



# BIOTECHNOLOGY TIMES

July 2004

A quarterly newsletter from the UC Davis Biotechnology Program

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Also posted at: [www.biotech.ucdavis.edu](http://www.biotech.ucdavis.edu) and [www.deb.ucdavis.edu](http://www.deb.ucdavis.edu)

## A Letter from our Director:

Welcome to our first official program newsletter of the new millennium. We plan to publish this on a quarterly to semi-annual basis, so that our faculty, students, industry affiliates and other interested groups will stay abreast of all of our activities. The UC Davis Biotechnology Program was created in 1986 by Dr. Charlie Hess, a visionary scientist in the College of Agriculture & Environmental Sciences. He appointed Dr. Tsune Kosugi as the first Director, who unfortunately passed away in 1988 (Monsanto honors his memory each year with the Kosuge Lecture). The program then took shape under Dr. Roy Doi, when the first NIH Biotechnology Training Grant was awarded, and in the mid-90's Martina Newell McGloughlin served as Director and created many of the existing programs. As of 2004, the vision is being realized and the Program is part of the core units of the Office of Research. It currently serves as the administrative home of the NIH Training Grant in Biomolecular Technology, the DEB graduate program and the ADP. This edition of the newsletter features interviews with some of our outstanding pre-doctoral students in the biotechnology training program. They are truly impressive scholars. We are also very proud our recent review of the DEB program (yes, the DEB is 7 years old!) and want to share a summary of the report by Graduate Council. In addition, the Program continues as a source of technology education for K-14 teachers and students as well as government officials. We would love to get your feedback. Is this valuable? What other topics should we cover?

With warmest regards, Judy Kjelstrom

## PICNIC DAY – April 17, 2004

The Biotechnology Program, along with the Center for Engineering Plants for Resistance Against Pathogens (CEPRAP), represented by Barbara Soots and Linda Curro, showed once again that Biotechnology is a hot topic with the annual Picnic Day crowd. While the people from CEPRAP demonstrated DNA extractions from strawberries for many excited youngsters, the Biotechnology Program conducted their own cheese-making and assays. Dr. Judy field questions and a b o u t while Jennifer Lee also helped in the they even provided workers from with the strawberry the end of the day.



DEB student Michael Kareta shows some future scientists how to make cheese.

experiments in blue-jean dye was there to help to get people excited Biotechnology, and Erica Chédin demonstrations – relief to the hard CEPRAP by helping DNA extractions at

Many thanks to the following companies for their generous donations: Genentech, Monsanto, Agilent Technologies, Scios, Novozymes Biotech, Inc., Invitrogen, and Roche. The t-shirts, other apparel, mugs, pens and gadgets they supplied for us were gone by the end of the day! Another big thank you for our student volunteers: Aminah Ikner, Anh Phung, Allison Dickey, Viyada Kunathigan, Scott Wong, Michael Kareta, Laura Higgins, Ryann Muir, and Wenshe Liu.

## 13<sup>th</sup> ANNUAL BIOTECHNOLOGY TRAINING RETREAT

Another successful retreat was enjoyed by all attendees at the Christian Brothers' Retreat Center in Napa Valley on March 27, 2004. The weather was beautiful, and the setting was absolutely lovely to enjoy learning about the research being conducted by our training fellows, as well as by some of the Biotechnology firms that were represented. Dr. Martina Newell-McGloughlin, the co-director for the Biotechnology Training Grant and director of the UC Biotechnology Research and Education Program, started out the day with an introduction to the retreat, and was clearly thrilled with the fact that the retreat she first held back in 1991 was now seeing its 13<sup>th</sup> year. We were honored that the vice-chancellor for research, Barry Klein, attended the event and stayed for the whole weekend. Additionally, professors Abhaya Dandekar and George Breuning chaired the morning and afternoon sessions, respectively.

