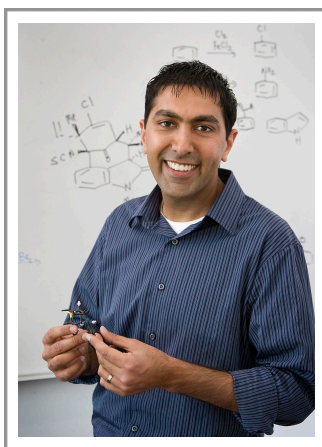


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Chemistry Never Sounded This Good!



Neil Garg

By now, the word is out at UCLA that undergraduates in Neil Garg's organic chemistry course produce clever, creative music videos as an extra-credit assignment. The bigger secret may be just how much chemistry they learn by doing so, as none of them are chemistry majors and most admit they didn't like chemistry when the class started.

It's a little too soon to say which music video will be this year's sensation. A strong candidate is

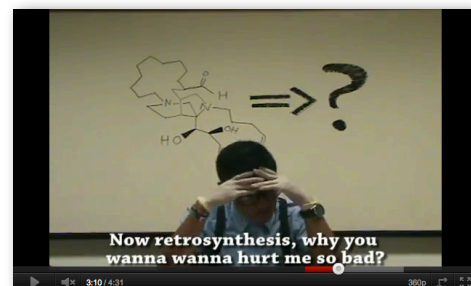
"We're Yours" by the Gargonauts — Rachel Stafford-Lewis, Myan Pham, Ali Lanewala and Jordan Halfman — which achieves the desired trifecta of excellent chemistry in a video that sounds and looks great. But unlike last year, when one video, "Chemistry Jock" — which has become the gold standard of the genre, with 38,000 YouTube views and many fans — ran away from the competition, this year's field is much deeper.

Last quarter, 250 students produced 87 videos. Among the most notable are "Let It Be" by John Boles and Edgar Gonzalez; "Forget That" by Alex Jaksha, Sean Nguyen, Kevin Nishida and Nakia Sarad; and "O-Chem Toolbox," sung with stellar vocals by Michelle

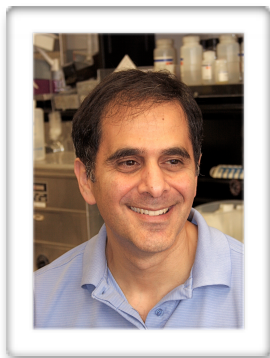
Azurin, joined by Daniel Brenners, Frank Choe and Mike Dai. Yannick Goeb and Kimberly Bui, who starred with Justin Banaga in "Chemistry Jock," are fans of "O-Chem Toolbox."

"When I am doing the problem sets or taking a test, I find myself singing the various chemistry songs that people wrote and it helps me remember all the details," said Rachel, a sophomore majoring in microbiology, immunology and molecular genetics. Rewriting lyrics helped her learn the chemistry, she added.

"I catch myself randomly singing the lyrics while I'm walking through the halls and just kind of laugh," said Edgar, a sophomore physiological science major. "It's crazy, because up until this point, I had hated chem. I remember when I first signed up for the class I was afraid, but I soon realized I had a great professor. I can honestly say that Professor Neil Garg has not only made it a fun class, but he made me care about learning chemistry. You can tell how much he cares about his students by the time and effort he puts into his lectures. He always had a dozen or so pieces of computer paper on which he wrote his lecture notes. (continued p. 13)



CHAIR'S MESSAGE



*Wow!! We finally have a new Department of Chemistry & Biochemistry newsletter after a gap of over a year since the last issue of this esteemed publication. This hiatus was necessitated by some staff reorganization that we undertook as an economy measure. Indeed, this issue of the newsletter was only possible through the tireless efforts of staff member Jin Lee who has been working overtime to get it out even though the newsletter is no longer a part of his portfolio. **Thank you Jin!!***

We hope to be on the way to a solution to this staffing deficiency and our goal in the future is to return to at least two issues of the newsletter every year.

Anyway, while there has been a gap between newsletters, there has been no such lapse in the Department's contributions to research and education. Modern science brings us unprecedented opportunities to meet the considerable challenges that face 21st century civilization, and our department is at the forefront of many such endeavors. These include efforts by our biochemists to combine computational and experimental approaches to determine the role of genes versus environment in longevity and disease, and by our chemists to develop nanomaterials that may lead to alternative energy sources for a post-petroleum economy, as well as ways to deliver therapeutic agents directly to cancer cells.

Our research is greatly enhanced by the cross-disciplinary interactions possible in a department such as ours, which includes faculty whose research stretches from developmental genetics to quantum physics. This diversity is a source of great strength and has led to groundbreaking discoveries that would have been otherwise impossible. Just to cite a few examples of these types of chemistry/biochemistry collaborative efforts:

- Biochemist **Steve Clarke** and organic chemist **Ken Houk** have worked together to reveal insights into the mechanisms by which protein damage contributes to cellular aging.
- Organic chemist **Ken Houk** has also been teaming up with biochemist **Jim Liao** to design enzymes for use in biofuel synthesis.
- Collaborative research between biochemist **Rob Clubb** and organic chemist **Mike Jung** has led to the development of small molecules that inhibit the machinery responsible for the attachment of proteins to bacterial cell walls. These molecules have been patented as potential new antibiotics.
- A joint effort involving biochemist **Emil Reisler** and physical chemist **Jim Gimzewski** has shed new light onto the nanoscale biomechanics of the cytoskeleton.

- Physical chemist **Bill Gelbart** and biochemist **Jim Gober** have teamed up to explain how viruses inject their genomes into living cells.

