

Industry/Government Panel Discussion

ACADEMIA RESPONSES

When interviewing candidates for a position that is 50% research and 50% teaching or extension, what qualifications are more important—their ability to conduct research or their education experience? What other qualifications are important or identified with successful candidates?

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It is important to remember that faculty are hired to succeed. No one wants an unsuccessful experience — neither the candidate nor the University. Evidence is sought that indicates success is likely. Success is defined by the position description. It is imperative that the candidate pay close attention to this document. It defines the expectations of the position, as well as the clientele and the scope of activity. It would be very rare for someone meeting the expectations spelled out in the position description to be denied promotion and/or tenure. At the University of Nebraska, the characteristics of each academic rank (Assistant Professor, Associate Professor, and Full Professor) are spelled out for research, teaching, and extension. There are a number of common features, which include meeting the position requirements, competence in your professional field, evidence of continued professional growth, and recognition (and reputation) as a scholar. Specific requirements can be added to this — communication of research results, leadership with students, faculty service, establishment of a nationally-recognized research program, grantsmanship, teaching innovation, and ability to direct the research activity of others. Of course, many other traits are also desirable. Some of the desirable personal traits include being a team player, strong communication skills, flexibility, ethics, and professionalism. An overarching tenant is one of sustained performance. Put succinctly, the candidate is being asked to conceive, initiate, and sustain an innovative, effective program in teaching, research, and/or extension. The ability to contribute effectively to a multi-disciplinary team effort is crucial. Greater emphasis is being placed on impact than on activity. You must be able to document that your work has had a positive influence on what is being done or how people behave. This is as important as having a large number of publications or success in obtaining funding.

The posed question implies an either/or situation for certain skills. There is no hard and fast rule. Rather, it is the balance, the overall package, offered by a particular candidate that determines success in the interviewing process and ultimately in the career. Students would be well advised to focus on gaining as much breadth of experience as possible while establishing the technical expertise necessary to become an expert in their field.

Finally, an observation on those who do not succeed in an academic environment. This generally occurs because of a lack of productive effort in areas that are clearly identified. It should not be a surprise to be denied tenure or promotion. The expectations are well known. Annual performance evaluations provide guidance. In some cases, being forced to reconcile one's career aspirations with individual performance, talents, and desires is a beneficial event — one that often leads to success and satisfaction in a different, more suitable career.

What are your thoughts on a graduate students receiving all three degrees from the same university, two degrees from the same program (if so which two degrees) or all three from different programs? What are the advantages between Land grant and private universities? Do these types of issues affect your decision when screening applicants for a faculty position?

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I believe this question could be appropriately subdivided for those students stopping with the M.S. degree and those continuing to a Ph.D. Where the M.S. is the terminal degree, it is less important to attend more than one institution. One just needs to find the best graduate program for them to accomplish their professional goals, and that may be the B.S. degree-granting institution. One does usually expand their experiences, however, by obtaining a M.S. degree from another institution. Employees of M.S. students are selecting for talent and few, if any, give much consideration to the number of institutions in the pedigree.

For students completing the Ph.D, institutions represented on the resume often receive more attention. There are situations and circumstances where it makes sense for some to obtain three degrees at the same institution. Far more typical, however, is the recommendation to attend at least two institutions for post baccalaureate studies. If the professional goals are exclusively research vs. teaching and extension, three institutions, and the subsequent experiences from three outstanding programs, are often beneficial. There are many very successful Meat Scientists who studied officially at only two institutions. For practical reasons it is often simpler to obtain a M.S. and Ph.D from the same institution. But for professional diversity, one can justify changing institutions between the M.S. and Ph.D degrees. If there is a period of time between obtaining advanced degrees, switching institutions may be less important.

What are the advantages between Land Grant and private universities?

I do not believe there are major differences in perceived value of degrees or programs obtained from Land Grant institutions and private universities for most agricultural related professions. For those who really know educational systems, the better value and training likely occur at the Land Grants. For students whose career is going to be more biological than agricultural, the institutions' reputation, scientists, centers of excellence etc. may take on greater importance.

Do these types of issues affect your decision when screening applicants for a faculty position?

When recruiting a new faculty member, the institutions studied at becomes far less important than the individual's skills, potential, and character.