We were impressed with the quality of research by our fellowship recipients and their preceptors: Craig Blanchette (Dr. Marjorie Longo lab); Scott Wong (Drs. Kit Lam and Earl Sawai labs); Chad Green (Dr. Scott Simon lab); Amanda Ellsmore-Fisher (Dr. Clark Lagarias lab); Larry Joh (Dr. Jean VanderGheyst lab); and Bob Ward (Dr. Bruce German lab). On the Industry side of the program, excellent presentations were given by: Dr. Stephen Brown (Novozymes Biotech, Inc.), Dr. John Purcell (Monsanto), Dr. Edward "Eddie" Moler (Chiron Corporation), Dr. Tim Osslund (Amgen, Inc.),



Fellows & their preceptors for the 2003-2004 academic year.

and Dr. David Hirschberg (Agilent Technologies). Dr. John Yoder provided everyone with an intriguing bioethics question for all to digest over lunch concerning the possibility for bias in industry-funded research, which was followed by an interesting and educational discussion.

We also had some excellent poster presentations given by students in the DEB Program: Alberto B. Iandolino (Dr. Doug Cook lab), Wade Reh (Dr. James Murray lab), Ze He (Dr. Michael Toney lab), Wenshe Liu (Dr. Michael Toney lab), and Anh Phung (Dr. Jason Eiserich lab). Other presenters were: Alexey Tomilov (Dr. John Yoder lab), and the laboratory of Dr. Angelique Louie presented a joint poster together. In all, over 80 people were in attendance, including a large group of faculty and students from Merced College.

## NEW TRAINEE FELLOWSHIP RECIPIENTS

We are pleased to announce the recipients of our graduate biotechnology trainee fellowships for the 2004-2005 school year! The choice was extremely difficult this year, as all 24 applicants were outstanding candidates. We would also like to express our gratitude to Monsanto and Scios, Inc. for providing the funding for two of our biotechnology fellowships.

### NIH-funded trainees

**Craig Blanchette**, in the laboratory of Dr. Marjorie Longo (Department of Chemical Engineering), is working on the Nano-Structuring of Receptors in Supported Lipid Bilayer Membranes for Optimized Interaction with Proteins. He hopes to use this technique for understanding the mechanism by which HIV infects cells. Craig has been selected for the second year in a row as one of our NIH fellowship recipients. He was also a recipient of a biotechnology fellowship during his first year on campus.

**Gian Oddone** is pursuing his thesis research in the laboratory of Dr. David Block (Department of Viticulture and Enology), and he is focused on studying the Expression of Recombinant Vaccine in *Lactococcus lactis*. His graduate work aims at developing a protein expression technology that will be critical to the development of orally-delivered vaccines. Gian is a new NIH Biotechnology fellowship recipient and will begin his second year of study this fall.

**Daniel Scott** is a 4<sup>th</sup> year graduate student in the laboratory of Dr. Michael Toney (Department of Chemistry), and his thesis project involves Improving Electron Flow from NAD(P)H to Electrodes for Bio-fuel Cell Applications. He hopes to advance the development of enzyme-based fuel cells with his research. This is the first year that Daniel has received the NIH Biotechnology fellowship.

**Alan Szmodis** studies Functional Lipid Microarrays for High Throughput Assays of Protein Crystallization under the direction of Dr. Atul Parikh (Department of Applied Science). Alan's research will help to develop high throughput assays for protein crystallization, which currently can be a rather cumbersome process. This is Alan's first year as a recipient of the NIH Biotechnology fellowship, although he did receive a first year Biotechnology fellowship in 2003-04.

**Robert Ward** is interested in the Metabolism and Functions of Human Milk Oligosaccharides, and he carries out his research in the laboratory of Dr. Bruce German (Department of Food Science and Technology). Bob's research is focused on investigating the nutritional value of human milk, and how it can confer a phenotypic advantage to young infants. This is Bob's second year as a Biotechnology fellow, but his first as a NIH biotechnology training grant recipient.

