Lawrence Charles Katz 1956–2005

Richard Mooney

On Saturday morning, November 26th, Larry Katz died from melanoma at the age of 48. During a remarkable research career punctuated by seminal discoveries on the organization and development of the visual system, as well as the neuronal basis for olfaction, he marshaled a restless creativity and a genius for technical innovation to illuminate fundamental questions in neuroscience. In the process, he enriched the lives of students, postdoctoral fellows and colleagues with his passion for science, his enthusiasm for life, and his unique blend of warmth, charm, humor and grace.

Larry was born in New York City and grew up in Spring Valley, above the west bank of the Hudson River. His father Leonard, a master mechanic, imparted an easy familiarity with mechanisms and measurement, fostering Larry's fascination with understanding how things work. Larry's mother encouraged his observational skills as a naturalist, which later would inform his research interests.

At the University of Chicago, Larry obtained a BA in Biology with Honors in 1979. In hindsight, his scientific talents were in early evidence: his undergraduate publications on tadpole schooling and crab burrowing became widely cited. During this period, Larry especially valued studies with Norman Maclean, author of *A River Runs through It*, who helped to hone his skills as a writer and fisherman. Work with Ray Guillery and Carol Mason proved transformative, leading him to focus on neuroscience. A strong interest in behavior coupled with an aversion to Chicago's winters convinced Larry to pursue doctoral research with Mark Konishi at Caltech, where he proved to be a gifted experimentalist. Larry's deepening interest in visual cortical microcircuitry led to postdoctoral research with Torsten Wiesel at Rockefeller University. From there he joined Dale Purves's newly formed Department of Neurobiology at Duke University as an associate professor in 1990. Larry received numerous awards, including the Clauser Prize for most original PhD thesis, a Lucille P. Markey Scholar Award, the Charles Judson Herrick Award, a McKnight Investigator Award, the Society for Neuroscience Young Investigator Award, election as an AAAS Fellow, appointment as a Howard Hughes Medical Investigator and appointment as a James B. Duke Professor of Neurobiology.

Larry was a highly creative thinker who loved challenging convention. He pushed himself and exhorted those around him to break new trails toward riskier but more exciting scientific frontiers. His lab was a rich source of new techniques and applications that continue to drive discovery in many areas of neuroscience, such as creating fluorescent latex microspheres to retrogradely label neurons, applying imaging techniques to monitor activity patterns in developing cortex, developing photo-uncaging of neurotransmitters to functionally map neural circuits and combining gas chromatography with electrophysiology to unravel mechanisms of olfactory coding.

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Few who watched Larry and Andreas Burkhalter playing with a can of spray paint could envision the powerful tool that would emerge. Confronted with the problem of how to identify different cortical neurons in living brain slices, Larry and Andreas sprayed a mist of day-glo paint into the air and collected the resulting droplets on a sheet of wax paper. Centrifuging these droplets through a density gradient isolated 'microspheres' small enough to be endocytosed by an axon terminal and transported to the cell body. Their dramatic images showed how this tool could be combined with intracellular injections in brain slices to visualize the dendritic morphology of identified projection neurons. Down the road, these beads also proved useful in monitoring how activity refined connectivity in the developing cortex and in demonstrating that retrograde transport of neurotrophins from the cortex could rescue lateral geniculate neurons from the cell death normally triggered by monocular deprivation.

Beyond the tools that fuel discovery, Larry had an almost unerring intuitive sense for where to focus his energy. Just when the field had agreed that activity was necessary for the initial formation of ocular dominance columns, he and Justin Crowley showed that these columns could form even without retinal input, much earlier than previously thought, with an initial precision difficult to reconcile with activity dependence. The question is still debated, but these provocative observations inspired new research into the interplay between activity-dependent and -independent processes in brain development.

Larry's restless nature led to a mid-career shift in focus from visual system development to olfaction. At a time when others might simply continue to extend new tendrils from the stem of their prior research, Larry uprooted the lab, because exploring a wide-open frontier was much more appealing for him than remaining in an increasingly well-plowed field. In a remarkably short amount of time, Larry made his presence known, using imaging techniques in the olfactory bulb to probe mechanisms of sensory coding, development and plasticity. Moreover, this transition rekindled Larry's interest in behavior, as he worked toward understanding olfactory cues for social communication. Larry's excitement over his research was at an all-time high as he regaled audiences with videos of chronic recordings in the vomeronasal system of freely misbehaving mice, and as he showed how gas chromatographic analysis could be used to find the component of male mouse urine that drives mitral cells and female mice wild.

Like many of Larry's junior colleagues, I benefited from his professional energy, insights and generosity. However, I got to know Larry best as his fishing partner. Early on those cold March mornings on the Roanoke River, with no one in sight, Larry would assure me that the tea-stained river was thick with fish—we just had to figure out exactly where and how to catch them. Then he was in his element, trying different flies or casting to different banks, never once doubting their presence. That was when I got the strongest sense for the joy Larry took in figuring things out, and it was largely beside the point that we caught so many fish we quickly lost count. ■