How do you cope with the high and continually increasing overhead costs that universities charge for your research grants?

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The cost of overhead and indirect costs at Universities today is a problem.

I think the best way to address the issue is to discuss the need for negotiation of a specialized rate. Non-profit organizations pay no indirect costs and other companies can negotiate a rate for off campus research that is lower than the on campus rate.

I believe that these costs reduce the ability of Universities to conduct research for companies who operate for profit. The only way to have research with for profit industry companies is to reduce the rate.

How important is it to complete projects by the suggested deadline in the research proposal, would you sacrifice the quality of research to make the deadline, or are proposals written with unrealistic deadlines just to get an advantage over the competition during the proposal submission and review process?

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"Men must have goals which, in their eyes, merit effort and commitment; and they must believe that their efforts will win them self-respect and the respect of others." While pondering this question, I was reminded of this quote by John W. Gardner. Deadlines are simply goals on when the project, replication, or phase of the project should be completed. Second only to the experimental protocols, deadlines are essential to any research project—whether imposed by the granting agency, major professor, or yourself. A researcher should enthusiastically "shoot" for these "goals," not agonize the impending "life or death" finish. Moreover, researchers are aware that mistakes will happen and delays will occur. Meat scientists typically work with either live animals or perishable product, and the dynamic nature of our experimental unit may cause unforeseen delays. However, delays caused by disorganization, mismanagement of time and resources, or just plain laziness will not be tolerated by anyone.

When considering deadlines, a researcher estimates the time to complete a specific study based on personal experience, the type of experimental unit (live animals or muscle), facilities, laboratory availability, equipment, labor, and other on-going studies. Moreover, deadlines will be adjusted for the level of graduate student conducting the project. For example, a M.S. student is new to research and the major professor must provide more guidance during the study, whereas a Ph.D. student or post-doctoral fellow have research experience and may have the ability to conduct the study unsupervised. When writing grant proposals, researchers set realistic "goals" for completing a study. Setting unrealistic deadlines to obtain funding may occur, but if those deadlines are not met, the researcher may risk being ostracized by the funding agency. If the results are not expeditiously obtained, future funding and the reputation of the researcher will be compromised.

Researchers have been, and will continue to be, measured by the "quality" of the research they perform. However, defining "quality" is difficult because the term "quality" is somewhat ambiguous. Does "quality" research refer to the scientific merit of the study, timeliness of the study, methodologies employed during the study, or application of results? I believe that "quality" research encompasses all of these; however, I would also add that the ability to complete the study in a reasonable amount of time as another factor in defining "quality" research. Deadlines should not compromise the pursuit of quality research. Nor should deadlines be used as an ex-

cuse for “sloppy” research. Balancing deadlines and research quality are the “tightrope” each researcher must walk to achieve excellence.

“Some people have greatness thrust upon them. Very few have excellence thrust upon them. They achieve it.” Another quote by John W. Gardner succinctly describes the ultimate goal of every researcher—the achievement of research excellence. The nature of our ever-changing industry requires expeditious, quality research in order to solve problems and implement scientific and technological advances. We cannot rush our answers, nor can we “wait around” for the answers to “just appear.” As researchers, we must be committed to quality research and place considerable effort in completing the research in a timely manner. Only then will research excellence be achieved.

How will the roles of the animal/muscle biology/meat scientist change in the 21st century within the academic community?

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First, I would like to define my perceptions of the current role of animal/muscle biology/meat scientist in the academic community to provide a template for discussion on the changing roles. Currently in academics, animal/muscle biology/meat scientists play one of three roles—teacher, researcher or extension/adult educator. Academicians play the role of educating young professionals for the animal/meat industry through their teaching programs, conducting goal-oriented research, and providing the forum for dissemination of research findings through extension and industry education programs. In addition, academics in the past have provided a significant amount of technical expertise for the animal/meat industry. I will only address my opinions on the changes in the research and teaching role in academics.