Undeniable evidence of the impact of our research is provided by the hundreds of highly cited articles we publish every year in the world's top journals. Indeed, in the chemistry program rankings recently released by the well-respected QS World University ranking service, UCLA was ranked 8th in the entire world in chemistry (http://www.chemistry.ucla.edu/news/item?item_id=268576). This high ranking was heavily influenced by our citation rate, which was third in the world, and just a hair behind the two leaders in this category!

The numerous external awards won by our faculty and students provide additional evidence of the esteem in which our scientists are held. A few recent examples of these awards are detailed on pp. 3-5 of this newsletter, and more can be found on the department's home page (www.chemistry.ucla.edu).

Since the last issue of the newsletter, our faculty ranks have been enhanced by the addition of two outstanding scientists, **James Liao** and **Gerard Wong**. Both hold primary appointments in the school of engineering and have accepted joint appointments in our department. Professor Liao, a world leading synthetic biologist, is engineering organisms to produce environmentally sustainable biofuels, while Professor Wong's wide-ranging research includes efforts to design new antimicrobials and to illuminate bacterial biofilm formation.

Finally, I would like to bring your attention to the many exciting upcoming events in the Department of Chemistry and Biochemistry summarized on pp. 6-7 of this newsletter. Perhaps foremost among these events is the 2011 Seaborg Symposium & Medal Award Banquet, which will take place on Saturday, November 5 on the UCLA campus. This year's honoree is 2010 Chemistry Nobel Laureate **Richard Heck**. Professor Heck is both an undergraduate and graduate alumnus of this department, having carried out his Ph.D. dissertation research under the mentorship of the late Saul Winstein, one of the premier physical organic chemists of the 20th century. We are very proud to count Professor Heck among the six Chemistry Nobel Laureates in our department's history (including three faculty and three alumni laureates). The program (which can be found at the end of the newsletter) is entitled "The Heck Reaction and Cross-Couplings". It is sure to be extremely stimulating, and the evening awards banquet will be great fun! I strongly encourage all friends and alumni of the department to attend. Additional information about this event and registration information are available online (www.seaborg.ucla.edu). See you there!!

Albert J. Carey

AWARDS

ACS Award- Chemistry of Materials

The American Chemical Society has honored Richard Kaner with the 2012 ACS Award in the Chemistry of Materials. The award recognizes Kaner “for the development of simple, high-yield, widely applicable synthetic routes to important materials including conducting polymer nanofibers, ultraincompressible superhard ceramics and carbon nanostructures including graphene.” The award will be presented to him at the ACS National Meeting in San Diego on March 27, 2012.

*Richard Kaner*

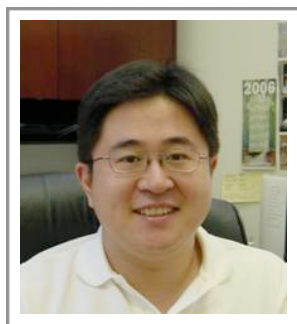
Kaner is a professor of chemistry and biochemistry and a professor of materials science and engineering at the UCLA Henry Samueli School of Engineering and Applied Science, and a member of the California NanoSystems Institute. Kaner is the second faculty member in UCLA's

Department of Chemistry and Biochemistry to win the award in recent years. The previous winner was Omar Yaghi.

ACS Arthur C. Cope Scholar Award

Yi Tang has been selected as one of 10 recipients of the Arthur C. Cope Scholar Award from the American Chemical Society (ACS). The award was established in 1984 by the ACS Board of Directors to recognize and encourage excellence in organic chemistry. Each award consists of \$5,000 and a \$40,000 unrestricted research grant that the recipient may assign to any university or nonprofit institution.

Tang is an expert on natural product biochemistry; engineered biosynthesis; biocatalysis and protein engineering; and biomaterials. His lab has also recently become engaged in research at the interface of nanotechnology, biomaterials and drug delivery.

*Yi Tang***Presidential Early Career Awards***Xiangfeng Duan*

Xiangfeng Duan has been honored with the Presidential Early Career Award for Scientists and Engineers by President Barak Obama. He was among 94 individuals to receive this year's awards, the highest honor bestowed by the United States government on science and engineering professionals in the early stages of their research careers.

Sixteen federal departments and agencies join together annually to nominate scientists and engineers whose early accomplishments show the greatest promise for assuring America's preeminence in science and engineering.

“It is inspiring to see the innovative work being done by these scientists and engineers as they ramp up their careers — careers that I know will be not only personally rewarding but also invaluable to the nation,” President Obama said in announcing the awards.

Duan studies nano-scale materials and devices and their applications for future electronics, energy science and biomedical science. In particular, he focuses on the rational design and synthesis of highly complex inorganic nanostructures with precisely controlled chemical compositions, physical morphologies and dimensions.

Earlier this year, Duan was ranked No. 41 among the world's top 100 chemists — and No. 20 among the top 100 materials scientists — of the past decade by Thomson Reuters, which rates scientists based on the impact of their published research. He earned his doctorate from Harvard University in 2002 and joined UCLA's faculty in 2008.



AWARDS



Paul Weiss

Paul Weiss named Alexander M. Cruickshank Lecture in Physical Sciences

The Board of Trustees of the Gordon Research Conferences named CNSI Director Paul Weiss the Alexander M. Cruickshank Lecturer in the Physical Sciences for 2011. Cruickshank lecturers are appointed annually in one of

the three principal subdisciplines of the conferences - Biological, Chemical, and Physical Sciences. Weiss, the Fred Kavli Chair in NanoSystems Sciences, presented his lecture in July at the Gordon Research Conference on Clusters, Nanocrystals & Nanostructures at Mount Holyoke College in South Hadley, MA.

The Gordon Research Conferences promote discussions and the free exchange of ideas at the research frontiers of the biological, chemical and physical sciences. Scientists with common professional interests come together for a full week of intense discussion and examination of the most advanced aspects of their field. These conferences provide a valuable means of disseminating information and ideas in a way that cannot be achieved through the usual channels of communication - publications and presentations at large scientific meetings. The Board of Trustees of the Gordon Research Conferences established the Alexander M. Cruickshank Lectures to honor the many years of service to the organization by the former director, Dr. A.M. Cruickshank.

