



SIGMA XI NEWSLETTER

Iowa State University
October 2011

CALENDAR 2011-2012

SIGMA XI LECTURE

Neandertals and Us

David Frayer
Department of Anthropology
University of Kansas

Thursday, October 13, 2011
8:00 p.m., Sun Room, Memorial Union

Since their discovery in 1856, Neandertals have generally been considered a different species or an offshoot from the European line with little or no contribution to the people who followed them. Yet, a variety of morphological, metric and genetic traits link Neandertals with their European descendants and living Europeans. Along with new information from Neandertal biology and culture, it is becoming increasingly difficult to eliminate them from a relationship to their successors in Europe. So, for Europeans at least, there is a Neandertal in our closet.

David Frayer is a Professor in the Department of Anthropology, University of Kansas, Lawrence. With degrees from Miami University (BA, 1969), Case Western Reserve University (MA, 1971) and the University of Michigan (PhD, 1976) he has focused on European paleoanthropology and dental anthropology. His early research involved the internal dynamics and long-term evolutionary trends in European Upper Paleolithic and Mesolithic populations. For the past two decades he has extensively published (independently and with a variety of American and European scholars) on the relationship between Neandertal and subsequent European populations. Ongoing research concerns various projects about the Croatian Neandertal site of Krapina, the dental anthropology of an early, preceramic Neolithic site of Merhgarh in Pakistan, early Homo from Eritrea and the so-called 'hobbit' from Flores, Indonesia. He has published widely in national and international books and journals on topics ranging from Neandertal toothpick use to evidence for human massacres in the German Mesolithic to evidence for language origins.

LOCAL HONOR LECTURE

Self-assembling Polymers for Gene Delivery and Biomineralization

Professor Surya Mallapragada
Department of Chemical and Biological Engineering, ISU

Thursday, December 1, 2011
8:00 p.m., Cardinal Room, Memorial Union

We are developing polymers for gene therapy to deliver suicide genes specifically to cancer cells. We have developed techniques to synthesize a family of smart polymers that can undergo changes in response to environmental temperature and acidity conditions and can form complexes with DNA. These polymers and polymer-DNA complexes dissolve in water and the solutions spontaneously form solid gels at physiological temperatures (37°C). Therefore, these polymer-DNA complexes can be used as injectable delivery devices that can be injected subcutaneously or intra-tumorally, and have significant advantages preformed gels as they do not need any invasive surgeries to implant. These gels eventually dissolve in the body and are excreted renally, without the need for any invasive surgeries to remove them. These polymers also form nanoscale structures in solution that can also serve as excellent templates for biomineralization. We have demonstrated that these polymers attached to mineralization proteins can template the growth of inorganic hydroxyapatite nanocrystals similar in morphology to those seen in native bone. We are investigating the use of these polymer templates in conjunction with mineralization proteins/peptides to form bioinspired injectable nanocomposites for potential orthopedic applications.

Surya K. Mallapragada is chair of the Department of Chemical and Biological Engineering and Stanley Chair in Interdisciplinary Engineering at Iowa State. Her research focuses on the development of new polymeric materials for medical applications, including neural tissue engineering, controlled drug and gene delivery, and as templates for biomineralization. The work has implications from cancer therapy to nerve regeneration to single-dose vaccines. Mallapragada is a fellow of the American Association for the Advancement of Science and the American Institute of Medical and Biological Engineering. She is the recipient of an NSF Early CAREER Award and was named one of the World's Top 100 Young Innovators, 2002, by MIT's Technology Review Magazine. She earned her PhD in chemical engineering from Purdue University.

COMING EVENTS

October 13, 2011 (Thursday). Professor David Frayer, University of Kansas, will deliver a National Sigma Xi Lecture at 8:00 p.m. in the Sun Room of the Memorial Union— see page 1 for details. Reception will follow.

November 3, 2011 (Thursday). Science Café will take place at 7:00PM in the downstairs banquet room of Lucullan's restaurant on Main Street. The presentation will be given by Bruce Babcock, ISU Department of Economics, on the topic *Black Gold: Why Iowa Land Prices Have Doubled in Value*. Further details will be given later.

December 1, 2011 (Thursday). Professor Surya Mallapragada, Department of Chemical and Biological Engineering, ISU, will deliver the Local Honor Lecture at 8:00 p.m. in the Cardinal Room of the Memorial Union – see above for details. Reception will follow.