Research role. Individuals in academics continue to have fewer state and federal dollars for support of teaching, research, and extension programs. The term “state or federally supported institutions” rather than “state or federally funded programs” has been coined. This reduction in funding requires that faculty support their graduate teaching and research programs through external grants and contracts. Funding has traditionally been obtained either through government agencies or commodity-based check-off research programs. Government funding agencies tend to fund more basic research and commodity groups tend to fund more applied research. Each of these two resources is either narrowing their focus to targeted areas of research or they are reducing the total amount of dollars available for funding. This drives two changes for the academician. First, scientists competing for the funds must have targeted research that either addresses a basic research area that will ultimately answer an industry-related problem or they must work in a high priority area for the meat industry. However, meat industry issues change. The 70’s were the

meat composition and leanness decade, the 80’s emphasized nutrient composition and the role of meat in the diet, and the 90’s have been the decade of food safety. Where does this leave the academic scientist? Either willing to change their area of interest to meet the needs of the industry or it leaves them with limited funding resources. I do not see this situation improving, but only escalating. Resources are going to continue to be limited and justification of research to meet industry needs will only increase. Meat scientists will have to keep up with the changing needs of the industry.

What will the 21st century bring as far as new needs? Certainly, food safety issues are not going to disappear; production of animals to meet the leanness/fatness, nutrient demand, or quality considerations of consumers is not going to go away; production of value-added meat products to meet consumer demands will most likely continue to be an issue; and food safety and development of interventions or technology to improve food safety will most likely continue as a major issue.

Animal/muscle biology/meat scientists will have to continue to develop collaborative teams to address industry issues. The lone scientist taking 5 years to answer a question is not likely to be the norm in the 21st century. Incorporation of engineering, packaging, or microbiology expertise with a meat scientist to address the development of new intervention strategies for decontamination of beef trimmings is an example of a research team concept. While most scientists are doing this today, I think the scope of these efforts will increase. Limited dollars, the need to conduct goal-oriented, problem-solving research, and the need to complete tasks in a timely manner will drive the research team concept.

I believe that there will be a stronger need for more interactions with industry and the dissemination of research findings. As the meat industry is, and has been employing a greater number of technical people, many companies have their own technical staff. The technical staff has the job of solving specific problems for their company. As academic research cannot address every industry problem, research that provides basic information for specific problems areas will most likely continue. Taking the basic science and applying it to a targeted problem or product within the company will continue to be the responsibility of the technical staff within a company.

Teaching role. I see a greater need for curriculum changes in our meat science courses as major issues change within the meat industry. Most meat science curriculums emphasize the need to understand basic principles of muscle biochemistry, muscle anatomy and physiology, conversion of muscle to meat, meat quality factors, meat compositional relationships, meat lipid chemistry, meat microbiology, meat packaging, meat color, processed meat principles, meat grading, and meat slaughter and fabrication techniques. Certainly every student at the undergraduate and graduate level must understand HACCP and food microbiology prior to graduating from a program emphasizing meat science. Assuring that our students have good communication skills and a basic understanding of business is also necessary.

I see our teaching programs emphasizing internships and field trips to expose students to the actual meat industry. The meat science laboratory at a major university, while having the ability to teach basic principles and provide opportunities for understanding basic slaughter, fabrication, and processing principles, can in no way expose students to the level of mechanization currently in the industry. The interactions between equipment, processing characteristics, and final product quality need to be addressed in a practical environment. In the past, the meat industry was viewed as either the fresh meat slaughter/processors or the further processors who made products such as hams, sausage, and frankfurters. The meat processing and value-added segments of the industry have expanded tremendously in the past 20 to 15 years. This segment of the meat industry is really—"the food industry." Understanding this segment of the meat industry is best understood by seeing and being exposed to the environment.

The advent of long-distance education and the use of computer technology will open the doors for academicians to reach more students and utilize more visually based examples as teaching aids. As more students from the "technology age" enter higher education, the classroom will either have to keep up by using technology to engage students, or students will lose interest. The role of the Internet in higher education will continue to expand. I see teachers in higher education becoming more facilitators of the learning process in some instances. Care will have to be taken to not lose the hands-on, student interaction that animal/meat science has been noted for.

INDUSTRY RESPONSES

What skills, competencies, knowledge, or training would you like for graduate students to possess prior to government/industry employment (e.g. food safety, processing, growth and development, etc.)?

