

ASCB PROFILE

Elizabeth Jones

Even after 35 years of teaching, Beth Jones can still be surprised by the undergraduate mind. Head of the Department of Life



Elizabeth Jones

Sciences at Carnegie Mellon University in Pittsburgh, Jones is one

of twenty new Howard Hughes Medical Institute “Million Dollar” education professors appointed in 2002 and charged

with devising ways to overhaul undergraduate biology teaching in this country. Last year, Jones used her new HHMI resources to select twelve students from CMU’s science, engineering, and computer science colleges for a special Summer Research Institute. After an initial two weeks

Jones is one of twenty new Howard Hughes Medical Institute “Million Dollar” education professors appointed in 2002 and charged with devising ways to overhaul undergraduate biology teaching in this country.

of learning techniques, the students worked individually or in pairs for eight weeks pursuing an original research project. Prior to the summer, the students, who were entering their sophomore year, didn’t see themselves as becoming scientists despite their intelligence, accomplishments and high energy levels.

At the end of the summer, the idea of being a scientist had become demystified and they were able to see themselves in such a career. “I believe it’s an undergraduate confidence issue,” says Jones. “Our data show that they learned a huge amount and their attitudes were swayed more than I thought possible. And I had far more fun than I thought possible.”

Aaron Mitchell, a microbiologist at Columbia who studies signaling pathways in fungal pathogens, dates the start of his

career to the day he walked into the Jones lab as an undergraduate 30 years ago. “Beth Jones was absolutely THE most important teacher in my life,” Mitchell declares. “Beth was totally psyched about doing research, reading papers, and writing papers. She loved to go through all the

aspects and all the details. If you came in with a result and you weren’t sure if it was good or not, you’d tell it to Beth. You’d get this immediate barometric reading. She’d just explode with en-

thusiasm if the results were ‘interesting,’ even if the results weren’t what you or what she’d expected. It was a blast to work in her laboratory.”

When Beth Jones first set up her lab at Carnegie Mellon in 1974, she wanted to meld her graduate background in yeast genetics with her post-doc experience in Boris Magasanik’s MIT lab where she’d learned bacterial physiology and biochemistry. “I found that I liked to work on the border between biochemistry and genetics,” says Jones. “Eventually I found my way to looking for protease-defective yeast. Many of these defects affected the biogenesis of vacuoles and the delivery of proteins to the vacuoles.” Today more than 50 genes are known to be involved in vacuole biogenesis and their pathways of protein delivery. The Jones lab has

recently zeroed in on four of them—*PEP3*, *PEP5*, *VPS16* and *VPS33/PEP14*—through null mutations that leave the yeast unable to form vacuoles. “In nature, these mutations would be fatal,” says Jones. “Cells that lack vacuoles are unable to go through the sexual cycle and if they enter stationary phase, they

lose the ability to enter log phase. Essentially, they’re dead. Being a mutant is not a healthy lifestyle. Fortunately we can freeze them down in the laboratory to -70°C and keep them around to work on.”

“Beth Jones was absolutely THE most important teacher in my life.”

For Jones, the attraction to yeast is how “obsessively conserved” these fundamental genes are between yeast and mammals.

For Jones, the attraction to yeast is how “obsessively conserved” these fundamental genes are between yeast and mammals. “If you look at all these major processes in the cell—DNA replication, secretory pathways, transcription and translation—you can map the genes almost one-for-one between mammals and yeast. Even for the cytoskeletal elements, the proteins differ by just a handful of amino acids.

These defective genes we’ve found have human homologs that are known to be involved in human metabolic diseases, particularly in lysosomal storage diseases like Tay-Sachs,” she explains.

Jones’ dual passion for genetics and cell physiology is reflected in her twin allegiances to the ASCB and the Genetics Society of America. She has been Editor-in-Chief of *Genetics* since 1997, and is widely known as the co-author of two current genetics textbooks. For the ASCB, Jones has served on the *MBC* editorial board, the Finance Committee and the ASCB Council, as well as recently accepting a term on the Education Committee. “I think the ASCB is an admirable society for what it does to promote science in general and cell biology in particular. ASCB has a strong commitment to education, to minority representation, and to women in science. It has also developed the ability to speak to Congress about science as a sort of ‘spokes society,’ if that’s a word. However you describe it, the ASCB does highly commendable work. My heart is with the ASCB,” says Jones.

