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Listening, Learning and the Brain of Nina Kraus

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Gabriella Musacchia, PhD

The brain of Nina Kraus is expansive, constantly searching and testing, but also demands the best and deepest work from her students. The Kraus lab was humming with activity and excitement when I joined. The main research project that all lab members contributed to, and drew data from, was called “Listening, Learning and the Brain.” The LLB project focused on testing the hypothesis that auditory encoding of speech was related to childhood learning deficits. The project had just produced several critical papers showing evidence that supported this link.[1–3.] When I look back, it seemed like we had children coming in and out all day, seven days a week. It was a constant stream of calibration, electrode application, electrode removal, audiometry, speech testing (with and without noise), and flipping standardized test booklet pages. Lab meetings were at lunchtime every week, and we were all on a rigorous diet of data collection and analysis. In my first years, the lab published two seminal papers showing frequency-following response deficits in children with learning problems[4] and a reduction of the speech-evoked FFR when presented in noise.[5]

I had come to the Kraus lab with a question. My experience as a professional musician prompted me to ask why people get more excited when they see live music than when they just listen? Nina, a musician and a music lover herself, paired the question with audiovisual methods to answer it. We set about to answer that and determine if musicians themselves had different FFR encoding compared to non-musicians. I learned everything about electrophysiology in Nina’s lab from the ground up. Her philosophy was that I needed to know how to put the presentation systems together and take them apart if I could be a successful independent researcher. She and the lab manager, Trent Nicol, insisted that I read the manual before asking a question. There was tremendous support and quite a bit of fun, too. We had holiday parties, conferences, visiting scientists (including my other mentor, Mikko Sams), and even dodgeball playoffs. It was a family. In the end, Nina and I found out that auditory and visual information combines in the brain to create a supramodal FFR response that is larger than either the visual or auditory alone.[6] Nina and I also answered the musician question, showing, for the first time, that musicians have enhanced FFRs to speech and music stimuli, compared to non-musicians.[7,8]

Today, I still rely on the skills and culture I learned in the Kraus Lab. So far, I have started two electrophysiology labs from four bare walls. I have grown from post-doc to professor to department chair. I love to listen and learn from the people around me, especially students who have unusual questions. But, more than anything, I strive to create an educational environment that feels like family. I believe that is one of Nina’s enduring legacies: inspiring generations of scientists to move hearing science forward and nurture the visionaries and leaders of tomorrow.



Figure 1. Holiday party in the Kraus Lab circa 2005. From Left to right: Beverly Wright, Erika Skoe, Judy Song, Erin Hayes, Marianne Cheatham, Brian Williams, Karen Banai, Steven Zecker, Anna Yermakova, Krista Johnson, John Seigel, Trent Nicol, Cynthia Warrier and Nina Kraus. Taken with an actual camera, but it was the best shot I got. Despite the poor photo quality, the feeling comes through.



Figure 2. A better, more composed shot of the Kraus Lab circa 2006. From left to right, bottom row: Nina Kraus, Gabriella Musacchia, Erika Skoe, Nicole Russo, Brian Williams, Krista Johnson. Top row: Catherine Warrier, Judy Song, Karen Banai, Trent Nicol, Steven Zecker.



Figure 3. Nina Kraus and Gabriella Musacchia, circa 2007, outside of the Frances Searle Building, home of the Communication Sciences Department at Northwestern University.

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