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When Vladimir Gelfand moved to the U.S. in 1991, he "cast his fate to the wind," says Rick Horwitz, who gave him his first U.S. faculty position, at the University of Illinois, Champaign-Urbana, in 1993. Horwitz knew that there was a risk in hiring a senior scientist who'd set up his first lab in Moscow nearly 20 years before and now was starting over at the bottom of the academic ladder. Gelfand had never written an American grant application nor mentored an American graduate student. But on balance, Horwitz decided that the risk to the University of Illinois was nothing compared to Gelfand's. "That's the real story behind Volodya—his courage to leave a position in Russia to come to the States," says Horwitz. Gelfand's colleague Andy Belmont agrees: "when he came [to the University of Illinois], he didn't have a lot of fancy techniques because he was working on a limited budget, but the experiments he described were so logical and so 'to the throat of the problem.'"

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Over the next 11 years, Gelfand got going American-style at Champaign-Urbana, learning the grants game, building a lab of devoted students, and becoming what Belmont remembers as the department's "glue person," that is, a tireless committee volunteer and the resident experimental troubleshooter. Horwitz confirms: "Volodya is a very gregarious person—a one-man scientific hub. In his own lab, Gelfand developed an ingenious model system based on immortalized melanophores—pigment cells from the frog *Xenopus* that allowed Gelfand to use the movement of pigment organelles melanosomes —as an assay for regulation of molecular motors.

Last May, Gelfand left Urbana for Northwestern. Along with his *Xenopus* melanophore model, Gelfand started to use a second model system, cultured *Drosophila* cells. "With our frog and *Drosophila* systems, we're trying to do the biology of motor proteins," Gelfand says. "We study how motor proteins work in a living cell and specifically how multiple motors on the surface of an organelle are coordinated and regulated. A typical organelle has, at least, three types of molecular motors on its surface—a plus-end microtubule motor, a minus-end microtubule motor, and the myosin. The big unsolved question is how those three are coordinated so they know where to go and which one has to be active. There is no tug of war [between motors of opposite polarity], but nobody has a clue about the mechanism of that. But what we have just shown is that if there are multiple kinesins or multiple dyneins on the surface of an organelle, they move more efficiently than a single motor protein. So there is no competition between two motors of opposite polarity and there is coordination of motors of the same polarity.

Vladimir ("Volodya") Gelfand was born and raised in Moscow, the son of mathematicians. His father, I.M Gelfand, who, like his son, emigrated to the U.S. in the early 1990s to become a professor at Rutgers (the senior Gelfand also became a MacArthur Foundation Fellow), is widely considered one of the greatest mathematicians of the last century. Volodya Gelfand says that he studied mathematics as an undergraduate at Moscow State University because it was the family "default setting." But he'd also followed the cell biology lectures and seminars of Jury Vasiliev and joined the Vasiliev lab as an undergraduate student and continued in 1970 as a graduate student. In Vasiliev's lab he studied the emerging structural components

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of the cytoskeleton, and especially the role of microtubules in establishing cell polarity. By 1974, having earned his doctorate, Gelfand set up his own lab at the Belozerksky Institute of Bioorganic Chemistry (a research division of the Moscow State University) to work on the biochemistry of microtubules. There his lab was the first to demonstrate that kinesin (shortly before it was isolated by Ron Vale and his colleagues) is a microtubule-dependent ATPase. Then in 1985, Doug Murphy arrived at Moscow State on a Fulbright and helped Gelfand to establish a culture of melanophores from fish scale. It was a primary culture system then, beautiful but hideously time-intensive and limited experimentally. The potential of it galvanized Gelfand's research.

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Outside the lab, the Soviet Union was falling apart. By the late 1980s, intellectual isolation, ever-more limited resources, and his responsibility as PI to watch out for his lab members in perilous times was weighing on him. Gelfand wrote a letter to Marc Kirschner, whom he'd never met, to ask for a position at UCSF as a visiting scientist. In 1989, Gelfand arrived alone in San Francisco to spend four months in the Kirschner lab. "UCSF was a dream. I'd never been in the States before but it was not just the materials or equipment. The people there were absolutely terrific: Marc and Tim Mitchison and Andrew Murray. I came straight from Moscow into that unbelievable environment and it was probably the great educational experience of my life."

The obstacles of starting over at his career stage in a new language, a new scientific system and without any employment beyond Kirschner's offer to return as a guest researcher at UCSF were tremendous. While he was in California, Gelfand's wife, Anna, remained in Moscow with the couple's two children, Eli, who was 16, and Masha, who was 6. But in 1991, the four Gelfands set out for a new life in the U.S.

New World science was wonderful but America was a very strange place for the Gelfand family. "At UCSF, Peter Walter told me that it takes 12 years to adjust," Gelfand recalls. "At first, I thought this was a bad joke. But I know now that he was perfectly correct." Eli is now a cardiology fellow at Beth Israel Hospital in Boston. Masha just graduated from Washington University in St. Louis and will start the Neuroscience Program at Harvard in the fall. Anna continues as a research associate in the new Northwestern lab. "I've probably adjusted as well as I ever will," says Gelfand after 13 years in the U.S.

The Gelfand lab was a wonderful place to work, says Steve Rogers, who was Gelfand's first graduate student at the University of Illinois in 1994 and his first American student to reach faculty status with his appointment this year at the University of North Carolina, Chapel Hill. "Volodya is one of the nicest guys imaginable," says Rogers. "He's extremely intelligent and knows a lot about all areas of cell biology, so if you have a question about anything, Volodya can usually answer it off the top of his head." ■

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