Born in Seattle in 1939, Elizabeth W. Jones had a childhood that sounds straight out of *Little House on the Prairie*, if the story had taken place in the Northern Cascades of Washington State. Her father was an electrician for the Seattle City Light Department but stationed 140 miles northeast of Seattle at the municipally-owned Diablo Dam in the remote Skagit River Gorge. Her family lived in a tiny village just below the dam, reachable only by the special railroad that the dam builders had driven 22 miles through the wilderness to Diablo. “There

were only about 100 people in town and all the kids went to a one-room school where grades one through eight were taught by one teacher,”

Jones recalls. “She was an absolutely wonderful woman. Every child loved her and she managed to get some achievement out of everyone. The town was right on the Skagit River and in summer we

were outside playing there 16 hours a day. Oh, it was wonderful,” Jones concludes wistfully. But when Beth’s older sister reached high school age, the family had to choose between boarding school and leaving Diablo. Her father took a new job with the Bonneville Power Authority in Longview,

“There were only about 100 people in town and all the kids went to a one-room school where grades one through eight were taught by one teacher.”

Micropipette Pullers

World-class quality!

Powerful: The laser-based **P-2000** puller remains the industry standard device for pulling fused silica, nanospray tips and optical probes.

Consistent: The **P-97** “workhorse” reliably fabricates a variety of tips: patch clamp, intracellular, transgenic and microinjection.

Economical: The simple and inexpensive **P-30** vertical puller suitable for basic and patch-type pipettes.



SUTTER INSTRUMENT
PHONE: 415.883.0128 | FAX: 415.883.0572
EMAIL: INFO@SUTTER.COM | WWW.SUTTER.COM

Washington. At age 10, Beth landed back in the real world.

City schools were a shock, especially for a girl who had a growing interest in “hard” science. When Jones entered the University of Washington as a chemistry major, she hit a brick wall. “I had very mixed experiences as an undergraduate at UW,” Jones says. “The Chemistry Department was about 95 percent male and they were not at all interested in educating females.” Then as a sophomore,

Jones had the good fortune to take a job washing glassware, making media and pouring plates in the genetics lab of Herschel Roman. The University had no “Biology” department as such, only Botany and Zoology. Roman was a plant geneticist in Botany who’d quietly jumped the wall into yeast. Jones soon moved from loading petri dishes to taking genetics classes to running experiments for Roman. Jones’ BS was in Chemistry but her transcript was filled with genetics courses.

Jones stayed on to do her doctorate with Roman, taking her PhD in 1964 from what had finally become UW’s Genetics Department. After a post-doc with Magasanik at MIT, Jones accepted her first faculty position in 1969 at Case Western in Cleveland before joining Carnegie Mellon in 1974. Today, Jones remains delighted with Pittsburgh, particularly its symphony and ballet. Unfortunately, she has been living in a Pittsburgh hotel with her two cats since a disastrous house fire last November. It was a frightening experience, Jones admits, but no one (human or feline) was hurt, even though the repairs have dragged on forever.

At Carnegie Mellon, Jones claims to be tapering off in her lab, restricting herself to one post-doc, one grad student and assorted undergrads. “I’m 65 now, but I’m not planning to retire any time soon,” Jones declares. “I’ll keep my lab cooking along.”

When told that Beth Jones is “tapering

off,” former students and post-docs remain politely skeptical, pointing to her workload as editor, author, department chair, HHMI professor, education reformer, and lab chief. They also can’t imagine Beth Jones without a lab and without people at her door.

Deborah Murdock did her PhD with Jones in 1996. “I remember that when Beth would be really, really busy with her other responsibilities, there would be a note on her door—‘NOT NOW!’

But you could always get past that sign if you brought in new data,” says Murdock, who now works on medical genetics at Vanderbilt. “Beth always had time to see results and talk about data.”

Sandy Lemmon is a former Jones post-doc now at the University of Miami. When Lemmon’s original NIH postdoctoral fellowship ran out, Jones told her to write her own NIH RO1 and then arranged a research faculty appointment for Lemmon. “It was a real risk for Beth,” Lemmon recalls. “She had to guarantee my salary if I didn’t get this money, plus she’d already given me my own tech. When the first big paper from that grant was ready, Beth refused to put her name on it. She said, ‘That’s your work. My name doesn’t belong on it.’”

Aaron Mitchell says that Beth Jones taught him that there was more to doing sci-

ence than working at the bench. “Beth has always been involved in the community in a big way, working on journals, societies, yeast meetings, and study sections. These days, I find myself in a position where I’m the one who is always asking colleagues to review papers for journals or to serve on study sections. Nobody has time to do it. Beth doesn’t have time to do it, either. But Beth makes the time to do the stuff she feels is important.” ■

“I’m 65 now, but I’m not planning to retire any time soon.”

“Beth has always been involved in the community in a big way, working on journals, societies, yeast meetings, and study sections.”
