



Cornell Undergraduate Margaret Dunn's Career Path Guided by Practical Approach to Research

By Lisa Fields

Margaret Dunn's love for animals and life-long experience raising dairy goats inspired her college choice of Cornell University's Department of Animal Science and the pre-vet curriculum. After exposure to extension-based research during her sophomore and junior years, Dunn shifted her focus towards agricultural education and extension work. "The veterinary track was a total immersion in science that I felt wouldn't fit my long term aspirations. I wanted to be involved more directly with agricultural research that's practical for farmers to apply."

It was Dunn's experience in the Whole Farm Nutrient Management course that inspired her change of direction. This spring-semester course is co-taught by Drs. Mike Van Amburgh and Quirine Ketterings of the Animal Science Department. Students learn about environmental regulations and develop a nutrient management plan for a local dairy farm. This entails evaluating the nutrient use efficiency of feed and fertilizer, and planning manure and fertilizer applications to meet crop needs while reducing the risk of environmental loss. "I took the course to gain practical knowledge of the farm system. I found the process of completing a nutrient management plan inspiring because it was a real-world, practical tool," Dunn added.

After the course, Dunn approached Ketterings about opportunities to join the Cornell Nutrient Management Spear Program (NMSP). The NMSP is the applied research and extension program in field crop nutrient management of the College of Agriculture and Life Sciences (CALs).

"I was really happy to hear of Margaret's interest in joining us," Ketterings remarked. "She had shown a keen interest in learning about nutrient management and applying that knowledge to improve the farmer's bottom line and she had practical farm experience. The complexity of the issue we deal with intrigued her and her enthusiasm to learn and share her

experiences and thoughts with others was obvious."



Margaret Dunn, Animal Science major at Cornell University, worked with the Cornell Nutrient Management Spear Program during her senior year at Cornell.

Margaret was employed at a beef farm in Lodi that summer where she worked with 65 heifers enrolled in the Empire Heifer Development Project, handling vaccinations, heat checks and artificial insemination, and assisting with calving and management of the rest of the farm as needed. At the same time, she assisted Dr. Mike Baker, Extension Beef Cattle Specialist in the Department of Animal Science, with sampling of forages and pastures.

Once back at Cornell in the fall of 2009, Dunn worked with NMSP team members Caroline Rasmussen and Patty Ristow on two software tools designed to aid in farm-level nutrient management planning, the "Manure Value Calculator" and the "Whole Farm Mass Nutrient Balance Assessment Tool".

The Manure Value Calculator is a tool for farmers to evaluate the fertilizer replacement value of manure for specific crops. The tool helps determine where manure applications

best fit crop needs, and where spreading is or isn't cost effective. The Whole Farm Mass Nutrient Balance program is a tool for farmers to determine where nutrient inefficiencies are occurring. The difference between the nitrogen, phosphorus and potassium exported in sales of milk, livestock, crops and manure and the nutrients imported in purchased feed, fertilizer, forages, and animals is calculated. When the balance of nutrients remaining on the farm is higher than typical, farmers can identify opportunities to improve efficiency, which often also improves farm economics.

Dunn described her work process. "First I had to familiarize myself with the software programs so I understood what they were supposed to do for the user. This was a challenge, because I had to learn the science of the assumptions behind the numerical values applied in the programs. An example is an ammonia loss calculation that's part of the Manure Value Calculator. When manure is applied to the soil surface rather than incorporated, the ammonia portion of the nitrogen is deducted as it isn't available to the crop. For both programs I ran example scenarios using actual farm data and checked for programming bugs."

A change of pace for Dunn from the farmer oriented software programs was a project assisting Ketterings in developing web-based learning modules for aspiring Northeast Region Certified Crop Advisers (NRCCAs). This project is funded by the Faculty Innovation in Teaching Program, Office of the Provost, Cornell University, and by USDA-NIFA (EPA Regions 1 and 2). The learning modules are designed to help with study for the NRCCA exam. Each module covers a distinct area of knowledge (competency area) within the field of agronomy: (1) nutrient management, (2) soil and water management, (3) crop production, and (4) pest management. Dunn's work with the course focused on the first two competency areas.

Dunn enjoyed this opportunity to apply her skills as a future educator. She commented;

"There was a lot of research involved as I reviewed the materials for relevance to the entire Northeast, found on-line links for the topics and created quiz questions."

Dunn also noted of her NMSP experience, "It was a very positive work environment. I felt highly encouraged by the staff and the easy-going atmosphere made the work days fun."

Ketterings added, "It is one of the key priorities in our program to involve students in the research and extension process. Their openness and enthusiasm brings a fresh perspective to our team. Students get exposed to a variety of ideas and approaches to the research and extension process and gain a greater understanding of the practical challenges and opportunities in the agricultural sector. We're all here because of a thirst for knowledge and a drive to do relevant work for the farm community. That common thread creates a respectful and supportive atmosphere for all in the program."

Dunn graduated in the spring of 2010 and is now pursuing a MS degree at Iowa State University. Her MS project evaluates both beef cattle and forage performance under three different grazing systems. "It will be interesting to see what the data show as to which system gives the best results. I am excited to do this work, because it is of practical, real world use to people who make their living raising beef."

Dunn's drive to do meaningful work was fostered during her time with NMSP. "An important point that I'll carry forward is that practicality is paramount. During the research process one needs to step back from the numbers and ask; "does it matter to the farmer?" The work must have the potential to contribute to a positive change on the farm to be worthwhile."

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The **Nutrient Management Spear Program** (NMSP) is an applied research, teaching and extension program for field crop fertilizer and manure management on dairy and livestock farms. It is a collaboration among faculty, staff and students in the Department of Animal Science, Cornell Cooperative Extension, and PRO-DAIRY. Our vision is to assess current knowledge, identify research and educational needs, facilitate new research, technology and knowledge transfer, and aid in the on-farm implementation of strategies for field crop nutrient management including timely application of organic and inorganic nutrient sources to improve farm profitability while protecting the environment. An integrated network approach is used to address research, extension and teaching priorities in nutrient management in New York State. For more information on NMSP projects and extension/teaching activities, visit the program website (<http://nmssp.cals.cornell.edu>) or contact Quirine Ketterings at qm2@cornell.edu or (607) 255-3061.