Seventeenth Lecture in the Series

James P. Holland Memorial Lecture

Monday, October 24, 2016, at 4:00 p.m.

Myers Hall 130 (915 East Third Street)
Indiana University Bloomington campus

Cryo-EM for the visualization of structure, interaction, and dynamics

Eva Nogales, Ph.D.

Professor of Biochemistry and Molecular Biology, University of California, Berkeley

Nogales lab members are dedicated to gaining mechanistic insight into two important areas of eukaryotic biology: (1) central dogma machinery in the control of gene expression and (2) cytoskeleton interactions and dynamics in cell division. The unifying principle in their work is the study of macromolecular assemblies as whole units of molecular function by direct visualization of their architecture, functional states, and regulatory interactions. To gain a molecular understanding of their systems of interest, lab members use cryo-electron microscopy (cryo-EM), a structural methodology that overcomes the requirement for crystallization, needs very little amount of sample, and can deal with conformational or compositional heterogeneity. Dr. Nogales will provide an update on their efforts in the study of microtubule dynamics and eukaryotic transcription initiation.

Thanks to our generous Indiana University Holland lecture sponsors:

Office of the Vice President for Diversity, Equity, and Multicultural Affairs
Office of the Provost
Office of the Vice Provost for Research
College of Arts and Sciences
Department of Biology
Medical Sciences Program

Courtesy photo

About Eva Nogales

Eva Nogales is an international leader in the field of molecular biophysics as well as in the use of electron microscopy (EM) to determine the fine scale structure of proteins. Among other things, her research strives to advance knowledge on microtubule dynamics and transcription initiation in cells. Dr. Nogales' groundbreaking work has uncovered the structure and function of proteins in these processes, which has broader relevance to the treatment of cancer and other diseases.

Professional Experience

Senior Faculty Scientist at Lawrence Berkeley National Laboratory, Molecular Biophysics and Integrative Bioimaging Division, 2015–present
Chair, Biochemistry, Biophysics and Structural Biology Division, MCB Department, UC Berkeley, 2015–present
Professor of Biochemistry, Biophysics, and Structural Biology; Molecular and Cell Biology Department; UC Berkeley, 2006-present
Investigator, Howard Hughes Medical Institute, 2000–present

Education

Lawrence Berkeley National Laboratory Life Science Division, Postdoctoral Fellow, Biophysics, 1993–1995
Keele University, UK, Ph.D., Biophysics, 1993
Universidad Autónoma de Madrid, Spain, B.S., Physics, 1988

Honors

Elected member of American Academy of Arts & Sciences, 2016
Elected member of National Academy of Sciences, 2015
Keith Porter Lecture Award, ASCB, 2016
Mildred Cohn Award in Biological Chemistry by the American Society for Biochemistry and Molecular Biology, 2016
Distinguished Role Model in the Life Sciences, Northwestern University, 2015
American Society for Cell Biology Early Career Award 2005
Chabot Science Award for Excellence, 2005

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Holland Lecturers

2000 Homer A. Neal
2001 S. Allen Counter
2002 Tyrone B. Hayes
2003 Scott V. Edwards
2004 Maydianne Andrade
2005 Ivette Perfecto
2006 Erich D. Jarvis
2007 Paul Turner
2008 Rick Kittles
2009 Harmit M. Singh
2010 Carlos Bustamante
2011 Adriana D. Briscoe
2012 Cassandra G. Extavour
2013 Paul Barber
2014 Joaquín M. Espinosa
2015 Graciela A. Unguez
2016 Eva Nogales

Holland Teaching Award Recipients

Michael Tansey
Akwasi B. Assensoh
Robert B. Affe
Massimo Scalabrini
George Malacinski
Georgia K. Strange
Albert Ruesink
Bruce Solomon
Richard B. Miller
James H. Madison
James M. Walker
Christoph Irmscher
P. David Polly
Anne Pyburn
Eric Sandweiss
Constance Furey
Mark Messier
Amy Berndtson

Holland Fellows

1998-99 Liana Bulmer
2000-01 Antiño Allen
2001-02 Jan Lee Santos
2002-03 Christopher Boston
2003-04 Leleña Avíla
2004-05 Adrian Land
2005-06 Kyle Wayne
2006-07 Adrienne Jones
2007-08 Samuel Miller
2008-09 Lesley Weaver
2009-10 Sheya Martin
2010-11 Nikki Rendon
2011-12 Delawrence Sykes
2012-13 David Thoms
2013-14 Aisha Burton and Amilcar Perez
2014-15 Lekeah Durden
2015-16 Jay Goldberg
2016-17 Anne MacKenzie

