Early in graduate school, I did lab rotations in three labs, and I liked two of them. The principal investigators in those labs—Kristi Anseth and Leslie Leinwand—were collaborators, so they agreed to let me take on a collaborative project. My goal was to engineer cardiac valve tissue for patients who need valve replacement surgery. Achieving that could have a big medical payoff, but to make it work, we needed to understand the fundamental interactions between cardiac valve cells and the tissue matrix surrounding them. It was my job to bring together fundamental and applied expertise.

To make co-advising work, everyone needs to play an active role. But you—the graduate student—are the main actor in this movie, so you must take the lead. Here are some things I learned from the experience.

• You need to be open-minded and a little adventurous, and you need to fully embrace a new field—or, in some cases, two new fields. I went to work each day with the attitude that all disciplines are of equal value, each offering advantages but also the risk of narrowing one’s thinking. The goal of cross-disciplinary collaboration is to break us out of those boxes and create a new approach that complements traditional disciplines.

• As a co-advised student, you may work in directions that diverge from the main themes of either lab. It is important to be independent and lead. In my early years, I spent more time in the molecular biology lab, but I gradually moved into the biomaterial engineering lab as I got fascinated by the possibilities of combining biomaterials and cell biology. None of this would have been possible if my advisers had not allowed me to lead, with their supervision.

• Co-advised students get twice as many researchers to interact with. Take advantage of that opportunity; interactions with other researchers are necessary for a young researcher to grow. Brilliant ideas may come from formal meetings or casual chats. An idea may be simple, but only a colleague’s years of experience can make it viable.

• Being co-advised usually means attending twice as many meetings, interacting with twice as many people, and learning techniques from both labs. So use your time efficiently and spend more time planning. My advisers scheduled their lab meetings on Wednesdays at different times, so for me, Wednesday was the day for summarizing data, planning future experiments, and interacting with people in the groups.

• Communicating well with your advisers will engage them in the progress of your work and invite suggestions. Learn the management, scientific, and communication styles of your advisers, and integrate those styles into your own. Find a comfortable and efficient middle ground for maintaining three-way communication. It takes time, confidence, and sensitivity to learn how to communicate well, but you will use this skill to great advantage for the rest of your career.

The result? I found that culturing cardiac valve cells on synthetic hydrogels preserves their normal properties better than the traditional plastic plates do, and I discovered a signaling pathway connecting the stiffness of the supporting scaffold to the cells’ cytoskeletal structure. One laboratory taught me diverse molecular and cellular techniques, and the other trained me to engineer biocompatible scaffolds. The interaction of these disciplines shaped my scientific perspective and focused my career on understanding and engineering organs for clinical applications. I earned my Ph.D. with confidence, a deep appreciation of both disciplines, and gratitude toward my advisers—both of them!

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A double dose of advice
Huan Wang

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