### Biotechnology Fellows: Campus or Industry-Funded

**Scott Wong** is studying the Identification of Small Molecule Inhibitors for the Simian Immunodeficiency Virus Nef/p21-Activated Kinase Interaction. He works under the direction of both Drs. Kit Lam and Earl Sawai, in the Department of Medical Pathology. Scott's research aims to understand the process of HIV pathogenesis using the SIV model, in order to help develop therapeutic agents to help fight HIV in infected patients. Scott was a recipient of the NIH training grant fellowship for two years in a row, and is now the recipient of the Biotechnology fellowship.

**Kristin Adair Hicks** is in the laboratory of Dr. Kate Scow (Department of Land, Air and Water Resources), and is studying High Sensitivity, Fluorescent Nanoparticles for

Detecting MTBE-degrading Genes in Environmental Samples. Her research will provide important information for the bioremediation of environmental contaminants. She was previously a trainee on a NEAT IGERT multidisciplinary fellowship, and this is her first year as one of our Biotechnology Program fellowship recipients.

**Robin GrayMerod** studies Plasmid DNA Uptake by Biofilms: Facilitating the Bioaugmentation of Wastewater Treatment in the laboratory of Dr. Stefan Wuerzt (Department of Civil and Environmental Engineering). Robin's research aims to improve the quality of water released into the environment from wastewater treatment plants. This is Robin's first year as a recipient of our Monsanto-funded training grant.

## BIOTECHNOLOGY FIRST-YEAR FELLOWSHIPS

Every year the Biotechnology Program awards one-year fellowships to outstanding incoming graduate students from a variety of disciplines (Division of Biological Sciences and the College of Engineering) on the UC Davis campus. This year we selected the following four fellows to receive this honor. Douglas Huseby (Biochemistry and Molecular Biology) and Kiem Vu (Cell and Developmental Biology) were chosen from the Division of Biological Sciences. Vannarith M. Leang (Chemical Engineering and Materials Science), and Robin Lin (Electrical and Computer Engineering) will be our Engineering fellows.

## ADVANCED DEGREE PROGRAM (ADP) FOR CORPORATE EMPLOYEES

The ADP began in 1994 as a means to increase academic-industry interactions. Outstanding employees could earn a Ph.D. at UC Davis without quitting their jobs at a biotechnology company. This was an outgrowth of the Biotechnology Training program, which requires UCD graduate students to spend 3-6 months at a biotechnology company. We currently offer five majors within DBS: Biochemistry & Molecular Biology; Cell & Developmental Biology, Genetics; Molecular, Cellular & Integrative Physiology and Plant Biology. The program has been successful since 1994 and we three students from the



department of Biochemistry and Molecular Biology. This year we welcome a new participant from Berlex Biosciences, Inc. and two new mentors to the program. The ADP is structured as follows: Dr. Judy Kjelstrom serves as the Director, and the ADP Advisory

Committee consists of: Prof. Carol Erickson, Chair & Assoc. Dean, DBS; Prof. John Harada, Plant Biology; Prof. J. Clark Lagarias, Biochemistry & Molecular Biology; Prof. James Murray, Animal Science; Prof. John Payne, Molecular, Cellular & Integrative Physiology; Prof. Lesilee Rose, Cell & Developmental Biology; Prof. Martina Newell McGoughlin, UC BREP (ex officio); and Dawne Shell, DBS Graduate Group Complex (ex officio).

Our new ADP participant and mentors are: David Kiewlich, Berlex Biosciences (new student in CDB for Fall 2004), Dr. Deborah Zajchowski, Berlex Biosciences (corporate mentor), Prof. Larry Hjelmeland, UC Davis mentor. Our continuing ADP Students and mentors are: Mariah Connelly and Dr. Alan Sloma (Novozymes Biotech, Inc.), Prof. Glenn Young, UC Davis mentor (BMB graduate group), Richard "Rick" Fitch and Dr. Gabor Rubanyi (Berlex Biosciences), Prof. Jack Rutledge, UC Davis mentor (MCIP graduate group), Katherine "Kathy" Tran and Dr. Gordon Parry (Berlex Biosciences), Prof. Bruce Hammock, UC Davis mentor (Dept. of Entomology).

