Department of Biology
The College of Arts + Sciences | Indiana University Bloomington

Tracy M. Sonneborn Lecture

Thu., Apr. 28, 2016 • 4–5:00 p.m. • Myers Hall 130

Jasper Rine, Ph.D.

Howard Hughes Medical Institute Professor
Professor of Genetics, Genomics, and Development
University of California, Berkeley

Epigenetic inheritance meets metabolism

Epigenetic mechanisms of inheriting information continue to reveal fundamental insights into chromatin biology and the functional organization of eukaryotic chromosomes. Heterochromatin in *Saccharomyces* is a specialized structure of chromatin that can template its own replication though the function of SIR proteins bound to nucleosome tails, including Sir2, the founding member of the sirtuin superfamily of protein deacylases. Dr. Rine will present his present understanding of how heterochromatin achieves gene silencing in the absence of DNA methylation, and focus on experiments at single cell resolution that illuminate heterochromatin formation, transient lapses of gene silencing, and how metabolism and oncometabolites influence heterochromatin and gene silencing.

Hosted by Scott Michaels
Professor of Biology and Director of IU Center for Genomics & Bioinformatics

Refreshments served prior to seminar

Support for this lecture has been provided by the Sonneborn Lecture Fund and the IU Department of Biology. Learn more at http://www.bio.indiana.edu/events/lectures/sonneborn.shtml.

Jasper Rine is a man of "silence."

"He studied mice and men and the canine beast, but his favorite thing is the noble yeast," sang Eric Lai in reference to Professor Jasper Rine. As a graduate student in the late 1990s at University of California, San Diego, Lai was entranced by a seminar Rine presented at San Diego. Lai renamed his now-defunct (1996-99) punk-rock band "The Jasper Rine."

Lai's song is true. As a geneticist, Jasper Rine studies issues of gene regulation, cell biology, and genomics in organisms ranging from yeast (*Saccharomyces cerevisiae*) to humans to dogs (as the founder of Dog Genome Project, Rine led the team that developed the first complete genetic map of the dog). In yeast, his group identified the Sir genes that are responsible for forming heterochromatin at specific positions in the genome. They discovered heterochromatic spreading from silencers and studied the spreading mechanism through biochemical and genetic studies. Rine and lab members also discovered the epigenetic inheritance of silenced chromatin, as well as the first mutations in the Origin Recognition Complex—establishing a link between DNA replication and silencing.

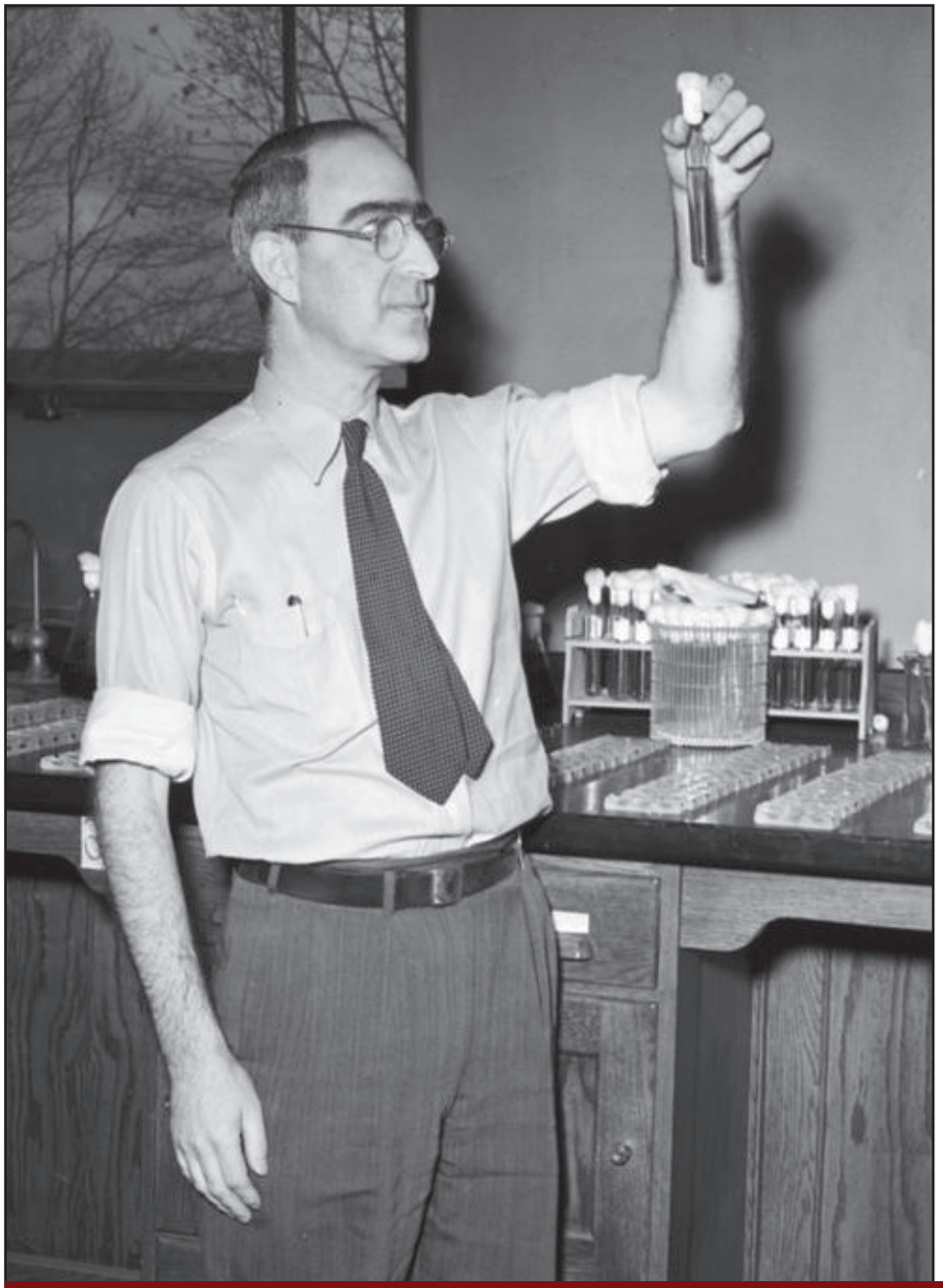
While best known for their studies in yeast, more recently Rine and lab members have focused on exploring the functional consequences of human genetic and epigenetic variation with the goal of understanding and reducing the incidence of two common birth defects and the mechanism of particular driver mutations in human cancer.

