One of the most important microbiologists of his generation, John Woodland “Woody” Hastings shed light on the phenomenon of bioluminescence, pioneered our understanding of circadian clocks, and taught us that Nature’s simplest creatures talk to each other in a chemical language of their own.

The Paul C. Mangelsdorf Professor of Natural Sciences, *Emeritus,* Hastings died at his home on August 6, 2014 at age 87. He was married for 56 years to Hanna Machlup Hastings, who died in 2009. He is survived by his four children Jennifer, David, Laura and Marissa, five grandchildren, and his late-in-life companion Barbara Cheresh. Born in Delaware on March 24, 1927, Hastings was the son of Vaughan A. Hastings and Katherine Anne Stevens. He graduated from Swarthmore College in 1947 and received his doctorate from Princeton University in 1951. He was a postdoctoral fellow at Johns Hopkins University from 1951 until 1953. Afterwards, Hastings accepted a faculty position at Northwestern University and then joined the Biochemistry Department at the University of Illinois at Urbana-Champaign in 1957. Finally, in 1966 Hastings moved to Harvard University, becoming a member of the Department of Biology and later its offshoot, the Department of Molecular and Cellular Biology.

Hastings was fascinated by biological luminescence, a phenomenon he studied in depth in bacteria and dinoflagellates but also in ctenophores, coelenterates, fungi, hydrozoans, ostracods, krill, jellyfish, squid, polynoid scale worms, and several species of fish. Hastings and his longtime collaborator, senior research associate Thérèse Wilson, studied the biochemistry of the luciferase enzymes that produce light. Wilson and Hastings co-wrote a captivating book on bioluminescence called Bioluminescence: Living Lights, Lights for Living that takes the reader from the biochemical reactions that produce light to the vast diversity of bioluminescent organisms to myriad functions and evolutionary origins of this remarkable biological phenomenon. The art and science of bioluminescence were celebrated with performance and educational talks at a special event held in Hastings’s honor at the Science Center in 2012. Hastings famously led late night swimming excursions at Woods Hole during departmental retreats where efforts at modesty were defeated by his beloved dinoflagellates who lit up the waters as the swimmers jumped into the sea.

Hastings love of luminescence led him into the world of biological clocks. Organisms ranging in complexity from bacteria and fungi to insects and humans have autonomous, circadian clocks whose rhythmicity approximates (*circa*) the 24 hour alternation of day and night. Entrained by light, these time keeping devices enable organisms to coordinate their physiology and behavior with diurnal cycles in the environment. Hastings discovered that his model bioluminescent organism, the dinoflagellate Gonyaulax, produced light only at night and when artificially maintained under constant light conditions continued to glow in this alternating cycle of about 24 hours. Hastings realized that bioluminescence was a visible manifestation of a circadian clock and could be harnessed as a tool for studying circadian rhythms, an approach that was later adopted by researchers studying biological clocks in other organisms. He framed many of the foundational concepts in the field, including that the clock is cell-autonomous, that it is entrained by light, and that it is temperature compensated.

Bioluminescence led Hastings into his most unexpected and ultimately most influential discovery: bacteria communicate with each other by releasing and responding to small molecules that he dubbed autoinducers in a phenomenon that was later called quorum sensing. Hastings was led to this discovery in his studies of a bioluminescent marine bacterium, *Vibrio fischeri*. Hastings discovered that the light-emitting, luciferase enzyme was only produced when the culture reached a high population density. Hastings and his postdoctoral associate Ken Nealson and others in the Hastings laboratory found that the conditioned medium of a culture that had grown to high numbers of cells contained a substance that would trigger light emission by cells at an early stage of growth. In other words, only when this substance, the autoinducer, reaches a threshold concentration do the cells in the population produce luciferase. Bacteria are not loners that go about their business without regard to their neighbors in the community. Rather, producing light is something to do only when there is a quorum. The autoinducer hypothesis nicely explained why individual marine bacteria in the ocean do not glow but do so in the light organs of certain fish and squid where they reach sufficiently high population densities. Nonetheless, Hastings autoinducer hypothesis was greeted by skepticism both in the larger community and even by prominent colleagues at Harvard. Now we know that many if not most microbes engage in chemical communication both within a given species and between different species. For example, certain pathogenic bacteria delay producing toxins until their numbers increase to a high level in their host. Strength in numbers enables these pathogens to overwhelm the defense mechanisms of their host.

Hastings was also a dedicated educator and mentor, having taught introductory biology courses in the College and having served co-Master of North House (now Pforzheimer) with his wife Hanna for twenty years. He was actively involved in the summer teaching program at the Woods Hole Marine Biological Laboratories where he taught and helped lead the famous Physiology course. Hastings also served as a Trustee of the Marine Biological Laboratories which lowered its flag in his memory.

Hastings was the recipient of numerous awards and prizes, including election to the National Academy of Sciences. A beloved colleague, Hastings is deeply missed by his friends and colleagues at Harvard and the many scientists and students whose lives he influenced.

Respectfully submitted,

Colleen Cavanaugh
Jay Dunlap
Peter Greenberg
Roberto Kolter
Richard Losick, Chair