ADP students were given an opportunity to share their experiences at our annual luncheon in June. The ADP is hoping to expand to more campus units, so that we can offer a wider variety of majors to our industry partners.



## BIOTECHNOLOGY INTERNSHIPS

As part of the Biotechnology Program, students wanting to obtain a Designated Emphasis in Biotechnology (DEB) alongside their Ph.D.'s need to complete a biotechnology internship. We have several students that have already completed their 3-6 month internships, and a few that are just about to embark upon theirs. A handful of students were able to take time out of their very busy schedules to chat with me about their internship experiences and hopes for the future: Ryann Muir, who was an intern at Genencor; Scott Wong, who was about to start an intership at Scios; Edwin Haghazari, who was an intern at Scios; and Chad Green, who completed his internship at ICOS.



Each of the students I talked to enthusiastically endorsed the internship experience, and they clearly thought that it was an important part of their scientific journey to be able to experience research in an industry setting, as opposed to only an academic setting.



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Ryan Muir commented, "Seeing the final end-products and the different things you can do [in a company] is more beneficial, as you can see the real-world applications of your work." For Ryann,

although her internship research was not directly applicable to her thesis work, she still gained valuable experience into methods of biochemical purification of proteins and assaying them for different properties, which she was able to apply to her thesis research.

For Chad Green, the experience was dually beneficial for his internship as well as for his thesis project, as he was able to continue his thesis research throughout his internship at ICOS due to collaboration between his thesis advisor and the company. Chad appreciated his  internship and said, "Working at a  company showed me a more professional environment, that in many ways was more smoothly-run than academia." In addition, he commented that "Being able to do my internship on the same topic as my thesis research was very important," as he didn't have to stop his thesis work for three months. Edwin Haghazari was in the same situation at Scios. Edwin says, "My thesis project was very much related to my internship research. It is nice to follow up on [my thesis work] and see the clinical applications." In addition, Edwin describes the internship experience as "Nothing but rewarding. I have talked to so many scientists here that have worked in industry for a number of years. This interaction is really great for recent Ph.D. graduates who are interested in pursuing an industry career but are not sure what it is like. You get plenty of opportunity to ask questions."



Scott Wong, who was about to embark upon his internship at Scios, was conflicted but enthusiastic about the experience. He was excited to work in a new environment, and to see the inner-workings of a biotech company, but at the same time he was a bit hesitant because his internship work was not directly related to his thesis work, and he thought it might be difficult. He commented to me, "I would like to say that at first, I was reluctant to do my internship, because I

didn't want to stop my research. However, on the eve of starting my internship, I am really excited ... to try new things." He continued, "The best part is that this internship will allow me to experience a new work environment, meet new people and work with a new research topic," Scott said. "Hopefully this internship will be like a working sabbatical, and I will come back to UC Davis refreshed and ready to do research."

One topic the students were unanimous about was whether or not they would like to work for the companies where they completed their internships. Scott commented, "I will most likely go into industry after graduation, so I would like to go to Scios when I get my Ph.D." Ryann is also keeping in contact with the people she met at Genencor. "Having contacts definitely helps you to get a job. Although you have to make an effort to keep in contact with people, it is definitely worth it." Although she is currently working to finish her thesis project, she also said she would like to work for Genencor, if possible. Chad Green echoed these sentiments and added, "Hopefully there will be a possibility to work at ICOS. Doing the internship definitely made getting a job easier." Chad has already received his Ph.D. but is currently working as a postdoctoral researcher for his thesis advisor while he awaits the graduation of his wife, also a Ph.D. candidate. The greatest success story so far came from Edwin. "If given the opportunity," said Edwin, he would definitely work for Scios. In fact, his wish was granted: Edwin was offered and accepted a postdoctoral position at Scios this spring.

