

December 2007

To: Worldwide members of the OSU Biochemistry and Biophysics Community

From: P. Andrew Karplus, Chair

Dear Friends and Colleagues:

It is my pleasure to continue the tradition started by Bob Newburgh and continued by Chris Mathews and Shing Ho to bring you news and greetings from the Department of Biochemistry & Biophysics at Oregon State University. With the department now in its 40th year, our alumni and friends are becoming quite a sizable community with far-reaching impact. Together we are making a difference!

Thoughts from the Chair

The Department of Biochemistry and Biophysics at Oregon State attracted me from Cornell University in 1998, and as new Chair, before moving on with the traditional elements of the newsletter, I'd like to share a few broad observations about why I am excited to be a part of this department and its mission to "*reveal how life works.*" As research into the molecular aspects of life becomes increasingly important to breakthroughs in human health, agriculture, environmental sciences, and even engineering and nanotechnology, so does the mission of our department. Our central goals of educating students and carrying out forefront research in Biochemistry and Biophysics have never been more important to the success of Oregon, the nation, and the world.

The performance and contributions of our students give friends and alumni much to be proud of:

- Students in the Biochemistry and Biophysics (BB) major at OSU pursue one of the most challenging scientific programs in the College of Science. Spanning both the physical sciences and the biological sciences, the program provides our students with broad and yet rigorous training for careers in biomedicine (among others).
- As the number of students at OSU has grown from about 14,000 to almost 20,000 in the past ten years, the number of BB majors has grown even faster, nearly doubling from about 70 to 130.
- BB majors are campus leaders and are among the best and brightest students in the state of Oregon. They enter OSU with average SAT scores that are 160 points above the University average, and compete with the very best in the nation.
- From the years 2004-2006, five of the six Goldwater scholars in the entire Oregon University System were BB majors from OSU.
- BB majors have also performed superbly in achieving their career goals. Each year, at least 50% graduate with the distinction of *cum laude* or higher, and 35 of the last 37 BB majors to apply to medical school have been accepted, with the other two still in the application process.
- In addition to the training of our BB majors, we educate over 1000 students per year in general biochemistry.

And these students would not get the quality education they do without my faculty colleagues who not only teach these students, but train graduate students and post-docs and lead active research programs that brought in \$2.5 million in external funding last year. Faculty engaged in cutting-edge research and a vibrant Ph.D. program are crucial drivers of our undergraduate program because these faculty bring in the graduate students who serve as quality Teaching Assistants, they teach from current advances rather than just from textbooks, and they provide opportunities for our undergraduates to personally participate in ground-breaking research as part of their training.

...Now, back to your regularly scheduled newsletter.

OSU and Department News

Major news at OSU during this year was the repeat of Beavers' Baseball team as the NCAA National Champions and the kick-off of the public phase of the first-ever OSU capital campaign. After a slump in the end of the regular season, and barely being selected for playoffs, the baseball team swept through the College World Series without a single loss. According to Coach Casey, the team's success is an example of working on the basics and letting the results take care of themselves. Also, the "Campaign for OSU" went public on October 26th under the theme "THIS AMAZING PLACE; THIS HISTORIC MOMENT." Already >\$375 million have been raised toward the goal of \$625 million - funds that will make a historic impact in advancing the ability of OSU to impact students' lives and the world of research. The kickoff dinner featured BB major **Jessica Page** (BS 2007) who did a marvelous job as the one undergraduate alumni speaker. Already funded through the Campaign is something **Balz Frei** has long been campaigning for: a new Linus Pauling Science Center that will be next door to us (bye-bye parking) and will house the Linus Pauling Institute and part of the Chemistry department.



For the department, it has been a year of transition with **Shing Ho**, after 20 fruitful years here including the last five years serving well as our Chair, accepting an attractive offer to become Department Chair at Colorado State University, Ft. Collins. To say thanks, bon-voyage and best wishes, we had a festive send-off at Gary Merrill's home that we billed as the "Shing-Fling" (pictures at <http://biochem.science.oregonstate.edu/shingfling>). Despite fiscally challenging times, the Department of Biochemistry & Biophysics has remained a strong research unit and continues to grow in the size and

Ten faculty at the October challenge course retreat



strength of its undergraduate program. This year we have organized our mission under the slogan "revealing how life works", redesigned our web site, and are working to enhance our undergraduate program by providing some alternate tracks and reorganizing and updating our laboratory series. We also had a first-ever faculty team-building retreat in October. Maintaining and growing a strong program takes working well together and the investment of much energy and many resources!