March of Dimes

Jorge Torres has been awarded a March of Dimes Foundation Basil O'Connor Starter Scholar Research Award for work on Molecular Analysis of 3-M Syndrome.



ACS Fellow

Joan Valentine has been elected a 2011 Fellow of the American Chemical Society. This designation honors those who have distinguished themselves in multiple areas, including service to the American Chemical Society and promoting the science and profession of chemistry. Joan joins three other members of our faculty among this select group including Ken Houk and Herb Kaesz (both elected in 2009, the inaugural year of this program) and Paul Weiss (elected in 2010). Joan and the other 2011 fellows were honored at a special ceremony during the ACS National Meeting in Denver on August 29, 2011.



Joan Valentine

Royal Society of Chemistry

Heather Maynard, was elected as a fellow of the Royal Society of Chemistry in recognition of her scientific excellence.



Heather Maynard

Amgen Award

Neil Garg has been selected to receive a 2011 Amgen Young Investigator's Award. Neil is one of only four national recipients of this annual award. All four Young Investigators will receive an unrestricted cash award and will be recognized at a symposium and dinner held in their honor in October.

DARPA Young Faculty Award

Anastassia Alexandrova has been awarded a Young Faculty Award from the Defense Advanced Research Projects Agency (DARPA), the research agency of the U.S. Department of Defense. Alexandrova was given the award in the topic area of Functional Materials, for her research project, "The inside-out design of artificial metallo-enzymes with unprecedented specificity and reactivity."

FALL 2011 NEWSLETTER FACULTY, STAFF & CONTRIBUTORS
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Editing & Production Jin Lee
College Development & Alumni Relations Kerri Yoder, Silvia Orvietani Busch
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UCLA Department of Chemistry & Biochemistry
 607 Charles E. Young Drive East, Los Angeles, California 90095-1569

AWARDS

Postdoctoral Recognition Awards

The 13th Annual MBI/Chemistry & Biochemistry Postdoctoral Recognition Awards Ceremony took place on May, 2011. In 1999, Dr. Paul Boyer donated a portion of his 1997 Nobel Prize in Chemistry to institute these annual awards to recognize our outstanding postdoctoral fellows. Generous donations were also received from Mrs. Phyllis Parvin and the Parvin Foundation, Dr. James and Joan Peter, and an educational donation from Amgen Inc.



James Bowie & Heedeok Hong

Dr. Shelley Claridge (Mentor: Prof. Paul Weiss), Dr. Heedeok Hong (Mentor: Prof. James Bowie), Dr. Meytal Landau (Mentor: Prof. David Eisenberg), and Dr. Qi Zhang (Mentor: Prof. Juli Feigon) were the postdoctoral researchers from the Department of Chemistry & Biochemistry who were presented with Research Excellence Awards.



Standing: Paul Boyer, Randy Hungate, Paul Weiss, Kathrin Plath, Hong Wu, Utpal Banerjee, David Eisenberg, Carla Koehler, Jim Bowie, Phyllis Parvin, Feng Guo. Seated: Shelly Claridge, Rupa Sridharan, Katharina Schlacher, Tina Mukherjee, Meytal Landau, Geng Wang, Heedeok Hong, Qi Zhang



Meytal Landau & David Eisenberg

2011 Audree Fowler Fellows

Timothy Anderson (Clubb Group) and Soohong Kim (S. Weiss Group) have been selected as the 2011 Audree Fowler Fellows in Protein Science.

Tim is a 5th year graduate student in Chemistry & Biochemistry. His research focuses on the assembly and characterization of multi-cellulase containing complexes on the surface of bacteria for use in biofuel production.

Soohong is a 4th year graduate student in Chemistry & Biochemistry. His research focuses on the development of high-throughput single-molecule assays for protein studies.

NSF Graduate Research Fellowships

Crystal Valdez (Alexandrova Group), Steven Jerome (Houk Group), Tristan Rose (Harran Group), Joel Smith (Garg Group), and Noah Fine Nathel (Garg Group) from the Department of Chemistry and Biochemistry have received the prestigious National Science Foundation's Graduate Research Fellowship. The program supports outstanding graduate students pursuing doctoral degrees and is extremely competitive. The fellowship provides financial support for three years, super computer access, and international research and professional development.

CALENDAR

2011-2012 Upcoming Events in the Department of Chemistry & Biochemistry

Winstein Lecture- Presented by C. Dale Poulter, The University of Utah

Thursday, October 27, 2011 at 4PM (Reception in Young Hall 3037), 5PM (Lecture in Court of Sciences 24)

Seaborg Symposium & Medal Award Banquet Honoring Richard Heck

Saturday, November 5, 2011 at 11:00AM (CNSI Auditorium, Covell Commons)



Photos from the 2010 Seaborg Symposium & Medal Award Dinner

Annual Department Awards Ceremony

Monday, November 7, 2011 at 4PM (Court of Sciences 76)

Scott Lecture- Presented by Stuart Rice, University of Chicago

Monday, November 14, 2011 at 4PM (Young Hall 2033)

Kivelson Lecture- Presented by Eric Heller, Harvard

Monday, January 23, 2012 at 4PM (Young Hall 2033)

Sigman Symposium & Lecture- Presented by William Wickner, Dartmouth College

Thursday, February 2, 2012 at 12PM (CNSI Auditorium)



Photos from a previous Sigman Symposium & Lecture Event

Regents Lecture- Presented by William Eaton, NIH

Monday, February 13, 2012 at 4PM (Young Hall 2033)