December, 2011. Forms for the nomination of Associate and Full Members, for Undergraduate Research Scholars and for the Promotion of current Associate Members will be available from the Secretary-Treasurer. They will be sent to Department Executive Officers and Department Representatives early in January. Nominations are to be sent to the Secretary/Treasurer, Paul Sacks, 396 Carver. Preferred deadline for receipt of nominations is February 13, 2012, for timely review by the Committee on Membership. Questions on procedures or

qualifications can be addressed at any time to Paul Sacks, 294-8143 or psacks@iastate.edu. The Winter Newsletter (late January) will contain a reminder, and details of the nomination procedures. Guidelines for nomination are a part of the nomination form, which is available online via the National Sigma Xi Website www.sigmaxi.org.

February 13, 2012. Nominations for Promotion, Associate and Full Membership and Undergraduate Research Scholars are due: c/o Paul Sacks, Sigma Xi, Department of Mathematics, 396 Carver Hall ISU.

March 8, 2012: National Sigma Xi Lecturer Professor Mark Batzer, Louisiana State University, will present a lecture, *'The Impact of Retrotransposons on Human Genome Evolution'*, 8:00PM, Sun Room, Memorial Union.

March 2, 2012: Invitations will be sent to those whose nominations have been approved by the Committee on Membership.

March 21, 2012. Deadline for receipt of acceptances from nominees for membership or promotion.

April 10, 2012. Deadline for receipt of ballots for election of committee members.

April 26, 2012 (Thursday). The Annual Initiation Banquet will be held in the Scheman Building. At this event, the initiates (who are the Chapter's guests at the Banquet) are installed as members of Sigma Xi; Undergraduate Research Scholars are recognized and awarded the Lester Earls prize; the Zaffarano Prize for Graduate Student Research is awarded; the Karas Dissertation Award is announced; and the new President is installed. The evening begins with a social hour at 5:30, followed by dinner and the necessary initiation formalities. The evening will conclude with a lecture by the retiring President, Diane Birt, at 8:00 p.m.

PRESIDENT'S MESSAGE

The word on the environment is grim; national, state and local politics are abrasive and we are marking the ten year anniversary of the terrorist attacks that changed our nation in many ways. So how do we cope? My strategy is to look on the bright side and I fully believe that science and engineering are at the heart of the bright side. Don't get me wrong, I'm not saying that we can just expect science and engineering to save us. But it seems to be our primary hope. And of course, our local ISU Sigma Xi chapter is all about holding up science and engineering as solutions for our local, national and global problems.

We are excited to announce our Fall National Honor Lecture, *Neandertals and Us* by David Frayer, University of Kansas, and Local Honor Lecture *"Self-assembling Polymers for Gene Delivery and Biomineralization"* by Surya Mallapragada, Department of Chemical and Biological Engineering, ISU. These promise to be exemplary lectures on timely topics (see details elsewhere in this newsletter). Chris Minion, 2011-12 Program Chair, is taking the lead in organizing these events and if you wish to meet with these scholars please let Chris know. We are actively planning a Science Café featuring Bruce Babcock and *"Black Gold: Why Iowa Land Prices have Doubled in Value"* for Fall 2011 so watch your in-box for the timing and venue. We hope to plan a Spring 2012 Science Café and we invite your suggestions. Further, we are pleased to welcome Lee Burras and Maynard Hogberg to the executive committee. Lee has agreed to serve as the Program Chair in 2012-13 and thence Chapter President in 2013-14. Both Lee's and Maynard's ideas will help spur our chapter on for the next several years. We are excited to have an Animal Ecology undergraduate honors student, Emily Artz, preparing to attend the November 10-13, 2011 Annual Sigma Xi Meeting in Raleigh NC. Emily was awarded a Sigma Xi grant for her honors research project entitled: "Does dispersal in shed bison hair reduce post-dispersal seed removal by granivores in tallgrass prairie?" This project was conducted under the mentorship of Sue Fairbanks, Natural Resource Ecology and Management, ISU.

This is an excellent time for you to be thinking about graduate students, postdoctoral students and colleagues to nominate for Sigma Xi membership. With the demographics of our chapter it is imperative that we all seek to increase membership. Nomination information and the nomination form are available at the national Sigma Xi website: <http://www.sigmaxi.org/member/join/nom.shtml>. The benefits of membership are many including our local and national honor lecture series, Science Café, the Grants in Aid of Research Program (providing \$1000 in funding to young scientists), the stimulating American Scientist magazine and fellowship with

colleagues from a range of disciplines who can keep your excitement about science and technology alive.

We also encourage those of you who have allowed their Sigma Xi membership to lapse, to pay your dues to restore your active membership. Your continued support of the local and national organization is needed.