The Faculty and Staff

Faculty and Staff recognition: The Department took home several College of Science awards, with grants technician **Jill Wait** receiving the Gladys Valley Award for Exemplary Administrative Support for her quality work and bright community-building spirit, **Linda Benson** receiving the Outstanding Faculty Research Assistant Award for her sustained excellence in running the Mathews lab, and **Joe Beckman** becoming the fourth BB faculty member to receive the F.A. Gilfillan Memorial Award for Distinguished Scholarship in Science - the top



COS Award winners Jill Wait, Joe Beckman and Linda Benson

research award in the college. At the statewide level, the Medical Research Foundation of Oregon selected **Kevin Ahern** for their Mentor Award. This is the first time the award has recognized someone whose contribution is mainly at the undergraduate level. As noted by selection committee chair John Fitchen, "Kevin has touched the minds and souls of thousands of OSU students, helping them to develop and pursue careers in medicine and biomedical research." A major honor missed in last year's letter was **Indira Rajagopal** being named the 2006 Honors College Professor of the Year. Finally, although quiet and effective service often goes unrecognized, the department is indebted to **Barbara Hanson**, **Lisa Shepard** and **Jill Wait** for providing the administrative support we all crucially need to succeed!

Indira and Kevin at the MRF Mentor Award presentation



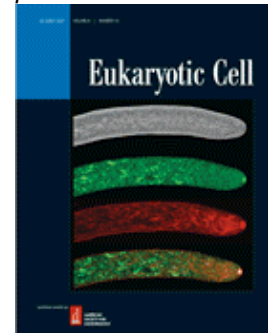
Faculty News: First, congratulations are in order to **Elisar Barbar**, who was promoted to Associate Professor with indefinite tenure this June. Recognition for her work on dynein is evidenced by invitations to speak at both the Biophysical Society and Protein Society meetings in 2008, and the work is expanding as she has a featured new concept article in press in *Biochemistry* proposing that the dynein light chain LC8 has broader importance as a hub protein essential in many protein networks. She also has set up a microcalorimetry facility and has a seed grant to measure protein interactions using biosensors based on semiconducting carbon nanotubes. My work has featured a couple of intradepartmental collaborations, one with **Elisar Barbar** and postdoc **Greg Benison** reporting the crystal structure of dynein LC8, and one with **Joe Beckman**, grad student **Blaine Roberts** and **Sonia Anderson** reporting the crystal structure and aggregation properties of Zn-free superoxide dismutase. An exciting breakthrough in ALS (Lou Gehrig's disease) research from **Joe Beckman's** lab is the development by grad student **Keith Nylin** (B.S. 2001) of a mass spectrometric analysis that can identify the presence of Zn-free superoxide dismutase *in vivo* in diseased spinal cord tissue of transgenic rats. **Joe Beckman** also hosted this Fall the Environmental Health Sciences Center Directors' meeting and treated the participants to some of the beauty of Oregon as well as a tour of the remarkable trout and zebrafish fish research facility.

Two students from **Shing Ho's** lab published papers in the *Proceedings of the National Academy of Sciences*. In the first, **Andrea R. Voth** (Ph.D. 2007) described the use of halogen bonds to drive the conformation of a four-stranded DNA junction. This is the first demonstration that halogen-bonding interactions can be engineered to control the structure of a biological macromolecule. The second paper, by grad student **Trish Khuu**, describes the results of a phylogenomic analysis of GC-rich transcriptional elements and presents a model for how such elements emerged. **Michael Gross** together with Chrissa Kioussi published another paper in *PNAS* about the role of the transcription factor Pitx2 in development, and also together they secured an NIH grant for further studies of this system. **Gary Merrill** published with former grad student **Ed Schmidt** (Ph.D. 1990) and this year's Nobel laureate Mario Capecchi on the derivation and characterization of a mouse lacking thioredoxin reductase. Also, a personal highlight for **Gary** was guiding a raft through the Grand Canyon on a trip led by OSU Zoology Professor Phil Brownell.