Cram Lecture- Presented by Andy Myers, Harvard

Thursday, March 15, 2012 at 4:30PM (Contact Organic Divisional Office for Location Info: 310-206-1036)

UCLA Dept. of Chemistry & Biochemistry ACS National Meeting Reception & Poster Session

Sunday, March 25, 2012 at 5PM (San Diego, CA- Location To Be Announced)

CALENDAR

Bernstein Lecture- Presented by Marsha Lester, University of Pennsylvania

Monday, April 23, 2012 at 4PM (Young Hall 2033)

Hawthorne Lecture- Presented by Chad Mirkin, Northwestern University

Wednesday, April 25, 2012 (Contact Inorganic Divisional Office for Time & Location Info: 310-825-4208)

Foote Lecture- Presented by Peter Ogilby, Aarhus University

Thursday, April 26, 2012 at 4:30PM (Contact Organic Divisional Office for Location Info: 310-206-1036)

*Photos from a previous Foote Lecture Event***UCLA Alumni Day**

Saturday, May 12, 2012

*Photos of Neil Garg's Group at the 2011 UCLA Alumni Day***Department Graduation Ceremony**

Saturday, June 16, 2012 (Court of Sciences)

Supporting our Seminar Series

Your help is needed to support our world-renown departmental seminar series! Each division has an outstanding seminar program. Lecturers from all over the globe visit the department and share their cutting-edge research. Students, post-docs, and faculty have the opportunity to meet and exchange ideas with famous academic and industrial researchers. This is not only crucial to their education, but also to their future careers, as the seminar series allow them to make vital contacts.

Your funds will support these exciting and critical lectures, allowing the Chemistry and Biochemistry Department to maintain its competitive edge and reputation for academic excellence. Your gift, however large or modest, is greatly appreciated.

To make your contribution, visit <https://giving.ucla.edu/ChemAndBioChem>. If you are interested in permanently endowing a seminar series in honor of someone special in your life, please contact Kerri Yoder (Director of Development, Division of Physical Sciences) at (310) 794-9045 or by email at kyoder@support.ucla.edu for more information.

**For more information about events, please visit www.chemistry.ucla.edu or contact the Chair's Office at 310-825-3958*

GRADUATION 2011

Doctor of Philosophy

ODISSE AZIZGOLSHANI
(Bill Gelbart, Advisor)

DANIEL CHAN
(Craig Merlic, Advisor)

MARCELLE DIBRELL
(Jeff Zink, Advisor)

DANIEL FERRIS
(Jeff Zink, Advisor)

G. JASON FORSE
(Todd Yeates, Advisor)

FERNANDO GOMEZ
(Cathy Clarke, Advisor)

BRYANA HENDERSON
(Jeff Zink, Advisor)

ROBYN HODGKINS
(Robin Garrell, Advisor)

CARLIN HSUEH
(James Gimzewski, Advisor)

ROBERT IAFE
(Craig Merlic, Advisor)

SHILPI KHARE
(Steve Clarke, Advisor)

GERT KISS
(Kendall Houk, Advisor)

ARTHUR LAGANOWSKY
(David Eisenberg, Advisor)

JOHN MCCOY
(Wayne Hubbell, Advisor)

ZACHARY O'BRIEN
(Miguel Garcia-Garibay, Advisor)

ERIC PANG
(Joseph Loo, Advisor)

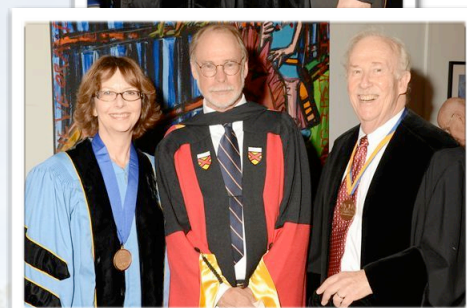
ANH PHAN
(Omar Yaghi, Advisor)

ALEXANDER TUCKER-SCHWARTZ
(Robin Garrell, Advisor)

ETHAN WEINER
(Robert Clubb, Advisor)

LAI XU
(Kendall Houk, Advisor)

CECILIA ZURITA-LOPEZ
(Steve Clarke, Advisor)



Masters of Science

MATTHEW CIPOLLA
(Tim Deming, Advisor)

LIANE FUKUMOTO
(Ohyun Kwon, Advisor)

DUSTIN HOCHSTATTER
(Craig Merlic, Advisor)

BLANTON MARITN
(Kendall Houk, Advisor)



Photos: GradTrak (R)

