



SIGMA XI NEWSLETTER

Iowa State University
October 2010

CALENDAR 2010-2011

SIGMA XI NATIONAL LECTURER

Climate Change: What Could Happen and What Can Earth's Past Tell Us?

Bette L. Otto-Bliesner
National Center for Atmospheric Research, Boulder CO

Thursday, October 21, 2010
8:00 p.m., Sun Room, Memorial Union

"Warming of the climate system is unequivocal." This bold statement from the 2007 report of the Intergovernmental Panel on Climate Change is based on many observations, including increases in global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. In this presentation, we will explore the evidence for climate change over the last century and the role of human actions. We will also consider the increasing array of impacts expected over the next century and beyond as greenhouse gas emissions continue to disrupt the Earth system. These include longer droughts and other changes to precipitation patterns, increasing acidity of the oceans and loss of coral reefs, and melting from the Greenland and Antarctic ice sheets contributing to greater sea level rise. These future changes will be put in the perspective of Earth's past. Evidence from natural recorders of climate such as tree rings and ice cores tells us about past warm periods and their causes, about megadroughts lasting decades or longer, and about sea level much higher than present.

Bette Otto-Bliesner is a senior scientist at the National Center for Atmospheric Research in Boulder, Colorado. She uses computer-based models of Earth's climate to investigate past climate change and climate variability across a wide range of time scales. She is particularly interested in the naturally forced climate change of the glacial-interglacial cycles of the last million years. Otto-Bliesner was a lead author on the Fourth Assessment Report generated by the Intergovernmental Panel on Climate Change, which shared the Nobel Peace Prize with Al Gore in 2007. She received her PhD in meteorology from the University of Wisconsin, Madison.

This lecture is also part of the Live Green! Sustainability Series and Women in STEM Series.

LOCAL HONOR LECTURER

Algorithmic Thinking in Biology

Professor Vasant Honavar
Department of Computer Science, ISU
Director, Center for Computational Intelligence Learning and Discovery

Thursday, November 18, 2010
8:00 p.m., Cardinal Room, Memorial Union

Over the past several decades, biologists have been accumulating detailed knowledge of the building blocks of biological systems e.g., DNA, RNA, proteins, cells, tissues, organs, organisms, and ecologies. The emergence of high-throughput techniques, e.g., for measuring the expression of thousands of genes under different perturbations, has made possible system-wide measurements of biological variables. The result is an ongoing transformation of biology from a data-poor science into an increasingly data-rich science. Despite these advances, biology today, much like physics was before Newton and Leibnitz, has remained a largely descriptive science.

This talk is organized into two main parts. The first part of the talk will argue for a central role for algorithmic or computational thinking – not just the use of computers -- in transforming biology from a descriptive science into a predictive science. I will make a case that biology is, at a useful level of abstraction, fundamentally an information science. Genes, genomes, cells, tissues, organisms, ecologies, and evolutionary processes can be described as processes that acquire, encode, process, and use information. Thus, algorithms : biology :: calculus : physics. In the second part of the talk, I will present some examples of the applications of algorithmic approaches (e.g., statistical machine learning, comparative sequence and network analysis) in biology, with emphasis on analysis and prediction of the relationships between macromolecular sequence, structure, interaction, and biological function.

Iowa State professor of Computer Science Vasant Honavar directs the university's Center for Computational Intelligence, Learning and Discovery. Much of his work is aimed at helping scientific researchers access, use and share massive amounts of data. Both NSF and NIH have funded Honavar's advances in machine learning, artificial intelligence, and bioinformatics. These include developing algorithms and software that allow researchers to integrate and analyze dissimilar forms of data and thus collaborate across organizational and disciplinary boundaries. Honavar earned his PhD in computer science and cognitive science from the University of Wisconsin, Madison. Sigma Xi Local Honor Lecture.

COMING EVENTS

October 21, 2010 (Thursday). Professor Bette L. Otto-Bliesner, NCAR, will deliver a National Sigma Xi Lecture at 8:00 p.m. in the Sun Room of the Memorial Union– see page 1. Reception will follow.

November 18, 2010 (Thursday). Professor Vasant Honavar, Department of Computer Science, ISU, will deliver the Local Honor Lecture at 8:00 p.m. in the Cardinal Room of the Memorial Union – see above. Reception will follow.

December, 2010. 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 14, 2011, 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, a summary of the nomination procedures and a nomination form. Guidelines for nomination are a part of the nomination form. Nomination forms are available online via the National Sigma Xi Website www.sigmaksi.org. Details will be noted in the January 2011 Newsletter.

February 14, 2011. 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.

February 24, 2011: National Sigma Xi Lecturer Dr. Lisa Weasel, Portland State University, will present a lecture, 'DNA at the Dinner Table: The Global Politics of Genetically Modified Food', Time and location TBA.

March 1, 2011: Invitations will be sent to those whose nominations have been approved by the Committee on Membership.

March 21, 2011. Deadline for receipt of acceptances from nominees for membership or promotion.

April 11, 2011. Deadline for receipt of ballots for election of committee members.

April 28, 2011 (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 an address by the retiring President, Steve Martin, at 8:00 p.m.

PRESIDENT'S MESSAGE

The busy schedule of classes, research, service, and outreach activities has once again settled in upon us at Iowa State and I am sure, like me, you are wondering how everything you've committed yourself to will get done, let alone all things you would like to do. Even this annual letter to you is being written as I wait for a delayed plane in La Guardia bound for a speaking engagement at Cornell University. Already I've sent out numerous e-mails, confirmed all is well with my class that is being proctored for me in my absence, and organized for one of my Ph. D. students to give his preliminary oral exam next week.