**Other companies where internships have been completed by DEB students include:**



## DEB Program 7-year Review

This year the Designated Emphasis in Biotechnology (DEB) program underwent a 7-year review of its strengths and weaknesses, which generated much praise as well as a few suggestions for improvement. The Graduate Council initiated the review of the DEB on August 11, 2003. As the DEB was formally established in 1997, this was the first review of the DEB program. Materials used in this review included the DEB's self-review package and responses of graduate students and faculty members to confidential questionnaires. The review was conducted by Professor R. Paul Singh (Biological and Agricultural Engineering), the Peer Review Council (PRC) liaison. Prof. Singh spent April 20<sup>th</sup> and 22<sup>nd</sup>, 2004, meeting with 50 faculty members, 30 graduate students, members of the Executive committee, and the chair of DEB.

At the time of the review, the DEB consisted of 96 faculty from 23 graduate programs. During the 7-year review period, there has been a remarkable increase in student enrollment. Approximately 20 students were enrolled in the DEB in 1999; as of 2003, there were 57 students representing 20 graduate programs. As of December 2003, 14 students have graduated with a DEB notation on their diplomas.

Prof. Singh described the DEB as a very successful and well functioning DE, as indicated in the PRC report. He stated that it truly meets the multidisciplinary aspects expected of DE programs. The students and faculty collaborate through the range of DEB activities (e.g. the retreat and seminars) and especially the industry-based internships. The strengths of the DEB included: ability to attract highly talented students from a wide range of graduate groups; a high quality of student mentoring as provided from the program coordinator (help in finding internships, preparing curricula vitae, and placing students in jobs), as well as easily-accessible and up-to-date information located on the website ([www.deb.ucdavis.edu](http://www.deb.ucdavis.edu)); promoting collaboration among students and faculty through seminars, retreats, and "chalk-talks"; promoting collaboration among students and faculty, as well as providing good networking opportunities for students and faculty to interact with scientists in the biotechnology industry; and providing the beneficial industrial internship program to students.

The recommendations for the DEB included: appointing a student representative to the DEB's executive committee; developing written guidelines for DEB faculty, who serve on the student's Ph.D. qualifying exam committees; offering the MCB course every year to prevent unnecessarily extending students' time in graduate school; and having a more rigorous faculty membership review process.



## Spring/Summer/Fall Outreach and Other Events

During the school year as well as during the summer, the Biotechnology Program is involved in a variety of outreach events, as well as planning our summer short courses. Here is a highlight of some of our latest and upcoming activities.

### Healthwise (an NIH funded project) - May 1, 2004

Dr. Kjelstrom made a presentation to thirty 2nd and 5th Grade Teachers at the University of the Pacific in Stockton on how Biotechnology Relates to Health: Biomedicine, Immunology

and Nutrition. Educational materials were also distributed. This special event was organized by the San Joaquin County Office of Education, Professional Development Center.

**Monsanto-sponsored Scholarship for High School Students – May 18, 2004:** Dr. Chédin served on a panel of scientists to help choose two students from Davis High School that would receive this year's scholarship award from Monsanto. Students were chosen based on research done at UC Davis, as part of the Biotechnology class that Ann Moriarty, at Davis High School, teaches. All students were excellent candidates, and very enthusiastic about their research experience here at UCD.

**Workshops in Business Skills –Spring 2004 (April 20 and May 25):** The Biotechnology Program co-sponsored the event with UC Davis CONNECT and Cindy Batchelder, PhD candidate in Genetics and PFTF fellow. We helped Cindy organize this Professor for the Future project. The first workshop focused on patents and intellectual property and the second was on leader and strategic management. The workshops were designed to address issues of importance to graduate and post-doctoral fellows outside the traditional PhD programs. Over 60 people attended the first workshop and over 80 were at the second.