Victor Hsu continues work on software for predicting protein:protein interactions, and in collaboration with Michael Bailey in Computer Science, he is exploring new approaches to parallel computing to dramatically enhance molecular dynamics simulations. **Mike Schimerlik** will be retiring next summer; in the meantime, he continues to be a great research resource to people around campus and among other things is aiming to work on a bacterial nitrilase he has long had in his sights. **Phil McFadden's** research program is in transition as he considers potential projects to focus on; this fall he particularly enjoyed teaching creative protein modeling to students in his BB100 course. **Balz Frei** keeps quite busy with running the Linus Pauling Institute, fundraising and now planning for the new

building, but has found time to oversee the renewal of a 5-year Program Project grant and to publish papers with **Tory Hagen** on the effects of lipoic acid and with **Joe Beckman** revisiting controversial results on the risks vs. benefits of vitamin E supplementation. **Tory Hagen** has also successfully renewed an NIH grant to continue his groundbreaking studies on dietary prevention of mitochondrial aging (Juvenon anyone?). Also, we are very excited that **Tory** will be named to an endowed chair in "healthspan research" early next year. **Michael Freitag's** lab is growing healthily (might one say like a fungus?) with research assistant **Lanelle Connolly**, post-doc **Kristina Smith**, visiting Professor **Blythe Nilson**, visting post-doc **Gabriela Roca** and undergraduates. He also has won an American Cancer Society grant on Centromere Assembly and Maintenance using fungi as model systems, and had his work featured on the cover of the October issue of *Eukaryotic Cell*. **Jeff Greenwood** completed work with **Steve Full** (MS 2007) on phosphoinositide regulation of α -actinin conformation, and has new ideas for how this conformational change impacts cell motility through regulating calpain cleavage of α -actinin.

Hypha of Neurospora crassa expressing a chitin synthase tagged with green fluorescent protein



Chris Mathews is pleased to be able to extend his work on nucleotide metabolism with four more years of NIH funding as a co-PI, but is definitely also enjoying more birding and traveling since his retirement. **Ken van Holde** with **Shing Ho** taught a graduate level course on Biology at the Single-Molecule Level, and **Ken** continues to write articles and serve as a *JBC* Associate Editor. **Don Reed** keeps busy with writing and program reviews, but most of his work is done at home as he cares for his wife **Caron**. **Bob Becker** and **Wil Gamble** continue to be in good health and serve as the dynamic duo enjoying regular lunches together and continuing to interact with and inspire students and staff with their stories and good humor; **Wil** also continues his atherosclerosis research and **Bob** his lobbying activities. **George and Margot Pearson** and **Henry** and **Jamie Schaup** are still enjoying their retirement and stop by occasionally. **Derek** and **Elizabeth Baisted** continue to enjoy good health, golf and travel. The saddest news this year was that **Dave Loomis** passed away after a prolonged illness and **Jane** died a few months later. A simple memorial service was organized by the family.

Recognition of Current Undergraduate and Graduate Students

It is through our students that we as a department have the potential to make the greatest impact on the future and we take that opportunity seriously. We are privileged to work with such a creative and talented group of both undergraduate and graduate students a number of whom have been recognized by specific awards. At the national level, **Tari Tan** (senior) was awarded the Iota Sigma Pi Gladys Anderson Emerson scholarship for research in Chemistry and Biochemistry for combining "amazing" scientific communication strengths with unusual drive and leadership qualities (for instance founding a sorority for women in science at OSU). More locally, in recognition of excellent research presentations, **Jennifer Coppersmith** (senior) became the first undergraduate to receive a best poster award at the Center for Genome Research and Biocomputing retreat, and **Caroline Hilburn** (sophomore) was selected to present a poster at the University of Washington HHMI symposium.

