evening Cyberinfrastructure Discussion, Calvin Simmons Ballroom 1

7:00–8:00 PM **CSU Cyberinfrastructure Discussion**

Organizer: *Spiros Courellis*, California State University, Fullerton

Evening Curriculum Workshop, Calvin Simmons Ballroom 2 and 3

7:00–8:00 PM **Real World Curriculum: Stem Cell Laboratories**

Moderator: *Jeffery Thompson*, Associate Provost for Research, California State University, San Bernardino

Panelists:

Nilay Patel, California State University, Fullerton

Janey Youngblom, California State University, Stanislaus

Valerie Albano, Merced College

Evening Workshop, Calvin Simmons Ballroom 4

- 7:00–8:00 PM **Integrating Hands-on Biotechnology into the Classroom**
Essy Levy, Curriculum and Training Specialist, Bio-Rad Biotechnology Explorer Program.
Bio-Rad's Biotechnology Explorer program is for educators seeking to provide their students with the very best hands-on molecular biology experiences. Our mission is to provide the highest quality biotechnology kits and curricula with hands-on applications that capture students imaginations, light up their inquisitive minds, and entice them to explore the science and issues behind biotechnology. Join us for an overview of the program and hear about our newest activity extensions such as Quantitative Real-Time PCR applications and the Comparative Proteomics Kit II: Western Blot Module. Prepare your students to enter the workforce by giving them the right tools!

Late Evening Activities, Exhibit Hall West

- 8:00–10:00 PM **Wine and Cheese Reception and Poster Viewing**
- 8:15–9:30 PM **Presentation of Posters #1-108**
Authors of posters #1-108 must be present from 8:15-9:30 PM during the poster session. The time before and after presentations is available to informally view posters. *Please see the "List of Posters" (page 56) to determine your poster number.* Please remove posters #23-108 between 10:30 and 11:00 PM.

Special Presentations (both evenings):

Posters from students nominated for the Glenn M. Nagel Undergraduate Student Research Award, the Howell-CSUPERB Research Scholar Award, and the Don Eden Graduate Student Research Award will be displayed on both Friday, January 11, and Saturday, January 12.

Glenn Nagel Undergraduate Student Research Award Nominees and Recipient, Posters #1-6

Howell Foundation-CSUPERB Research Scholar Nominees and Recipients, Posters #7-13

Don Eden Graduate Student Research Award Nominees and Recipients, Posters #14-22

SATURDAY, 12 JANUARY

7:00–9:00 AM ***Continental Breakfast, Jewett Foyer***

7:00 AM–
10:00 PM **Registration, Jewett Foyer**

7:00 AM –
12:00 PM **Poster Setup for Posters #1-22 and #109-194, Exhibit Hall West**
All posters numbered #1-22 and #109-194 should be displayed by noon. Posters will remain posted through 10:00 P.M. on Saturday, 13 January. Posters need to be removed between 10:30-11:00 P.M. on Saturday, 13 January. *Please see the “List of Posters” (page 56) to determine your poster number.*

10:00 AM–
6:00 PM **Exhibitor and Graduate School Recruiter Booths Open, Exhibit Hall West**

Plenary Session, Jewett Ballroom**“Current Applications of Protein Engineering”**

9:00–9:30 AM **Introduction:** *Stephen L. Weber*, President, San Diego State University

Welcome: *Charles B. Reed*, Chancellor, California State University

CSUPERB Legislator of the Year Award:
Senator Ellen M. Corbett, Tenth Senate District

Presenter: *Mohammad “Mo” H. Qayoumi*, President, CSU East Bay

Plenary Session Introduction: *Susan Baxter*, Executive Director, CSUPERB

9:35–10:05 AM **Antibody Engineering for Enhanced Immune Effector Function**
John Desjarlais, Vice President of Research, Xencor, Inc.
Fc gamma receptors on immune effector cells play a critical role in mediating the anti-infective or anti-tumor effector functions of natural or therapeutic antibodies. We have used state-of-the-art computational protein engineering tools and automated screening to generate and characterize thousands of amino acid variants of the antibody Fc domain. The effort has yielded a suite of variants with a variety of clinically desirable properties, including enhanced cytotoxicity against target cells, prolonged *in vivo* half-life, and immune system suppression. I will discuss application of these variants to generate clinical candidates for treating various oncological and autoimmune diseases.