*Scott J. Eilert, Ph.D. Excel Corporation
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I will choose to respond to the question, not specific to Excel, but to industry in general. For those persons with advanced degrees in Meat Science or related areas, Excel will most likely consider these candidates for a position in Research and Development. Excel has hired people that have extensive experience in food safety research, further processing, engineering, meat quality, or carcass composition. However in many cases, one's specific research area will be considered secondary to other traits. We have hired, and will continue to hire people to work in research areas that are not specific to the titles of their thesis or dissertations.

Our company is not unique in this sense. One can look around the industry and see that many, if not the majority, of persons with advanced degrees working in research areas far removed from that of their graduate work. I think that one of the most marketable skills of a graduate student coming out of school

is a well-rounded experience. It is important to take opportunities to broaden your "field of vision" so that one will fit well into a variety of industry environments. A graduate student who spends 2-5 years in one specific research area without branching out to learn other areas will find it difficult to obtain an industry position. However, the person who concentrated in one area for their thesis or dissertation, while at the same time, took the opportunity to be involved in a variety of research, teaching, and extension activities will be far more marketable. If there was one research area today that every graduate student should have some working knowledge of, it would be the area of food safety, because there are very few positions today that are not impacted by food safety considerations.

Everyone needs good communication skills. In an industry position, the most beneficial trait is to be able to concisely communicate a technical message in a manner that can be comprehended by those that may not possess the technical skills of the presenter. To put it more concisely and comprehensible—"keep it simple, keep it short." Leadership and management skills are also valuable. It is important that a candidate be able to demonstrate that they can lead a group of people towards a common end, be it in research, teaching, or work experience. In addition, a graduate student must demonstrate a solid work ethic and ability to handle several priorities at one time. Very few positions today afford the luxury of being able to work on one project or task at a time.

Would you prefer to employ people who have a broad knowledge base with less depth, or one who has very specific, in-depth training in the area related to the job position? Would you rather train the person yourself?

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Our goal is to employ the right person for the right job. If we need to hire a specialist, then they obviously need to be trained in that area. If we need to hire a generalist, the broad knowledge base is good. Ideally, we need someone with broad exposure but with a specialty or in-depth training in some area of importance to us. In-depth training alone without broad exposure limits the marketability of the individual.

Ideal candidates have a strong background in the sciences—statistics, biochemistry, biology, and meat science with strong communication and interpersonal skills. Exposure to the industry through internships, research projects, and plant trips are a decided advantage. A broad knowledge base allows the individual to be more flexible in their career path and contribute in many different areas as the industry is changing focus.

Industry does not take much time in training in areas deemed prerequisites for the job. It is expected that the candidate have basic skills, just experience. Everyone ends up being trained in some respect at any position they go to. However, there is very little formalized scientific training accomplished outside of the university. There is plenty of scientific

discovery and learning, but very little training. For instance, the discipline of statistics is used daily, but not in the same fashion as in university research projects. It is more the application of statistical design to achieve the best answer with limited time and resources.

The training that one gets in graduate school is just the basis or foundation that one builds on throughout their career. Training any new individual is a time consuming process, and most people do not have the time. Therefore, I would want a person that has a strong background with good interpersonal skills that I can add to by providing them with learning opportunities and challenges.

How do advanced degrees compare to beginning salary and potential rate of advancement/promotion within a government or industry setting?

*C. Ann Hollingsworth, Ph.D., Keystone Foods
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The financial rewards and rate of advancement within government and industry positions are largely dependent upon individual performance and personal objectives. The advanced degrees are often the minimum requirement to be considered for a job or promotion but simply holding the minimum degree does not guarantee professional success. The applicant or employee must be able to add value to the organization and to work comfortably within the organizational structure.

How will the roles of the animal/muscle biology/meat scientist change within government/industry in the 21st century?

*Gordon Smith, Ph.D., Jimmy Dean Foods
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1. A focus on food safety.

Food safety will continue to be a high priority with scientists in government and industry. This will continue to reinforce the need for strong cross-functional knowledge and skills across many areas including meat and food science, microbiology, sensory evaluation, quality assurance, food processing/preservation, and sanitation. Advances in ingredient, processing, and preservation technology will be driven by the moral and economic responsibilities to produce increasingly safer food. Adaptation of these practices into mainstream manufacturing will require creative and innovative product development.