*Tari Tan, 2007
Gladys Anderson
Emerson scholar*



In terms of College of Science and Department based awards **Duy Pham** (senior) and **Scott Hollingsworth** (sophomore) received Ray & Fran Cripps Memorial Scholarships and **Duy Pham** also received the Woodstock scholarship. **Daniel Bai** (senior) received the Mary Hutchins Hohner Scholarship. **Tony Rianprakaisang** (senior) and **Andrew Nguyen** (senior) received Donald MacDonald scholarships. **Rachel Dukes** (junior) received an Andy Aitkenhead Memorial Scholarship, **Caroline Hilburn** and **Vihangi Hindagolla** (senior) received Jesse Hanson scholarships, **George Mitev** (junior) the

Augustin & Rita Gombart medical scholarship, and **Chris Brown** (junior) the Milton Harris scholarship. **Elizabeth Cobarrubias** (junior) was awarded the Margaret Dowell-Gravatt, M.D. scholarship and **Brett Bemer** (junior) the Powis L & Winifred C Heitmeyer Scholarship. **Tari Tan** (senior) received an Excellence in Science Scholarship. Adventurous medical or research summer internships had **Tari Tan**, **Tony Rianprakaisang**, and **Hank McNett** in India, **Vihangi Hindagolla** in Sri Lanka, and **Tuyen Dang** at the University of Texas Southwestern. Also, foreign studies were undertaken by **Ben Dawson** (sophomore) in Chile, **Nicole Newcomb** (junior) in China, **Alex Haddock** (junior) in England, and **Katherine Jones** (senior) in Denmark.

Our new incoming graduate students include four Ph.D. students, **Luis Gomez** (National University of Colombia), **Sam Waters** (University of Central Florida), **Tim Rhoads** (Gonzaga University), **Jun Xu** (Nanjing University) and a M.S. student **Cameron Long** (Franklin & Marshall College).

New graduate students Jun, Luis, Tim and Sam



Undergraduate and Graduate Class of 2007

Congratulations to all of the students who earned their Biochemistry and Biophysics degrees this year. Six students earned Ph.D.s: **Ben Figard** (Ph.D. Deinzer), **Chris Stoner** (Ph.D. Merrill; now studying patent law), **Kristine Robinson** (Ph.D., Beckman; post-doc at OHSU), **Blaine Roberts** (Ph.D. Beckman; post-doc in Australia), **Hung-Ping (Ben) Shih** (Ph.D. Kioussi; post-doc with Maike Sanders at U.C. Irvine), and **Alex Michels** (Ph.D. Hagen; postdoc with Balz Frei). and **Andrea Voth** (Ph.D. Ho; Post-doc with Shing). In addition, **Juan Vanegas** (M.S. Schimerlik) completed his M.S. degree.

Bachelor's of Science degrees were conferred to 14 undergraduates this June including **Eric Brooks** (Ph.D. program at the University of Texas, Austin), **Drew Calhoun** (Teach for America in New York), **Megan Christ** (married and in Portland), **Anahita Fallahi** (HIV research at NYU and interviewing for medical school), **Jose Gonzalez**, **Chris Holguin** (planning to apply to graduate school), **Peter Hsu** (in OSU's Pharmacy Program but now applying for graduate school), **Gautam Mankaney** (working in China and interviewing for medical school), **Nick Mastrandrea**, **Keita Oishi**, **Paul Oyala**, **Jessica Page** (working for SIGA in Corvallis and looking toward medical school), **Kaleb Reese**, and **Caleb Stuebing** (interviewing for dental school).