**Agrowknowledge Bioinformatics Workshop, June 27 – 30:** This hands-on workshop provides the introductory basics of bioinformatics, DNA microarray technology, and proteomics to community college and high school instructors who want to further science knowledge in the classroom. Dr. Kjelstrom is a member of the university council of Agrowknowledge, an NSF Center for Agriscience Education and was asked to organize this workshop. Over 20 participants came to UCD from throughout the United States for this 3-day in-residence workshop, taught by Dr. Vickie Carollo (USDA). Guest presenters included: Dr. Martina Newell McGloughlin (UCBREP and Plant Pathology); Dr. Paul Harris (Novozymes); David Tricoli (Ralph Parson Plant Transformation Facility); Dr. Ken Kubo (American River College); and Dr. Erica Chédin (UCD Biotech Program). Erica Chédin and Jennifer Lee also assisted in the computer labs.

We have already received some great feedback from the conference. Dr. Arlin Karsten (Kirkwood Community College, Iowa) wrote, "Thanks so much for a great conference. As a 'beginning' biotechnologist it really clarified some major points for me. The speakers also did a great job of exposing us to other areas I had not considered. I also enjoyed the campus setting for meals and accommodations as it allowed us to interact very easily with the other participants. The new agricultural biotechnology class I am starting this fall was opened for registration the day I left and when I returned it was filled."

**The California State Summer School for Mathematics and Science (COSMOS)** will be at UCD July 11 – August 4. Dr. Erica Chédin will be giving a lecture to the students (which will be comprised of the state's brightest high schoolers) about different aspects of Biotechnology. Our goal is to inspire these talented young people to major in life science and hopefully come to UC Davis!

**Contra Costa Summer Biotechnology Science Camp, July 12 – 16:** This intensive summer learning opportunity is for incoming high school juniors and seniors to learn about science experience in the biotechnology field. Topics include theory, hands-on laboratory and industry application in the manipulation of living organisms, and practical applications of products and

services. Dr. Judy Kjelstrom will be giving the Keynote address entitled "Biotechnology: The Future is Now".

**NSF-funded Bioinformatics Course (presented in conjunction with American River College), August 2-6.** This is an intensive, 5-day in-residence course offered to community college teachers and high school teachers across the US. The workshop, followed by an on-line course in the fall, gives a thorough introduction to bioinformatics and its applications both in the classroom, and in the laboratory. Dr. Deanneal Jamison McClung (PhD in Genetics with a DEB; 2003) is the lead instructor. The Biotechnology Program began this program in 2000 in order to assist in the development of new curriculum.

**Advanced PCR Course: Quantitative Real-Time PCR, August 16 – 20.**

**Lead Instructor – Dr. Christian Leutenegger, Lucy Whitter Molecular and Diagnostic Core Facility** (to register, go to <http://www.cevs.ucdavis.edu/Cofred/Public/Pro/ConfHome.cfm?confid=200>)

The Biotechnology Program is offering a newly updated Advanced PCR Course to cover real-time PCR applications to quantify nucleic acids for gene profiling and pathogen detection. The course will cover: sampling strategies to obtain high quality sample material, micro-dissection of frozen or paraffin embedded tissues using a PALM Laser Catapult (Zeiss, PALM Microlaser Technologies), sample preparation and nucleic acid recovery from tissue, blood and paraffin samples, quality controls for sample preparation, real-time TaqMan PCR and contamination control and monitoring, calculation methods for relative and absolute quantitation, and gel-based PCR applications for gene characterization. The course structure will allow students to work on their own samples, including micro-dissection of frozen or paraffin embedded tissues, RNA extraction, QC and gene profiling.