About James Holland and the Lecture Series

The James P. Holland Memorial Lecture Series was initiated in the fall of 2000, and is now organized by the Herman C. Hudson and the James P. Holland Scholars Program and the Department of Biology. The lectures honor the memory of one of the most beloved faculty members on the Bloomington campus. Professor Holland had a passion for teaching that earned him virtually every teaching award offered on campus, including the President's Award for Distinguished Teaching. This lecture series honors his legacy and is designed to bring awareness of and support to diversity in the life sciences.

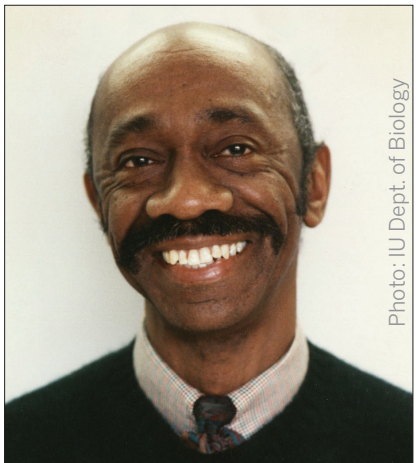
Photo: IU Dept. of Biology
Professor James P. Holland, 1934–1998

Professor Holland worked tirelessly to address the needs of minority students. He created biology's summer enrichment program, which brings Indiana minority high school students to campus to attend science lectures and participate in hands-on laboratories. The program is designed to spark their interest in science and provide a taste of college life. Holland and the late Herman C. Hudson joined forces to found IU's Minority Achievers Program (MAP) and the Mathematics and Science Scholarship Program (MASS). In 2003 the programs were named after Hudson and Holland to honor the efforts of these two men.

James Holland came to Indiana University to study zoology, earning a master's degree in 1958 and a doctorate three years later. Holland was on the Howard University faculty until 1967, when he returned to IU as an associate professor in the Department of Biology, advancing to full professor in 1974. His research involved reproductive endocrinology, and he examined the mechanism by which thyroid hormones influence female reproductive physiology.

From recruiting and mentoring students to serving as associate dean and interim dean of the graduate school, Professor Holland's commitment to the university was exceptional. He was a recipient of IU's Distinguished Service Award, the Herman B Wells Lifetime Achievement Award, and the Distinguished Alumni Service Award. Jim Holland taught over 11,000 undergraduates during his IU career, and his talent for teaching earned him a FACET award, given to exceptional teachers who inspire both students and colleagues. He was the first to receive the Chancellor's Medallion for his "transcendent efforts on behalf of the university."

It was his wife, Constance, who created the **James Philip Holland Teaching Award for Exemplary Teaching and Service to Students**. Mrs. Holland—a highly respected, award-winning secondary school teacher—established the award to recognize others who shared the Hollands' passion for teaching. Amy Berndtson, senior lecturer in biology, is this year's recipient.

About the Holland Fellowship

Biology established the James P. Holland Graduate Fellowship in Biology to honor Professor Holland, who died of cancer at the age of 63. He was a member of our faculty for 31 years, loved science, and—as indicated above—was a truly dedicated teacher and mentor.

The Holland Fellowship supports the training of a first-year Ph.D. graduate student from groups underrepresented in the life sciences. This fellowship provides stipend, tuition, and health insurance during the first year of graduate training for the Ph.D. degree. The total support package amounts to a minimum of $60,370 per year. Anne MacKenzie is the 2016–17 recipient of the James P. Holland Graduate Fellowship in Biology.


Photo: IU Dept. of Biology
Anne MacKenzie

Anne MacKenzie, who goes by Annie, is from Camarillo, CA. She attended Gonzaga University in Spokane, WA, where she graduated with a B.S. in Biology. During her time at Gonzaga, Annie discovered her passion for science and spent two years in the lab of Dr. Kirk Anders studying aneuploidy in budding yeast. She became fascinated by how science works at the molecular level. When applying to graduate school, Annie knew she wanted to attend a school that had a strong program focused on discovery-based research.

During her interview weekend at IU, Annie was impressed by the many Genome, Cell & Developmental Biology Program faculty members whose research interested her. She says that the faculty, staff, and graduate students she met that weekend were welcoming and genuine. It was this combination of interesting science and friendly people that drew her to IU.