Watermark Photo: Yves Rubin

GRADUATION 2011

Bachelor of Science

Yasmin Nahreed Abedin	Long Hoang Duong	Janet Kim
Roxanna Alejandra Abrines	Andrew Wayne Eddy	Minsoo Kim
Salma Abulebda	Petra Sanaa Elias	Patrick Yoon Kim
Anie Aklian	Andrew Gareth Elliott	Young Jin Kim
Edward Albert Amador	Jeordle Esguerra	Ashlee Nicole King
Ramela Amirian	Denise Nicole Salvador Fadul	Tyler William Knapp
Lawrence An	Omeed Foroutan-Naini	Donghyok Ko
Albert Aparicio	Kevin Thomas Frew	Fred Fred Kobzeff
Ani Bagdasarjana	Belen Garcia	Miryam Rachel Kornfeld
Omar S Bakr	Vanessa Patricia Garcia	Solida Kry
Nathanael Joshua Lui Bangayan	Kaycee Gelera	Jiyoung Kwak
Julie Marie Barbarino	Jonathan Gibo	Anderson Ka Ho Lai
Naira Daniyelovna Barsegyan	Christy Gorman	Tong Tong Lam
Dana Ben Yehuda	Stephanie Mercado Gregorio	Mya Angel Le Thai
Jeffrey Alan Brumbaugh	Agnieszka Grzechnik	Brian Le
Paula Alejandra Bunel	Xin Ning Guan	Chantalle Anhmy Le
Thomas Allen III Caldwell	Udayabagya Halim	Linh My Le
Ethan Jeremiah Canfield	Ramin Hamzehei Nejad	Nga Hoang Le
Lisa Ann Cao	Cong Han	Changyoung Lee
Alexander Nguyen Castillo	Songhui Han	Ji Won Lee
Ji Eun Cha	Angel Herrera	Jonathan Jun Tac Lee
Soeun Cha	Christopher Hidajat	Judy Yuk-Ying Lee
Tanakorn Chaivasin	Christina Hii	Juho Lee
Stanley Saputra Chandra	Hnin Phyu Hlaing	Kyeongmin Lee
Elaine Chau	Brian Hopkins	Lillian Joy Lee
Joanne Chau	Howard Jenhao Hsieh	Sang Ah Lee
Neha Vijaykumar Chauhan	Steven Hsu	Sean Hyung Kwon Lee
Chi Ho Cheang	ChenWei Huang	Si-Young Lee
Seung Yoon Chi	Chu-Han Huang	Woojin N Lee
Jiarong Chiang	Grace Lan-Shin Huang	Bruce Leewiwatanakul
Roger Chiem	Ta-Wei Huang	James Chien Li
Andrew Michael Chiu	Bao-An Huynh	Shannon Li
Suk Jin Cho	Inkyung Hwang	Ying Li
Hee Jung Choi	Jason Hwang	Carol Lin
Elizabeth Sung Ji Choi	Diane Elizabeth Inocencio	Frances Qing Lin
Michael Robert Choy	Jiwoon Inn	Ta Chun Lin
Eveline Chu	Eriko Iseki	Xinbei Liu
Loan Ngoc Chung	Chijioko Chris Iwuchukwu	Wai Yin Lo
Alan Vi Chung	Caroline Jap	David C Loh
Alexander Cosico	Daniel Hee Young Jeong	Amy Ly
Christine Yuen Dang	Seoung Jeoung	Chelsea Yaqian Ma
Jason Do Diep	Soo Jean Jun	Kevin Ryuji Machino
Christine Ani Dimirjian	Yong Ha Jung	Michael Jason Maclean
Jonathan Edwards Ditty	Eunice Yunmi Jung	Jordan Tsung-Dek Mak
Christopher Djunaedi	Hyun Sik Kang	Sarah Elizabeth Mallough
Kristina Do	Jee Hae Kang	Rachna Rani Mamidi
Michael Do	Lauren Mayumi Kawabata	Edgar Emmanuel Manguia
Nhat Nguyen Hoang Do	Satoru Kawakita	Armine Manukyan
Nguyen Tu Doan	Pwint Phyu Khine	Adrine Markosyan
Antoin Douglawi	Bona Kim	Jesada Mathiyakom
Michael Steven Downs	Dae Woong Kim	Tun-Min Oo Maung
Bao Tram Le Duong	Daniel Kim	Michael A McSunas
Christine Duoung	Grace Miyoung Kim	Yuan Mei
Giang Tung Duong	Hana Kim	David Melamed

Watermark Photo: Yves Rubin

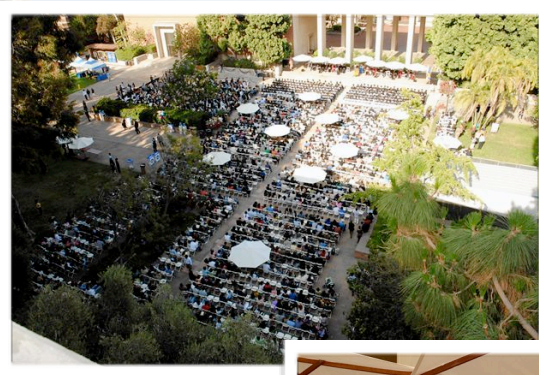
GRADUATION 2011

Bachelor of Science (continued)

Michael Gregory Mgerian
 John Izaak Miller
 Argie Lagrimas Mina
 Sanaz Kailey Mohseni
 Travis Joseph Moore
 Alon Pinhas Nachshon
 Saranpreet Singh Nagra
 Alice Temari Nakata
 Carlos Rapael Jr. Naranjo
 Ausencio Jr Navarro
 Jimmy Ngo
 Raymond Ngo
 Hailey Hong Nguyen
 Melanie Nhu Nguyen
 Nhien Y Nguyen
 Nhuhanh Thi Nguyen
 Uyen Bich Vinh Nguyen
 Adam Daana Niku
 Sari Novieta
 Roda Omar Nur
 Kevin Roderick Ogilby
 Brenda Owuor
 Hye Jin Park
 Jinyi Park
 Sung Yeun Park
 Annooj Mayur Patel
 Anvi J Patel
 Karan Patel
 Nubar Petikyan
 David S M Phak
 Wa Sai Phung
 Jonathan Steve Phuong
 Olga Prikhodko
 Yan Qin
 Duc Hong Quach
 Geizhar Ramirez
 Ilene Ramirez
 Vennela Devulapalli Reddy
 Melvin W Rico
 James Spencer Roche
 Katherine Joanne Rosen
 Sun Yim Ryu
 Kazuhiro Shamim Sabet
 Chris Samatmanakit
 Selina Ann Salvador Sarno
 Mikhail Delorey Schumacher
 Maral Semerjian
 Jonathan Shaw
 Jonathan Caplette Shaw
 Chiu Yin Shek
 Chunyi Shen
 Laura Joohee Shim
 Jae Ho Shin
 Yoon Ho Shin
 Jaklin G Simonian

