My name is Kathy Prestridge and I have been a scientist at Los Alamos National Laboratory for almost 15 years. I lead a team of students, postdocs and staff performing multiple experimental projects. I agree with the articles in our resource packet by Larry Woolf from GA and the experiences of Laure Haak described in the Science article. I also see skill gaps in new Ph.D.’s. The evolution of a graduate student into a Principal Investigator or project leader requires many skills. This evolution should begin in graduate school, and it is not a step function that occurs after the PhD is received. Demonstrating communication, management and people skills can often mean the difference between getting a job and not.

In technical research I look for interdisciplinary experience, including collaborations across experimental, theory, modeling and simulation areas. Outstanding candidates demonstrate “agility,” including applying existing knowledge to new situations (sometimes called the T-shaped physicist).

In INDUSTRY and at NATIONAL LABS US citizens (or permanent residents) are needed. Can more US students from undergrad programs be encouraged to attend internships at national labs and to continue or begin graduate educations?

COMMUNICATION at the appropriate audience level is critical. New graduates must be able to explain their project to technical experts and to high-level program managers, and they MUST understand the importance of their work in a broader context. If students have only prepared papers for peer-reviewed journals, they may have no experience writing technical reports or progress reports for funding agencies. They have never given an elevator speech. In other words, they can’t describe their project and its importance and goals in 30 seconds if they happen to be trapped in an elevator with a program manager.

PROJECT MANAGEMENT and organizational skills are critical. All researchers must understand how to run a project, including defining scope, setting a schedule, setting and meeting realistic deliverables, and sticking to a budget. They must also be able to highlight or advertise incremental project successes to higher levels of management or to the funding agency. Graduate students are often in the mode of working for years and then producing a few epic papers. This model will not work for programs that expect quarterly or monthly technical updates. Good PI’s understand the importance of strong communication with program managers. It can mean the difference between funding or not for current and future proposals.

So, I don’t think I have ever heard anyone say, “I have great people skills—I should be a physicist!” However, the value of interpersonal skills such as listening and teamwork must not be downplayed in a graduate education. If a mentor shows that she values a diverse team, students will learn to appreciate diversity. The consequence is that people with varying skill sets or academic backgrounds will be heard and may provide the idea that saves the project. Treating technicians without Ph.D.’s poorly, not respecting female colleagues, or dismissing the ideas of graduates from less prestigious universities are behaviors that can destroy teams.

In summary, students must think strategically about their own careers, communicate their goals, and develop plans to achieve them. If they have these skills, I know that they will be able to learn many of the detailed project management and other skills needed for success in research. If they are searching for jobs without understanding their own career goals or the context of their graduate research, they are demonstrating difficulties in planning and contextual thinking that are
impediments to future success. Agile, out-of the box thinking, communication, management and people skills are hard requirements for future researchers.