Alumni News

Many of our undergrad alumni are making their way through medical school: **Nancy Lee** is in her first year at UT Southwestern, **John Stenberg** (B.S. 2006) in his first year at Ohio State, **Brett Palama** (B.S. 2004) at the University of Michigan, **Jeremy Gregory** (B.S. 2005) at Mayo, **Nima Motamedi** (B.S. 2005) in his first year at the University of Miami, **Crystal Ives** (B.S. 2006) in the first year at USC, **Tam Vuong** (B.S. 2005) in his first year and **Jennifer Atkin** (B.S. 2006) in her second year at OHSU, **Luis Monson** (B.S. 2006) at Johns Hopkins. In Pharmacy programs are **Tony Tong** (B.S. 2006) at OSU and **Katy (Marvel) Lauderdale** (B.S. 2006) in Florida.. **Crystal Hammer** (B.S. 2006) is working at Bend Research and applying to medical schools. **Trevor Starnes** (B.S. 2006) is applying to medical schools. **Derek Youngblood** (B.S. 2005) got married and is a first year dental student at OHSU and **Tam Vuong** (B.S. 2005) has been accepted for medical school at OHSU. **Eddie O'Donnell** (B.S. 2006) and **Valerie Black** (B.S. 2006) got married and **Eddie** is working with Siva Kolluri in Toxicology here at OSU. **Angie Pagano** (B.S. 2006) is working in Portland and applying to medical schools. Many alumni also continue in Ph.D. programs: **Dan Koch** (B.S. 2006) in Toxicology at OSU, **Heather Bolstad** (B.S. 2006) in Toxicology at U.C. Davis, **Marcus Duffin** (B.S. 2006) at the University of Connecticut, and **Loren Brown** (B.S.

2003) at UC San Diego. Nearing completion of their Ph.D. degrees are **Mike Harms** (B.S. 2004) at Johns Hopkins, **Jackie Wirz** (B.S. 2000) at OHSU and **Anna Hsu** (B.S. 2004) at OSU with Emily Ho in Nutrition. Anna also got married last summer. **Robyn Ikehara** (B.S. 2003) completed her law degree and is an attorney in Los Angeles. **Keith Hazleton** (B.S. 2001) is completing work on his MD/Ph.D. at Albert Einstein and **Jessica Hewitt** (B.S. 2005) completed her M.S. degree in Horticulture at OSU with Hiro Nonogaki and now works in the biotechnology industry in San Diego. **Vivian (Madison) Zumstein** (BS, 1980) is now a contractor teaching new Naval intelligence employees how to do analysis, and the first of her four kids is in college. **Jay Gandolfi** (Ph.D. Buhler 1972) was promoted to Associate Dean for Research and Graduate Studies at the University of Arizona and continues as Director of their NIEHS Superfund Program.

Our grad alumni also are advancing. **Mark Bernard** (Ph.D. Mathews, 1999) has moved to be a senior scientist with Pfizer in Cambridge, MA. **Steve Hendricks** (Ph.D. Mathews, 1998) was promoted to Director of Enzyme R&D at Applied Biosystems and also enjoys relaxing at his cabin near S. Lake Tahoe. **Stella Martomo** (Ph.D. Mathews, 2002) has taken a senior post-doc position with Riccardo Dalla-Favera at Columbia. **Korakod Chimploy** (Ph.D. Mathews, 2002) returned to her native Thailand after completing her thesis, but then returned with her husband to Corvallis. After working for a year with **Rod Dashwood** in LPI, she will be rejoining the Mathews laboratory in January as a research associate. **Patrick Young** (Ph.D. Mathews, 1992) continues in a junior faculty position at the University of Stockholm, Sweden, where he has already minted two Ph.D. students and is working with two more. Pat hopes to return to the U.S. after his two children (ages 11 and 13) have finished high school. **Zac Wood** (Ph.D. Karplus, 2001) accepted a faculty position at U. Georgia, Athens. **Brandt Eichman** (Ph.D. Ho, 2000) published his first paper as an independent research scientist this year in *EMBO Journal*; the paper describes the structure of a DNA glycosylase recognizing methylated adenine bases in DNA. **Frank Hays** (Ph.D. Ho, 2005), along with wife Susan and son Robert, welcomed to the world their second son, Jonathan H. William Hays, and Frank also published in *Science* the crystal structure of an agonist bound to a membrane receptor. **Josh Hicks** (Ph.D. Hsu, 2005) is the proud father of daughter Dahya N. Hicks. **Ed Schmidt** (PhD Merrill, 1990) traveled to Stockholm in December to attend his post-doc advisor Mario Capecchi's Nobel Prize ceremony. **Kurt Schesser** (Ph.D. Merrill, 1994) was promoted to Associate Professor with tenure in Microbiology at the University of Miami. **George Rose** (Ph.D. van Holde, 1975) ended his term as chair of Biochemistry & Biophysics at Johns Hopkins. He looks forward to get into the lab and do some projects with his own hands. He also looks forward to doting on his two granddaughters, ages 1 and 2. **Gerry Adams** (Ph.D. Gamble, 1971) was a Professor at Whittier College for 28 years and is now a Registrar at Grinnell College. **Mitchell Wise** (Ph.D. Gerwick, 1995) is married with two grown children and working on natural products biosynthesis at the USDA Cereal Crops Research Unit in Madison, WI. **David Stephenson** (M.S. 98, Wong) received his M.D. from OHSU in 2005 and is a resident in Internal Medicine at the University of Michigan.