Ngai Pok Sit
 Wing Siu
 John B Son
 Cleber Yong Sonu
 Carolina Lia Sonu
 Teresa Irene Soriano
 Priscilla Nathania Sugianto
 David Suh
 Michael Sun
 Eleanna Czarina Tan
 Nitin Tandan
 Karina Jokwan Tang
 Syuhui Tang
 Thanh Ngoc Tat
 Angelica S Tatar
 Robert Lee Taylor
 Alison Genevieve Tebo
 Maung Htein Lynn Thu
 Wa Hin To
 Anh Ngoc Ton
 Benson Ngoc Tran
 Jenny K Tran
 John Ngoc-Long Tran
 Lyly Thuy Mi Tran
 Tam T. Tran
 Andrew Phi Trinh
 Victor Wei Da Tu
 Vladimir Petrovich Ufimtsev
 Charisma Maria Coletto Urbiztondo
 Sheleana Varvaro
 Boris Voloskiy
 Chau Huyen Vu
 Daniel Michael Vu
 Vi-Anh T Vu
 Joshua Curtis Wade
 Fatema Walai
 Jingru Wang
 Qian Wang
 Yuqi Wang
 Shota Watanabe
 Hsin Wei Wen
 Allison Wai Yi Wong
 Belinda Lu-Hua Wong
 Stefanie Michelle Wong
 Angie Wu
 Dakyung Yang
 Qi Yang
 Talia Lisann Yates
 Wan Ying Ye
 Aurora Seen-Yu Yeung
 Lisa Ashley Yogi
 Chan Yang Alice Yoon
 Sun Hee Yoon
 Chaoran Yu
 Clarissa Chi-Yan Yu

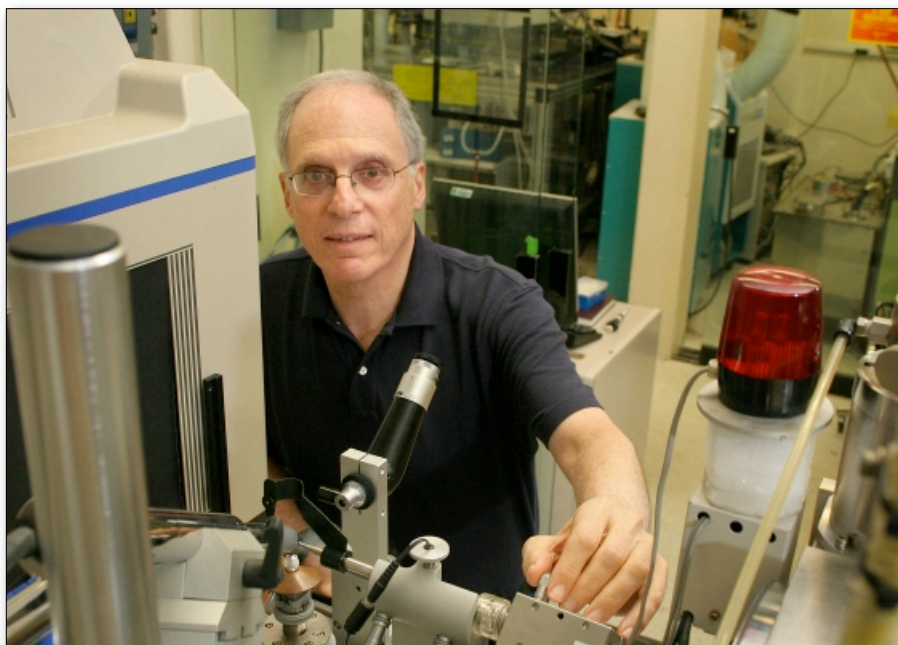
Stanley King-Ming Yu
 Dayoung Yun
 Jessica Zyana Zaragoza
 John Tyler Zavoli
 Shuna Zhang
 Chu Ran Zheng
 Siyun Zheng
 Manna Zhu
 Yaoquan Zhu



Photos: GradTrak (R)

Watermark Photo: Yves Rubin

RESEARCH



David Eisenberg

Breaking the Chain: 'Molecular Cap' Blocks Processes that lead to Alzheimer's, HIV

A new advance by UCLA biochemists has brought scientists one step closer to developing treatments that could delay the onset of Alzheimer's disease and prevent the sexual transmission of HIV.

The researchers report that they have designed molecular inhibitors that target specific proteins associated with Alzheimer's disease and HIV to prevent them from forming amyloid fibers, the elongated chains of interlocking proteins that play a key role in more than two dozen degenerative and often fatal diseases.

“By studying the structures of two key proteins that form amyloids, we were able to identify the small chain of amino acids responsible for amyloid fiber formation and

engineer a 'molecular cap' that attaches to the end of the fibers to inhibit their growth,” said research leader David Eisenberg, director of the UCLA–Department of Energy Institute of Genomics and Proteomics and a Howard Hughes Medical Institute investigator.

The study was published online June 15 in the journal *Nature* and in print July 7.

“This research is an important first step toward the development of structure-based drugs designed against amyloid diseases,” said Eisenberg, who is a UCLA professor of chemistry, biochemistry and biological chemistry, and a member of the California NanoSystems Institute at UCLA. “Our results have opened up an avenue so that universities and industry can start creating therapeutics that could not have been produced 10 years ago.”

Toward delaying Alzheimer's disease

Amyloid fibers are elongated, water-tight structures formed from two linked protein sheets. Proteins from each sheet contribute side chains, causing them to interlock like the teeth of a zipper, Eisenberg said.

The fibers are found not only in Alzheimer's disease but in a variety of conditions, including Lou Gehrig's disease, Parkinson's disease, type II diabetes and a family of disorders related to mad cow disease, among others. In Alzheimer's and other neurodegenerative diseases, amyloid fibers form inside brain cells, destroying them through a mechanism that is still being investigated.