Jasper Rine received his Ph.D. in molecular genetics from University of Oregon in 1979. He joined the University of California, Berkeley faculty in 1982. He was named a Howard Hughes Medical Institute Professor in 2006. Rine is currently Professor of Genetics, Genomics, and Development in Berkeley's Department of Molecular and Cell Biology.

Rine received the Distinguished Teaching Award at UC Berkeley in 1997. Students have dubbed his research seminars "Rinestone" lectures because they are "gems." Rine has noted that traditional science teaching relies too much on memorization—"which is looking backward" rather than "asking a question, obtaining data, and interpreting it." A focus of his HHMI professorship is to overhaul introductory biology laboratory instruction.

Jasper Rine is a member of National Academy of Sciences, American Academy of Arts and Sciences, and American Society of Microbiology. He is a fellow of American Association for the Advancement of Science.

http://mcb.berkeley.edu/labs/rine/



Tracy M. Sonneborn (1905–1981)

Photo courtesy of IU Archives

To learn more about Dr. Sonneborn, read John Preer's essay and 2006 commentary in *Genetics* 172:1373–77.

About Tracy M. Sonneborn

Aside from a few years at Johns Hopkins University, where he received the Ph.D. degree, Tracy Sonneborn spent his entire career at Indiana University. His devotion to the study of *Paramecium* established him as the world leader in biology and genetics of protozoa; indeed it is no exaggeration to say that he founded the modern era of study in these areas.

One of his major contributions was in demonstrating that preexisting structures in cells can repeatedly determine the patterns of new structures through many generations. Although recognized as an important exception to Mendelian inheritance and a critical element in prion diseases, the mechanism of structural inheritance in biology is not yet understood. "Whatever the final outcome of studies of these phenomena, he must take his place among the most brilliant and devoted experimentalists in the history of biology and a true giant, like no other, in the field of protozoan research," John Preer.

With precision, thoroughness, and infectious enthusiasm—Tracy Sonneborn also contributed unstintingly to teaching at Indiana University. In spite of the many attempts to entice him away, he remained loyal to IU, finding here the environment he thought was best.

To honor his contributions to science and his outstanding career, Tracy Sonneborn's friends and colleagues initiated the Sonneborn Lectureship. This is the 32nd lecture in the series.

Past Lectures

2013	Eric F. Wieschaus
2011	Joseph G. Gall
2011	C. David Allis
2010	Tian Xu
2009	Terry L. Orr-Weaver
2007	David Baulcombe
2006	J. Richard McIntosh
2005	Cynthia Kenyon
2003	Sharon Long
2002	Philip Hanawalt
2001	David Prescott
2000	Elliot Meyerowitz
1999	John Kilmartin
1998	James Forney, Eric Meyer, Meng-Chao Yao, John Preer
1997	Randy W. Schekman
1996	Lucy Shapiro
1995	Gerald M. Rubin
1994	Christine Guthrie
1993	Christiane Nüsslein-Volhard
1992	Melvin I. Simon
1991	Elizabeth H. Blackburn
1990	Thomas R. Cech
1989	Ira Herskowitz
1988	Franklin Stahl
1987	David Botstein
1986	Mark Ptashne
1985	David S. Hogness
1984	Gerald R. Fink
1983	Philip Leder
1982	Donald D. Brown
1981	Charles Yanofsky