10:10–10:40 AM **D-peptide Inhibitors of HIV Entry**
Michael Kay, Assistant Professor of Biochemistry, University of Utah
During HIV-1 entry, the highly conserved gp41 N-trimer pocket region is transiently exposed and vulnerable to inhibition. Using mirror-image phage display and structure-

assisted design, we have discovered protease-resistant D-amino acid peptides (D-peptides) that bind the N-trimer pocket with high affinity and potently inhibit HIV entry. High-resolution crystal structures of two of these D-peptides in complex with a pocket mimic suggest sources of their high potency. One of these peptides is the most potent pocket-specific entry inhibitor yet reported by three orders of magnitude ($IC_{50} = 250$ pM). These results show that D-peptides can form specific and high-affinity interactions with natural protein targets and strengthen their therapeutic promise. The D-peptides described here address limitations associated with current L-peptide entry inhibitors and are promising leads for the prevention and treatment of HIV/AIDS.

10:45–11:15 AM **Break, Exhibit Hall West**

11:15–11:45 AM **Peptide-based Materials as Therapeutics**

Joel Schneider, Associate Professor, Department of Chemistry and Biochemistry and Department of Materials Science and Engineering, University of Delaware

We are developing peptide-based hydrogels, heavily hydrated materials that are finding use as extracellular matrix substitutes and in the delivery of therapeutics such as small molecules, biomolecules and cells. For example, peptides can be designed to undergo sol-gel phase transitions in response to biological cues. This allows peptide solutions to be delivered in a minimally invasive manner to an *in-vivo* site where subsequent gelation takes place. Alternately, hydrogelation can be triggered *ex-vivo* in the presence of a therapeutic such as stem cells. In this case, gels become impregnated with cells and can serve as a delivery vehicle. A unique characteristic of these gels is that when an appropriate shear stress is applied, the gel will shear-thin, becoming an injectable low viscosity gel. However, after the application of shear has stopped, the material quickly self-heals producing a gel with mechanical rigidity nearly identical to the original hydrogel. This attribute allows therapeutic-impregnated gels to be delivered to target tissues via syringe/catheter where they quickly recover complementing the shape of the tissue defect. If cells have been impregnated into the gel, this shear-thin delivery method is a convenient way to introduce cells to wound sites to aid healing.

11:50AM–
12:20 AM

Looking to Nature to Make Nature Better: Enzyme Discovery and Evolution for the Development of Green Processes

David Weiner, Associate Director, Enzyme Technology, Verenum Corporation

Approximately 3.5 billion years of evolution has led to the extraordinarily varied microbial biodiversity that exists on our planet. The genes of these myriad organisms represent one of the earth's greatest riches. We have developed technologies to generate metagenomic libraries from diverse microbial habitats and to screen these libraries for novel enzymes. Enzymes are of interest because they catalyze reactions with extremely large rate enhancements and can offer exquisite selectivity. In this presentation I will describe some of our recent work on the discovery, evolution, and commercial application of a variety of enzyme products for use in animal feeds, human food, industrial processes, and pharmaceuticals. By unlocking the secrets of untapped microbial genomes we have discovered new and versatile enzymes. Realizing value from biodiversity makes for a sustainable business and also provides a compelling argument for the preservation of the world's natural habitats.

12:30–1:45 PM **Lunch, Exhibit Hall East**

Poster Preview

12:00–10:00 PM **Posters #1-22 and #109-194 are Available for Preview, Exhibit Hall West**