Though many serious diseases are characterized by amyloid fibers, Alzheimer's is the most prevalent, Eisenberg said. Today there are 5 million patients in the U.S. who suffer from Alzheimer's, with 500,000 new cases every year. Alzheimer's health care costs this year alone have been estimated at \$178 billion, including the value of unpaid care for Alzheimer's patients provided by nearly 10 million family members and friends.

“By the year 2050, it is projected that there will be 19 million Alzheimer's patients,” Eisenberg said. “The care of so many patients with this debilitating illness could consume a substantial fraction of the gross domestic product of the United States.” (continued p. 12)

RESEARCH

Breaking the Chain (continued from p. 11)

Eisenberg and his research team found that of the entire tau protein (which forms the amyloid fibrils linked to Alzheimer's), a small chain of just six amino acids — abbreviated VQIVYK — was responsible for the formation of amyloid fibers. By studying the structure of the fibers using microcrystallography, a method developed at UCLA for this research, the team was able to use the fibers as a template to design an inhibitor that could 'cap' the fiber and stop it from growing.

The results were dramatic. The introduction of the inhibitor into a tau protein solution completely prevented amyloid fiber formation, validating the idea that the structure-based design of therapeutics for amyloid diseases is a plausible option.

Despite this success, there is still a long road ahead before a viable therapeutic can be developed to combat the onset of Alzheimer's in human patients, Eisenberg said. The inhibitor, a chain of amino acids, is far too large to penetrate deep into the brain where the tau proteins form amyloid fibers.

"This research is an important step toward identifying smaller molecules that can be utilized to develop a therapeutic," Eisenberg said. "Our goal is to be able to delay the onset of Alzheimer's disease."

Preventing the transmission of HIV

Unlike the tau protein, the SEVI (semen-derived enhancer of viral infection) protein is a far more accessible target for a molecular blocker because it builds amyloid fibers in a vaginal environment, a key process in the sexual transmission of HIV, Eisenberg said.

"The presence of SEVI makes HIV infection through sexual transmission up to 100,000 times more likely," he said. "By blocking SEVI, we have a method for inhibiting the sexual transmission of HIV."

Though the tau and SEVI proteins have different structures and unrelated functions, they both form amyloid fibers with similar morphology, making it possible to design two separate inhibitors using the same process, according to Eisenberg.

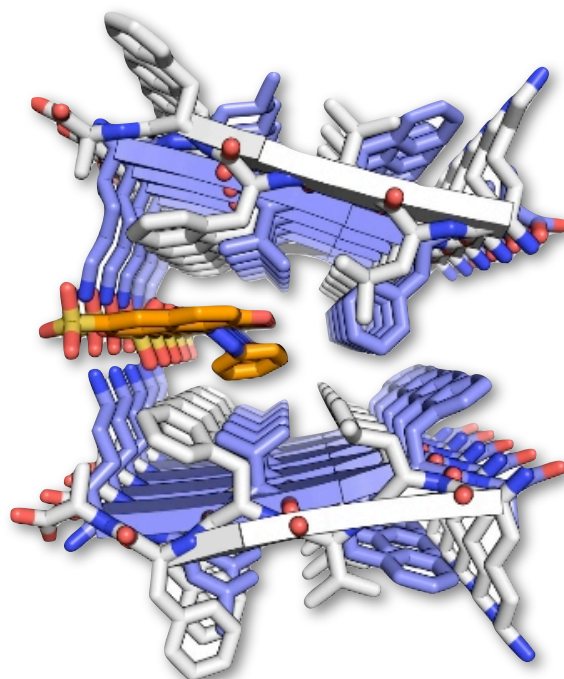
The SEVI blocker proved to be equally effective in preventing fiber growth, bolstering the idea that blockers can be designed for other diseases associated with amyloid fibers as well.

"Though many tests remain, it seems we could be on the way to developing a therapeutic," Eisenberg said. "Our hope is that we could make a blocker that could be applied with a vaginal gel or spray that would help to prevent HIV infection."

The tau and SEVI protein inhibitors were designed using synthetic amino acids, similar to the standard protein building blocks of the human body. But these synthetic amino acids were flipped, as if viewed in a mirror, or had added side chains not normally found in nature. Enzymes in the human body that are programmed to break apart protein-like chains are unable to recognize the non-natural amino acids, keeping the blockers safe to latch on to the target proteins.

This research was federally funded by the National Institutes of Health, the National Science Foundation and the U.S. Department of Energy, as well as by the Howard Hughes Medical Institute and the Joint Center for Translational Medicine.

Other co-authors of this study included UCLA postdoctoral scholars Stuart Sievers and Lin Jiang; UCLA graduate students Howard Chang and Anni Zhao; John Karanicolas, an assistant professor at the University of Kansas; Jason Stevens, an undergraduate at the University of Kansas; David Baker, a professor at the University of Washington; and professor Jan Münch and researcher Onofrio Zirafi, of the University of Ulm in Germany. (continued p. 13)



Protein that forms amyloid fibers in Alzheimer's

RESEARCH/HAPPENINGS

Breaking the Chain (continued from p. 12)**Small molecules, big job**

A second research team also led by Eisenberg recently announced that it had identified four small molecules that bind to amyloid fibers, including a promising candidate called 'orange-G' that wedges into the zipper-like fiber and may be able to break it apart.

This study was published June 14 in PLoS Biology, an online journal of the Public Library of Science.

"These are the first small molecules visualized as they bind to amyloid-like fibers," Eisenberg said. "These small molecules are less likely to be broken up in the body and can potentially be modified to force apart amyloid fibers or serve as diagnostic tools to identify infected areas of the body."

Eisenberg and his research team found that orange-G was uniquely able to pierce the impenetrable "steric zippers" that seal the water-tight amyloid fibers of the amyloid-beta protein that is responsible for forming senile plaques in Alzheimer's disease.

