

# Teaching/Undergraduate and Graduate Education Symposium: Graduate Education in a Shifting Research Landscape

**125 Mentoring graduate students for success in a shifting research landscape.** R. Randel\*, *Texas A&M AgriLife Research, Overton.*

The purpose of the educational process for graduate students is to develop scientists and educators who will be successful in their area of expertise. They must be capable of creating new knowledge and be able to impart this knowledge to appropriate end users. The research landscape is always shifting as economic change occurs and the technology of today will be replaced with new technology tomorrow. The scientific method will remain constant through technological and economic change. Scientists and educators grounded in the fundamental sciences as well as application to agriculture will remain in demand and will be successful in this shifting research landscape. Students require a blending of fundamental science with application to agriculture. Each student is a unique individual and will need a program designed to eliminate weaknesses and to amplify strengths. For animal agriculture each student must have a background in statistics and biochemistry. These 2 fundamental sciences should be included early in the educational process. It is never too early to involve a student in their own research. Early ownership of research data and with use of the scientific process is crucial for future success. Each graduate student should be involved in collaborative and interdisciplinary research. To be successful in a shifting research landscape requires having the ability to work and collaborate across disciplinary lines. With a well-designed program emphasizing fundamental science and use of the scientific method supported by understanding the application of science to agriculture, graduate students will have the tools needed to become successful in the shifting research landscape.

**Key Words:** mentoring, graduate student

**126 Adjusting to the other side of the table: Experiences as a newer mentor.** B. J. Bradford\* and L. K. Mamedova, *Kansas State University, Manhattan.*

Effective graduate student mentoring is a crucial but under-recognized component of launching a research program. Advice for new faculty members is typically focused on research topics, teaching methodology, extension programming, and grant writing, and with the many tasks facing a new faculty member, mentoring can too easily be forgotten. However, effective mentoring is critical to student success, program visibility, and new student recruitment. Mentoring graduate students often requires a delicate balance between conflicting goals: providing guidance while fostering independence, offering broad experiences without loss of focus, and identifying weaknesses while building confidence. In our experience, striking the right balance is aided by some key practices, which we have learned through mistakes as much as success. First, the fit of a prospective student in the group must be considered, rather than selecting students based on academic merit alone; this can be a particular challenge for new faculty members who may not have lots of applicants. Second, expectations should be as clear as possible. Often students transitioning from BS to MS programs, or even from MS to PhD programs, fail to fully grasp the differences. Third, mentors must have adequate availability to provide constructive and timely feedback. This can be accomplished in a variety of ways, and we rely on both technology and team mentoring to help address this challenge. Finally, graduate training should develop “soft skills” in addition to

technical knowledge. Research projects can offer excellent opportunities to develop abilities in personnel management, task/time management, communication skills, conflict resolution, and professional networking that will serve students well regardless of their career path. Key to all of these is a mindset that, while the graduate student is responsible for contributing to the research program, the mentor is also responsible for helping the student to grow personally and professionally. Despite its many challenges, mentoring is one of the most rewarding aspects of a professorial career if it is approached as a worthwhile endeavor.

**Key Words:** graduate education, mentorship, training

**127 Making the transition from academia to industry researcher: Perspectives on similar and unique skill sets.** A. E. Wertz-Lutz\*, *ADM Alliance Nutrition, Quincy, IL.*

The objective of this presentation is to discuss skill sets that are similar and those that are unique to conducting research in an academic setting compared with an industry setting. Animal agriculture is dynamic, and with recent changes in the landscape of animal agriculture research, opportunities have arisen for suited individuals to transition from research in an academic to an industry environment. Making the transition from academic to industry research requires careful consideration. Evaluation of career goals, innate skills, and intended purpose are essential to making an informed decision and having a smooth transition. Additional factors such as opportunities for collaboration, expectation for research outcomes, and potential for research impact should all be considered when making a move from academic to industry research. The fundamental skills of written communication, sound experimental design, proper use of controls, ethical interpretation of the resulting data, and integrity are common to research in both an academic and industry setting. Beyond the commonality of these fundamentals, research within an industry setting has the added facet of interfacing with the business front. Issues such as product commercialization, compliance and regulatory, ethical use of science in marketing, and return on invested capital begin to emerge when taking a demonstrated biological response to marketable product. Strong interpersonal communication skills are needed to bridge the gap between business and research within an industry setting. Factors such as securing research funding, travel expectations, work pace, research focus, confidentiality, and student mentoring differ between research in the academic compared with industry setting. This presentation is intended to compare and contrast the role of academic and industry researcher, and to provide, based on personal experience, some guidance to current graduate students weighing the option of an academic or industry career with an advanced degree in animal science.