Karen Miller's (Research Assoc./Asst. Professor, 1973-2003) beautiful work as a katazome artist (look it up!) was featured in October on Oregon Public Broadcastings "Art Beat" TV program. And we have a 'Miller' original here in the BB reading room! **Jim Summerton** (Research Asst. Professor, 1978-80), founder of Gene Tools of Philomath and inventor of morpholino oligonucleotides, received news coverage for using novel designed peptides to specifically target molecules to cancer cells.

We also enjoyed visits by former BB associates **Allen Bieber** (Ph.D. Newburgh 1962), **Patrick Varga** (Ph.D. Barnes, 1992) giving a seminar in March, **Bo Demeler** (Ph.D. van Holde, 1992), **Jeffrey Vargason** (Ph.D. Ho, 2002) giving a seminar in May, **Jeff Hanson** (postdoc 1980s, van Holde), and I suspect others of whose visits I was not aware. Thanks to all of you for keeping in touch and for living a life that impacts the world to make a positive difference in your own way.

Thank you for your support in helping us to reveal how life works!

We are doing remarkable things here in Biochemistry and Biophysics to reveal how life works, both through our research to reveal novel aspects of how life works and through our teaching to reveal to the next generation what is known about how life works and how to study it. The snippets in this newsletter give only a small glimpse of what we are accomplishing. With limited resources, it is the generous gifts from you that "grease the wheel" and give us the possibility to go the extra mile in both our research and teaching. On behalf of the whole department and our students I say thank you to those of you who have contributed to the department this year! Your gifts help to support, among many things, the undergraduate BB Club, graduate student recruitment, the department seminar series, awards and scholarships, graduate and undergraduate student travel to meetings, new research endeavors and teaching innovations. If you feel you have benefited from your time in Biochemistry and Biophysics at Oregon State, please consider how you might give back to impact our current and future students and faculty. Currently the strong undergraduate program is fed by the graduate program - which provides our TA's and funds them and allows our faculty to bring the results of cutting edge research into the classroom. Particular campaign priorities for us are endowed graduate fellowships and one endowed Professorship, as these would provide the most long-term benefit to the program as a whole allowing us to enhance the breadth and quality of the courses we offer. Also this year with our vision of a modernized undergraduate laboratory curriculum, donor funds will play an important role in allowing us to purchase modern equipment.

In closing I note that with the growing size of our worldwide community, this letter may cease to be an adequate way for us to keep in touch with each other, and I will be exploring web-based ways to do this more effectively. If you have any ideas let me know. Also, I am thinking we could use a logo to go along with our slogan of "revealing how life works" and invite any of you who are artistically minded to submit a suggestion! Finally, on behalf of the faculty, staff and students in the Department, I would like to extend to you and yours best wishes for the New Year. As always, we would welcome your visit at any time, and in case you are wondering, Wednesday afternoon is still popcorn time!

Yours warmly,

P. Andrew Karplus

P.S. I thank my colleagues and especially Kevin Ahern, Chris Mathews, Bob Becker, Wil Gamble and Barbara Hanson for their help with assembling information and the editing of this letter.



Collage from the Fall Department picnic to welcome new students and kick off the year. In case you can join us, the fall 2008 picnic is tentatively set for Sunday September 28th.