**Proteomics: Fundamentals and Technology Platform, September 13 – 17.**

**Lead Instructor, Dr. Young Moo Lee, Molecular Structure Facility** (to register, go to <http://www.cevs.ucdavis.edu/Cofred/Public/Pro/ConfHome.cfm?confid=201>)

The Biotechnology Program is offering this introductory proteome analysis workshop designed to expose trainees to fundamental technology platforms and current information in the field of proteomics. The course will cover both 2-D gel based proteomics and liquid chromatography (LC) based "multidimensional protein identification technology (Mudpit)" employing a complex mixture of proteins. Technologies associated with 2-D gel based proteomics will include separation of multiple proteins that will mimic the wide dynamic range of expressed proteins in vivo (hands-on workshop), gel image analysis (demonstration), gel staining, in-gel digestion, peptide finger printing by MALDI-TOF-TOF mass spectrometry (MS), and demonstration of de novo sequencing of peptides using a static nanospray. Trainees also will do a database search with MS data generated in the process of protein identification and will evaluate and compare the proteome coverage by 2-D gel and LC based proteomics with their own data. The lectures will cover: fundamentals of protein chemistry and MS, MS based protein identification, posttranslational modification of proteins, database search using MS data, and traditional tools of protein biochemistry.

**DNA Microarrays: Theory, Techniques and Analysis, September 20-24.**

**Lead Instructor, Dr. Satya Dandekar, Director, Developmental Core** (to register, go to <http://www.cevs.ucdavis.edu/Cofred/Public/Reg/Index.cfm?confid=205>)

The Biotechnology Program is offering this course that includes hands-on experience with DNA microarrays as well as in-depth lectures on the uses and applications of this technology. Affymetrix, the leading DNA microarray chip manufacturer, will supply the reagents and one of their scientists, Dr. Katrin Stapleton, will give lectures as well as instruct students in the lab. Dr. Satya Dandekar, the head of the DNA microarray facility at the UCD Genome Center, will be the lead instructor for the course, and Dr. Elva Diaz, an expert in the functional genomics of neuronal development, will give a special lecture about the applications of DNA microarray technology.

**Western Regional American Chemical Society (ACS) Meeting in Sacramento, October 27 – 30.** The Biotechnology Program will be chairing a section during this conference, and we have invited speakers from Amgen, ImmvaRx, Scios, Celera, and FivePrime. Registration at: <http://rex.ucdavis.edu/wrm>.

#### FUTURE EVENTS:

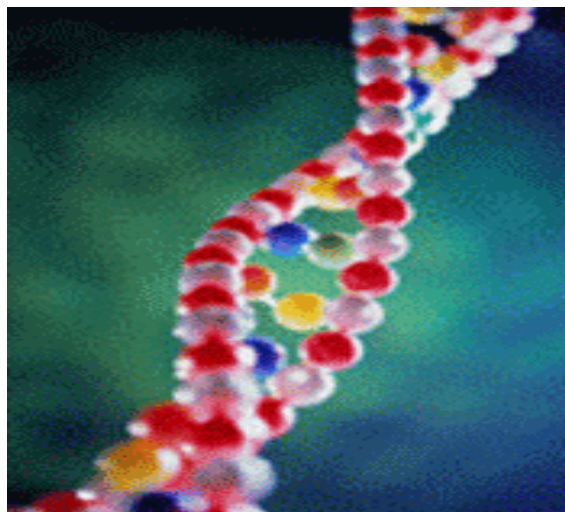
**October 8, 2004** – Kick off the 2004-5 Big Bang Business Plan Competition at the MCB/ECH 294 seminar.

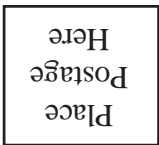
The next **Biotechnology Training Retreat** is on May 7, 2005.

**Transgenic Animal Research Conference V** in Granlibakken is August 14-18, 2005.

We also need speaker suggestions for **MCB/ECH 294** for Fall 2004 and Winter/Spring 2005. Please contact us with any suggestions you might have for interesting seminar speakers!

DEB alumni, please send us your personal updates for the newsletter! Feel free to include honors or positions that you may have received, as well as any special events (new baby, new job, etc.). Please contact the Biotechnology Program at [biotechprogram@ucdavis.edu](mailto:biotechprogram@ucdavis.edu) and we will be happy to include it in the newsletter!





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