We are all perhaps too busy and things we would like to do get dropped, and certainly, your participation in the activities of your local Sigma Xi Chapter might also be an added item to your schedule.

We recognize your commitments and for this reason keep our activities to a few highly focused and high quality events, typically held in evening. This academic year, we celebrate our 90th year of active service to ISU and perhaps this might give us all a reason to reflect upon all of the previous ISU Sigma Xi members who have helped our chapter thrive over the years. I encourage you to participate in our evening seminars from world recognized faculty from around the country and from right here at ISU. This year's fall lecture program, assembled by President-Elect Diane Birt, includes a local Honor Lecture by Professor Vasant Honavar, from the ISU Computer Science department, and in October we will welcome Sigma Xi National Lecturer Dr. Bette Otto-Bliesner from NCAR. Details about these two evening lectures are given elsewhere in this newsletter. We have also continued the Science Cafe' programs that Bill Simpkins initiated last year – hosting a critical examination of the occurrence of flooding in the greater Ames area. Look for more exciting programs this coming spring, including the Annual Initiation Banquet in April.

Finally, it is important for the health and vitality of our Chapter to hear from you about how we can better serve your research interests. Please feel free to contact any of the Executive Committee, listed below, with ideas for activities, seminars, and/or lectures. We also encourage you to nominate students, post-doctoral fellows, staff, and faculty for Sigma Xi membership. You will find a nomination form in the next Newsletter, but you can obtain one right now at the Sigma Xi website: <http://www.sigmaksi.org/member/join/nom.shtml>. Membership benefits include our lecture series, access to the Grants in Aid of Research Program which provides \$1000 in funding to

young scientists, fellowship with lively colleagues from a range of disciplines who share a broad curiosity about science and technology, and last (but not least) the top-ranked American Scientist magazine. You should also nominate deserving students for the Zaffarano Prize for Graduate Research and the Karas Award for Outstanding Dissertation in the Behavioral Sciences. It is through your continued support that our Chapter will continue to serve the ISU research community for another 90 years.

Best wishes for a healthy, enjoyable, and productive 2010-2011 academic year.

Steve W. Martin, President

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 the research aptitudes 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. Details will be given in the *Guidelines for Nomination* which you will receive together with a nomination form in the Winter, 2010 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 2010-11 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

2009-2010 MEMBERSHIP ACTIONS

There were a total of 64 in attendance at the initiation Banquet, including 11 initiates and promotees, and including 5 new Golden Anniversary members with their spouses. In total, there were 13 initiates plus two individuals promoted to Full Membership. The initiates fall into the following categories: 11 New Full Members, 2 promoted to Full Membership, and 2 new Associate Members; 5 graduate students, 3 in non-academic related positions, 2 in academic positions other than at ISU, and 5 ISU faculty. The Graduate College recognized one Zaffarano Prize Awardee, 2 Zaffarano Honorable Mentions, and one Karas Award Winner. The 4 prize winners were all initiated as Full Members in Sigma Xi.

A surprise event, not included in the formal program, was a recognition of Harry Weiss' service as Secretary-Treasurer for 18 years. A number of Past Presidents with whom Weiss had served were invited to attend the Banquet, and each gave a brief presentation of his or her interaction with Weiss. Weiss is retiring as Secretary-Treasurer at the end of this fiscal year. Paul Sacks of the Mathematics Department has agreed to serve as Secretary-Treasurer for a 3-year term, with an option for renewal.

The Banquet and Award and Initiation Ceremonies were followed by the address of the Retiring President's, Steven Kawaler, Professor of Physics & Astronomy, ISU: *One Astronomer's View of Why We Must do Astronomy from Space*.

2010 INITIATES

FULL MEMBERSHIP

Khalil Ahmad	Minnesota Pollution Control Agency
Sarah D. Cady+	Chemistry
Christopher H. Chandler	Ecology, Evolution and Organismal Biology
Joan E. Cunnick	Animal Science
William Edwards**	Kinesiology
Yili Hong*	Statistics (VPI)
Jong-Tae Park	Food Science and Human Nutrition
Jun Wang**	Materials Science and Engineering
Daniel A. Warner	Ecology, Evolution and Organismal Biology
Aoshuang Xu	Merck & Co., Inc.
Shengqiang Zhong	Monsanto Corporation

- * Zaffarano Prize
- ** Zaffarano Prize Honorable Mention
- + Karas Award

PROMOTION TO FULL MEMBERSHIP

Hongxin Jiang	Food Science and Human Nutrition
Ann E. Russell	Natural Resource Ecology and Management

ASSOCIATE MEMBERSHIP

Nan Huang	Food Science and Human Nutrition
Jeanine M. Refsnider	Ecology, Evolution and Organismal Biology

OFFICERS OF THE CHAPTER

President	Steve Martin
President Elect	Diane Birt
President Emeritus	Steven Kawaler
Secretary-Treasurer	Paul Sacks

COMMITTEE ON MEMBERSHIP

Mark Gleason	2008-11
Carol Vleck	2008-11
Amy Bix	2009-12
Nick Christians	2009-12
Thomas Sauer	2010-13
Curtis Struck	2010-13

Executive Committee

Steve Martin	2008-11
Harry Horner	2008-11
Diane Birt	2009-12
David White	2010-12
W. Sue Fairbanks	2010-13
F. Chris Minion	2010-13
Paul Sacks	2010-13

NOMINATING COMMITTEE (one-year terms)

Jay-Lin Jane Thomas Jurik
Charles Schwab