Watson School 2010 graduates

In its 11th year, the Watson School has produced a bountiful harvest.
Ten extraordinarily talented students, who all matriculated between 2004 and 2006, earned Ph.D.s
this April. Here's a brief glimpse into their work and experiences at CSHL.   **Hema Bashyam**

Galen Collins
Wabash College
Beckman Graduate Student
"Activator Turnover and Proteolysis in Transcriptional Activation"

In William Tansey's laboratory, Galen worked on the seemingly existential question of how the very first step in a protein's life—its production from genes—is linked to the very last step—its destruction by a cellular machine called the proteasome. Galen's research shows that the proteasome can actually help switch on genes (and trigger protein production) by increasing the turnover of the genes' "on" switches.

Yaniv Erlich
Tel Aviv University
Goldberg-Lindsay Fellow
"Compressed Sequencing"

Yaniv came to CSHL after hearing his college mentor describe it as "the Mecca of molecular biology." In Greg Hannon's laboratory, he worked at the interface of biology and computing, developing, among other things, a novel method that uses the logic of the popular game Sudoku to harness the power of next-generation DNA sequencing. He is the third Watson School student to win the prestigious Weintraub Award, an international prize for outstanding graduate research.

Oliver Fregoso
University of California, Santa Cruz
Seraph Foundation Fellow
William Randolph Hearst Scholar
"Elucidating the Functions of Splicing Regulatory Proteins Through the Use of High-Throughput Proteomics"

In Adrain Krainer's laboratory, Oliver learned "to approach scientific questions critically and creatively." Krainer is a leader in the field of RNA splicing, the process by which RNA transcripts made from DNA are edited before being translated into protein. Oliver applied the tools of proteomics—the large-scale analysis of the structure and function of proteins—to decipher how proteins that modulate splicing also regulate other processes within the cell.

Amy Leung
Cornell University
Beckman Graduate Student
"Regulation of Chromatin by Histone H2B Ubiquitylation"

As a participant in the Undergraduate Research Program (URP) at CSHL, Amy found that the faculty "makes it a priority to teach and mentor young scientists," and stayed for graduate studies. In William Tansey's laboratory, she investigated how genes are turned on and off at the right time even though cells tightly package their DNA into structures called chromatin. She showed how the attachment of a molecule, ubiquitin, to certain chromatin proteins alters chromatin, and thereby, gene activity.

Hiroshi Makino
University of St. Andrews
Elisabeth Sloan Livingston Fellow
"AMPA Receptor Dynamics and Synaptic Plasticity at Excitatory Synapses"

Communication between the brain's neurons is strengthened when molecules called receptors amass at the synapse, the gap between neurons. Mentored by Roberto Malinow, Hiroshi resolved the long-standing controversy of how some of these molecules, the AMPA receptors, are derived and how they help control neural plasticity — a key requirement for learning and memory.

Colin Malone

Washington University, St. Louis
Beckman Graduate Student
NSF Graduate Research Fellow
*"Evolution, Inheritance and
Specialization of Transposon Control
Pathways in Drosophila"*

Colin came to the Watson School knowing that "its Ph.D. program is not for the faint of heart." In Greg Hannon's laboratory, Colin studied the biology of small RNAs, uncovering several features about their role in defending the genome against genetic parasites. He also found that like DNA, small RNAs are vehicles of inheritance, passing on epigenetic information from mother to offspring in fruit flies.

Katherine McJunkin

Princeton University
Robert and Teresa Lindsay Fellow
*"Inducible RNAi Targeting Essential
Genes"*

Katie's doctoral work in Scott Lowe's laboratory has helped expand the applications of RNA interference (RNAi) technology and widened the frontiers of mouse genetics to unravel cancer's genetic basis. With the goal of discovering genes that could be targeted by cancer drugs, she used RNAi to switch genes on or off in a reversible manner in animal models to study their roles in maintaining cancer progression and malignancy.

Shraddha Pai

University of Waterloo
Charles A. Dana Fellow
*"Neuroanatomical Localization of
Timing-Specific Brain Loci in the Rat"*

Motivated by her mentor Carlos Brody's motto that "scientific research requires the attitude of a marathon runner," Shraddha investigated how time and temporal patterns are sensed and represented in the brain. She developed experiments to teach rats to discriminate sound durations and frequencies, and carried out surgery to identify brain spots that mediate the ability to time a cue.

David Simpson

University of California, Davis
Beckman Graduate Student
Department of Defense
Breast Cancer Research Program
Predoctoral Trainee
*"Regulation of Myc-Induced
Apoptosis in Mammary Epithelia"*

When normal breast tissue transforms into invasive cancer, cells lose their organization and fail to suppress cancer-promoting genes. In William Tansey's laboratory, David investigated the role of cancer-causing gene Myc, which is mutated in more than 50% of cancers, in this process. His work, performed in three-dimensional cell cultures that mimic structures in the human breast, provides new insight into how this enigmatic oncogene functions in human cancers.

Oliver Tam

University of Sydney
Bristol-Myers Squibb Fellow
*"Characterization of Small RNA
Populations and DNA Methylation
in Mammalian Development"*

Oliver's thesis, undertaken in Greg Hannon's lab, delved into the role played by families of small RNAs and DNA-modifying methyl groups in epigenetically controlling gene expression. Such epigenetic regulation is what enables multicellular organisms to develop different tissues and organs. In the spirit of his mentor's tendency "to diversify and innovate," Oliver also addressed these biological questions with computational tools that he learned to build.