This is the age of communication and we welcome your input on any aspect of Sigma Xi. We are blessed to live in interesting times.

Diane F. Birt, President, ISU Sigma Xi Chapter 2011-12

GENERAL COMMENTS

We need to have you begin to think about those graduate students and colleagues whom you would wish to nominate for either Associate or Full Membership in Sigma Xi, or for Promotion from Associate to Full Membership. Please take a little time to identify individuals who have impressed you with their achievements or research aptitude necessary for membership. We also encourage you to consider those outstanding undergraduates who have had a research experience and whom you would wish to honor by nomination as Undergraduate Research Scholars. Generally, these Scholars would be initiated as Associate Members; however, an especially research-productive undergraduate might well qualify for Full Membership. General requirements for nomination as an Undergraduate Research Scholar are a good GPA (3.50 or better) and contribution to an original research investigation which has led to a written report, a presentation at an appropriate meeting and/or (preferably) a publication. More details will be given in the *Guidelines for Nomination* which you will receive together with a nomination form in the Winter, 2012 Newsletter. Nomination forms may also be obtained electronically via the Sigma Xi Web site: <http://www.sigmaxi.org/member/join/nom.shtml>. Note also, that recognition as an Undergraduate Research Scholar carries with it not only a certificate but also a monetary award, the Lester Earls Award, made possible by a generous contribution to the ISU Chapter by Professor Emeritus Lester Earls. We do publicize this honor to undergraduates, so do not be surprised by questions you may be asked.

Please let us know of any new faculty or graduate students who are Sigma Xi members and who should be on our mailing list. Also, please let us know if your address is incorrect. We wish to encourage inactive members to pay their current dues and become active (past arrears in dues need not be made up; payment of 2011-12 dues will reactivate your status). We encourage ISU members and active Ames residents who have other affiliations to join the ISU Chapter. If you wish to change your affiliation or return to active status, please contact me for assistance.

Paul Sacks, Secretary-Treasurer
Department of Mathematics
396 Carver Hall
515-294-8143 psacks@iastate.edu

2009-2010 MEMBERSHIP ACTIONS

The annual initiation banquet took place on Thursday, April 28, 2011 at the Scheman building. There were a total of 56 in attendance at the initiation Banquet, including 9 initiates and promotees, and including 2 new Golden Anniversary members. For the year there are a total of 12 initiates plus one individual promoted to Full Membership, see below for details. The Graduate College recognized one 1 Zaffarano Prize Awardee, 2 Zaffarano Honorable Mentions, one Karas Award Winner and one Karas Award Honorable Mention.

The Banquet and Award and Initiation Ceremonies were followed by the Retiring President's Address, Steven Martin, Distinguished Professor of Materials Science and Engineering, ISU: *New chemistries for new lithium batteries for a green future: Why the Chevy Volt only goes 40 miles on a charge.*

2011 INITIATES

FULL MEMBERSHIP

Ramkrishna Adhikary*	Chemistry
David C. Cantu	Chemical and Biological Engineering
Leslie Hogben	Mathematics
Firoz Jaipuri	New Link Genetics
Hailiang Liu	Mathematics
Siu-Hung (Richard) Ng	Mathematics
Amit Pande**	Computer Engineering
Sunder Sethuraman	Mathematics
Alan D. Wanamaker Jr.	Geological and Atmospheric Sciences

* Zaffarano Prize **Zaffarano Prize Honorable Mention

PROMOTION TO FULL MEMBERSHIP

Ian C. Schneider	Chemical and Biological Engineering
------------------	-------------------------------------

ASSOCIATE MEMBERSHIP

Yongfeng Ai	Food Science and Human Nutrition
Zhiyi Qiang	Food Science and Human Nutrition
Bing Wang	Veterinary Microbiology and Preventive Medicine

OFFICERS OF THE CHAPTER

President	Diane Birt
President Elect	F. Chris Minion
President Emeritus	Steve Martin
Secretary-Treasurer	Paul Sacks

COMMITTEE ON MEMBERSHIP

Amy Bix	2009-12
Nick Christians	2009-12
Thomas Sauer	2010-13
Curtis Struck	2010-13
L Keith Woo	2011-14
Susan Lamont	2011-14

Executive Committee

Diane Birt	2009-12
David White	2010-12
W. Sue Fairbanks	2010-13
F. Chris Minion	2010-13
Paul Sacks	2010-13
Lee Burras	2011-14
Maynard Hogberg	2011-14

NOMINATING COMMITTEE (one-year terms)

Philip Dixon John Lajoie
Judy Vance