"In 10 years we have gotten to the point where we are starting to understand the structural biology of amyloid fibers and how to inhibit them and how to interfere with them," Eisenberg said. "The next step is to make practical molecules that inhibit and break amyloid fibers — that is the ultimate goal."

Co-authors on this UCLA research included Kym Faull, professor of psychiatry and biobehavioral sciences; Jorge Barrio, professor of molecular and medical pharmacology; researchers Michael Sawaya and Jie Liu; postdoctoral scholars Meytal Landau, Lin Jiang and Stuart Sievers; and graduate student Arthur Laganowsky. *Source: UCLA Newsroom*

Chemistry Never Sounded This Good! (continued from p. 1)

"Making the music video was really fun, and a great way to get out of my comfort zone and at the same time learn some chemistry. I would recommend this course as long as Professor Neil Garg is teaching it."

Myan, a second-year pre-med history major, agreed, saying, "Making this video motivated me to do better in the class. This is my favorite chemistry course by far. It's a lot of thinking and

solving problems; I've learned a lot. Sometimes we forget that learning should be a fun experience."

Myan added that she's "never been superbly great in chemistry" and "it's always been a little hard" for her, although you'd never suspect that watching her sing "We're Yours."

The lyrics to "We're Yours" include"

*Well, I got this chem equation and it's getting pretty hazy
Palladium on carbon and ethanol, that's crazy
With hydrogen molecules, I don't know what to do
But then Garg showed me cat. hydrogenation
Breaking alkenes, what a sensation
Syn addition of hydrogens, it's reduction ...*

*I've been spendin' way too long on this one chem equation
Ozone and DMS, I'm filled with frustration
Alkenes and double bonded O's, please get rid of my woes
I looked at Garg's answer and it all made sense somehow
You split the alkene and add oxygen to each now
You've got two molecules, with carbonyls, wow!*

John and Edgar turned for inspiration to the Beatles, whose "Let It Be" was, of course, a huge hit long before they were born. One of their verses is:

*SN2 electrophiles: primary carbon not tertiary
Lone pairs show nucleophilicity
Use polar aprotic solvent
Tosylates and halides, they will leave
Inversion of stereochemistry*

John, a life sciences major, like many of Garg's students, said, "I looked forward to class with Professor Garg. He turned a class of potential hours of memorization and confusion into a series of intricate logic games with organic molecules. I had a great time with my buddy Edgar making the movie. As I studied for the final, at least twice in my head I've sung a part of our song or a part of another song from last year. Putting the exceptions and rules of thumb to music helps me remember concepts like solvation and which solvent causes which reaction."

Jordan, a second-year psychobiology major, called the course "an awesome experience" and said, "I've never had a professor so qualified in all aspects to teach a class." He added, "After spending so much time learning so many different reactions, a chance to use that knowledge creatively was a very welcome break." (Continued, p.14)

HAPPENINGS

Chemistry Never Sounded This Good! (continued from p. 13)



Counterwise from center: Justin Banaga, Kimberly Bui, and Yannick Gobe (The stars of the 2010 video, "Chemistry Jock") with Neil Garg

The students uniformly agreed that making the videos was great fun.

"We had a great time shooting our video," Rachel said, adding that she and her creative partners knew early on that "we were going for a different feel" from the rap music videos that dominated Garg's class last year.

"Organic chemistry is as difficult as you make it," she said, noting that Garg "does help to make it more interesting and entertaining than I ever thought possible."

"I loved taking Chem 14D with Professor Garg," said Michelle, a neuroscience major who just finished her third year. "It's not one of my best subjects, but he definitely taught us that chemistry doesn't have to be intimidating. We were encouraged to be innovative with the information we learned, and I think that is the thing that I appreciated most about this class."

"My friends and I had a great time making the video. We were looking for ways to create both an entertaining and educational video, and we are happy that we could share that, and most importantly, that other people enjoyed watching it as much as we enjoyed producing it. I learned that there are definitely outlets for creativity in all subjects, including chemistry." Among the inspired lyrics of "O-Chem Toolbox" are these:

*Substitution — think of LG ability
Fluoride, OH, don't do Sn2 on these*

*Nucs attack elects with backside attack
Faster in aprotic solvents; that is a fact
Don't forget to switch your stereochemistry
E1 or E2 lets you make an alkene
It's good to know for your synthesis...*

*Oxymercuration: Markovnikov
Hydroboration: Anti-Markovnikov
Diels Alder: cyclohexene
If you're asked the date just think 1928
If you make epoxide think MCPBA,
Carbonyls from alkenes the ozonolysis way*

Most of the students who take this course "come in with little or no interest in organic chemistry," Garg admitted. They don't end the course that way, though. Last year, only 5 percent started the course with a high interest in organic chemistry, but by the end of the 10 weeks, most of the students said they had a high interest.

Why does Garg offer students this optional extra-credit assignment?

"The majority of the Chem 14D students are hooked on technology, such as the Internet and YouTube," Garg said. "Rather than fighting this, I designed the assignment to take advantage of the students' strengths and interests. I didn't realize at the outset that so many students would create spectacular videos. When you consider the clever lyrics about organic chemistry and the high quality of the video editing and the audio, the TA's and I were extremely impressed by how amazingly creative UCLA's south campus students are."

"Don't believe anyone who says creativity is mostly in the humanities and arts; the evidence otherwise is right in these videos. And for all the time the students put into creating these videos, we give them some extra credit, but not much."

If your musical taste runs more to Lady Gaga, you might enjoy "[Bond This Way](#)," starring Natalie Green, Storm Hagen, Megan Johnson and Kylie Wilson and directed by Brian Tan.

Garg's [course website](#) has all these music videos, and more. Garg called this year's class "Chem 14D Jedi," and many of the videos picked up this "Star Wars" theme, in which the students strive to become "Chemistry Jedis." *Source: UCLA Newsroom*

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