2. Commitment to work with the “others.”

“Science based” regulations development and enforcement by USDA will drive the need for government and industry scientists to better understand one another and commit to work together. Industry will be challenged to identify, test, and prove positions on food safety such as process lethality, combination strategies, and Critical Control Point selection and validity. Governmental scientists will be faced with the

monumental task of further protecting the public through better R&D, regulation development, and consistency across agencies. Constructive interaction between once possibly adversarial or competitive groups will be necessary to achieve best results, most economically, under accelerated time frame.

3. A need to generalize.

Specialists will continue to be needed but generalists will rule. Once separate food industries will continue to overlap as multi-ingredient foods and multi-component meals become more common place. Strong knowledge of food science beyond meats will be necessary for product development in these areas.

4. A need to specialize.

Generalists will continue to be needed but specialists will rule. Highly technical advances in meat science including biotechnology and novel pasteurization systems will require people with highly focused interest and skills. Breakthrough technologies and applications will result from intense study and research on highly specific areas.

5. Evolved management and communication skills.

Scientists will become directors, clearinghouses, and caretakers of information provided by many sources including academia, the government, suppliers, and competitors. Symbiotic relationships will be cultivated to solve complex problems resulting in competitive advantages or of common good to the industry as a whole. Technology will make collaboration and peer review of ideas easier and more fruitful.

In addition, scientists will be asked to communicate effectively over an increasingly wide variety of audiences. Transition of good science to the market place will involve translation to non-scientists including consumers, regulators, marketing, sales, and corporate executives. More complex solutions to issues will make these skills invaluable for successful implementation.

GOVERNMENT RESPONSES

What do you see is the greatest challenge for graduate students in obtaining a successful career in government or industry?

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One of the biggest challenges facing graduate students is finding the first job that is close to their career goals. Particularly in government, but also in industry and academia, there are often only a limited number of jobs in a particular area and they may not be available when the student is looking for a position. One thing of extreme importance is to develop a network with potential employers in the area in which you

are interested so that you can find out if any jobs will be opening during the period in which you are looking. Work with your professors and go to meetings, etc. to take every opportunity to meet with people in the area you wish to pursue your career. Too often, students wait until they are about ready to graduate to begin looking, and this is often too late. If there are any opportunities for internships, even during your graduate program, take advantage of them. If you can, visit with potential employers to learn more about potential jobs and let them learn more about you. Often in government, we need considerable time to create and/or fill a position. It cannot be done in just a couple of months. Also, don't be afraid to keep looking for the right position after you take your first job if it is not what you want. Very few people finish their careers in the same job, much less the same company or branch of government.

I think a second challenge is finding a job in which you are happy doing the work you do most of the time. If you do not enjoy your job most of the time, you will probably not be very successful. Too many times, employees look only at salary or location, but not career satisfaction. The most successful people I know look forward to going to work, they do not dread going. Those who are always dissatisfied are generally less successful. If you are not satisfied, keep looking.

Do government or industry positions require graduate students to possess skills that are basic, applied, or a combination thereof for employment? Is there a preference for either?

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The Agricultural Research Service (ARS) is the "in-house" research agency for USDA. It conducts mission-oriented targeted research to address national high priority questions and issues of U.S. agriculture and provide research needed by USDA action agencies. The focus of research projects in ARS varies from very specific to more general industry problems, and may require basic and applied skills.

Although it is difficult to generalize, usually the training needed for a position in ARS would include both basic and applied skills. Because these are full-time research positions, one must have sound scientific training in order to analyze problems/questions and come up with research that will provide solutions. On the other hand, some knowledge of applied issues is necessary to fully understand and address the problems. But sound training and good skills are more important than whether the skills are "basic" or "applied." ARS emphasizes using multi-disciplinary teams to focus the needed expertise on addressing high priority issues; thus, one scientist does not have to know everything about a specific issue.

All of one's training does not have to come from M.S. and Ph.D. programs. Many times, a post-doctoral position is considered as a last resort, but this should not be the case. Two-year post-doctoral positions can be very useful in helping a person mature as a researcher and gain additional skills. Particularly in ARS, post-doctoral positions can provide valuable research experience, expose one to different viewpoints, and pay very competitive salaries. Another valuable experience is a short research fellowship. If a fellowship is available, three to six months spent working in someone's laboratory between degrees can provide good experience, additional skills, and insight into what area to direct your career.