**Key Words:** Academic research, industry research, skill sets

**128 An undergraduate research experience: Team dynamics and mentoring.** B. J. Bequette\*, *University of Maryland, College Park.*

The undergraduate research experience often exposes students to their first opportunity to see the scientific process up close. This first-time exposure can have a lasting impact on student's career options, and so the process should be designed carefully to instill a sense of research ownership and accomplishment by students, and the value of their

research to current and future societal issues. The Gemstone Program at the University of Maryland is a multidisciplinary 4-year research program for undergraduate honors students of all majors. Under guidance of faculty mentors and Gemstone staff, teams of students (6–15) design, direct and conduct research exploring the interdependence of science and technology with society. As freshman, students learn to explore current topics in science, technology and society, and the essentiality of team building to research success. During the year, students naturally migrate around a topic of mutual interest. In sophomore year, teams meet with their selected mentor when the process of teaching the scientific process begins in earnest for the mentor. As a mentor, patience is essential to guiding the team. Guiding the team toward a testable hypothesis and well-defined and achievable objectives must be step by step. To ensure team ownership, mentors should resist leading the team too far from their initial interests. As sophomores, students have yet to take courses that fill their heads with the basic knowledge required to write their proposal and initiate experimentation. Thus, the mentor should make use of the limited, yet valuable, time in team meetings to lecture, teach and discuss basic concepts and current literature. Take every opportunity to encourage and engage all team members; leave no student behind. Team and experimental challenges will arise, as they often do in research, and so mentors must use these instances as teaching moments of the essentiality of teamwork and the realities of conducting research. In the fourth year, teams present their research in the form of a thesis to experts selected by the students, and the students complete the program with a citation and a sense of accomplishment.

**Key Words:** undergraduate, research, mentoring

**129 Effective personal development planning for scientists and graduate students.** B. Rittgers\*, *Elanco Animal Health, Greenfield, IN.*

Effective Development Planning is paramount in all aspects of business and academia as the workforce evolves and people are looking to grow professionally and personally. The saying “Help them Grow or Watch them Go” could not be more true. Effective Development Planning does not happen for a variety of reasons. These may include individuals not knowing what aspects of their scientific or transferable skill set to develop. (A lack of coaching and feedback); skill development and career planning are looked at separately or not at all. Personal development planning may be nothing more than a “check the box” exercise. No accountability on the part of students/scientists or supervision to prioritize development planning. Emphasis is put on class room training versus relationships and experiences to drive development; in other words, the 70–20–10 Principle of Effective Development is not followed. The 70–20–10 Principle was developed by the Center for Creative Leadership. The concept is based on findings that personal development occurs from 70% Experience: On the job experiences of in-place assignments that allow individuals to utilize and grow the aspects of performance or skills needed for success. These can happen on the job (55%) or through off-the-job experiences (15%) in the community, industry affiliations or faith based organizations; 20% Relationships: Relationships that provide individual feedback, coaching, personal insights and mentoring contribute to 20% of development; 10% Training: Although most prevalent when planning for development, training only contributes to 10% of actual development. To be sure, it is important but true development comes most frequently from experiences and relationships. Development Planning should be done around the congruence of personal interest and growth needs and the business or academic needs of the larger organization. By assessing and understanding the needs of both, individuals can develop a good balance of development that will help them develop their careers as well as further the goals of their organizations.

**Key Words:** development, coaching, training