Awards Session: Lectures and Presentations, Jewett Ballroom

Session Chair: *Susan Baxter*, Executive Director, CSUPERB

Don Eden Award Nomination Presentations

- 2:00–2:15 PM **Proteomic Response of the Sea Urchin *Strongylocentrotus purpuratus* Embryo to Ultraviolet Radiation (Poster #14)**
Joseph Campanale, Department of Biological Sciences, California Polytechnic State University, San Luis Obispo
- 2:15–2:30 PM **Application of Synthesis-Based Direct Sequencing as a Global Assay for ChIP in Large Genomes (Poster #15)**
Gordon Kwan, Department of Biological Sciences, California State University, Los Angeles
- 2:30–2:45 PM **Optimized Natural HIV-1 Entry Inhibitors Are Active Against an Amyloid Peptide (Poster #16)**
Andy Lee, Department of Chemistry, California State Polytechnic University, Pomona
- 2:45–3:00 PM **Can Northern Anchovies (*Engraulis mordax*) serve as paratenic hosts for the parasitic protozoan, *Toxoplasma gondii*? (Poster #18)**
Gloeta Massie, Department of Biological Sciences, California Polytechnic State University, San Luis Obispo
- 3:00–3:15 PM **Protection of BALB/c Mice Challenged with H1N1 Influenza Virus Following Vaccination with Liposomal H1N1 Hemagglutinin (L-HA/H1N1) or Liposomal H1N1 M2e (L-M2e/H1N1) (Poster #19)**
Meilen Munoz, Department of Biological Sciences, California State Polytechnic University, Pomona
- 3:15–3:30 PM **Segmentation of Large Periapical Lesions toward Dental Computer-Aided Diagnosis in Cone-Beam CT Scans (Poster #20)**
Steven Rysavy, Department of Computer Sciences, San Francisco State University
- 3:30–4:00 PM **Afternoon Break, Exhibit Hall West**
- 4:00–4:45 PM **2007-2008 Biotechnology Faculty Research Award Lecture**

How does a virus that causes a respiratory tract infection become a virus that causes a systemic infection?

Nancy McQueen, Biological Sciences, California State University, Los Angeles

Presenter: *Sandy Sharp*, Biological Sciences, California State University, Los Angeles

4:45-5:25 PM

Special Recognition of 2007 Howell-CSUPERB Nominees and Scholars

A listing of Howell-CSUPERB Student Research Fellows can be found on page 36.

Presenter: *Jean Lunsford*

Crellin Pauling Student Teaching Award: *Molly Klein-McDowell*, Biology, San Francisco State University

Presenter: *Kay Pauling*

Announcement and Presentation of the Glenn Nagel Undergraduate Student Research Award

Introduction: *Marcelo Tolmasky*, Biological Sciences, California State University, Fullerton

Presentation: *Greta Nagel*

Announcement and Presentation of the Don Eden Graduate Student Research Award

Introduction: *Nick Ewing*, Biological Sciences, California State University, Sacramento

Presentation: *Lisba Fowler*

Andreoli Biotechnology Faculty Service Award: *Alejandro Calderon-Urrea*, Biological Sciences, California State University, Fresno

6:00–7:15 PM

Dinner, Exhibit Hall East

Late Evening Activities, Exhibit Hall West

8:00–10:00 PM

Wine and Cheese Reception

Poster Viewing

8:15–9:30 PM

Presentation of Posters #1-22 and #109-194

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Special Presenters (both evenings):

Glenn Nagel Undergraduate Student Research Award Nominees and Recipient, Posters #1-6

Howell Foundation-CSUPERB Research Scholar Nominees and Recipients, Posters #7-13

Don Eden Graduate Student Research Award Nominees and Recipients, Posters #14-22

9:40 PM

Exhibition Raffle

Open to all attendees who complete an exhibition raffle ticket. Must be present to win.

9:50 PM

Student Raffle

Raffle for students attending scheduled events. Scanning your badge at all sessions makes you eligible for special raffle items.

SUNDAY, 13 JANUARY

CSUPERB Faculty Consensus Group Meeting, Calvin Simmons Ballroom
[Agenda]

| | |
|----------------|------------------------------|
| 7:00–7:45 AM | Continental Breakfast |
| 7:45 AM | Call to Order |
| 8:00–11:45 AM | Meeting |
| 11:45–12:45 PM | Lunch |
| 12:45–2:00 PM | Meeting |
| 2:00 PM | Adjourn |

California Community College Biotechnology Faculty Meeting, California Ballroom

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|---------------|--|
| 7:30–9:00 AM | Continental Breakfast, Arrival and Registration |
| 9:00–12:00 AM | Update on “The New Genetics” Project <i>Sally Tobin</i> , Senior Research Scholar, Stanford Center for Biomedical Ethics and Author of Twisted Ladder Media. Dr. Tobin will report on the response from the grant submitted to the National Science Foundation, which requested funds for the next steps after the Pilot Project. |
| 12:00–1:00 PM | Networking and Lunch |
| 1:00–4:00 PM | Perspectives on Biotech and Nanotech Convergence – What Does this Mean for Lab and Classroom Instruction. |
| 4:00 PM | Adjourn |