



Cornell Presidential Research Scholar Conducts Applied Research with Implications for Agriculture and Environment

By Kate Birchenough

Scott Grandt was not the typical undergraduate student at Cornell University. He challenged himself in everything he did, from sailing to his coursework and research.

Grandt recently graduated with a Bachelor of Science Magna Cum Laude with a double major in Applied Economics and Management and Crop and Soil Sciences and distinction in research. He was also honored as a Hunter R. Rawlings III Cornell Presidential Research Scholar (RCPRS) and, in July of 2008, he received the Northeastern Branch of the Crop, Soil and Agronomy Associations of America (NEBCSA) Outstanding Senior Award.



Scott Grandt (left) is congratulated by Cornell President Hunter R. Rawlings III for his research achievements (Photo credit: Robert Barker, Cornell University Photography).

The RCPRS Program enabled Grandt to conduct research during his undergraduate years.

"Being selected as an RCPRS was a big honor since it is one of the Cornell Commitment programs. This award was one of the primary reasons I chose to come to Cornell. Knowing that I was going to have meaningful support for my research from the university meant I was going to be able to pursue research in any field I wanted," said Grandt.

RCPRS recognizes and rewards Cornell undergraduate students who are committed to research, discovery, and intellectual curiosity. Established in 1996, its purpose is to serve as a vehicle to attract top students to Cornell, by providing them with the opportunity to interact closely with a faculty mentor, engage in research during each of their undergraduate years, receive funding for their research-related expenses, and receive financial aid if eligible. RCPRS spans all academic disciplines, in all seven undergraduate colleges at Cornell. The program enables its student participants to collaborate with faculty mentors of their choosing in designing and carrying out an individualized program of research, which may be done in a lab, with a research group, or as an independent project.

"Scott had access to \$8,000 in a Research Support Account (RSA) to cover his research related expenses throughout all four years," said Kristin Ramsay, coordinator of the RCPRS program. "He was able to spend a summer involved in research full-time at Cornell, funded by the program. He also used his RSA to support academic-year research wages through his senior year."

Grandt became involved with the Cornell Nutrient Management Spear Program (NMSP) under the direction of Dr. Quirine Ketterings, Associate Professor in the Department of Animal Science.

While with NMSP, Grandt looked into the current guidelines for soil sampling for fertility and environmental management of field crops in New York. The California native worked with Ketterings and the NMSP team to examine the relationships between soil sampling density, timing of sampling, and accuracy of field soil test averages. In addition, Grandt's research investigated the impact of sampling time on the reliability of models used to convert soil test values from Mehlich-3 to Cornell Morgan.

Grandt explains, "Cornell University phosphorus soil fertility and runoff risk guidelines are based on the Morgan soil test, but the Mehlich-3 test is widely used as well. Earlier work had shown Mehlich-3 P results

could be converted to Cornell Morgan estimates if Mehlich-3 Al, Ca, P and soil pH were known. However, research was needed to study the impact of sampling density, timing of sampling, and manure application on the reliability of the estimates. My research showed for most accurate estimates, fields should be sampled in the fall after harvest but before manure application. The results allowed us to improve Cornell guidance for soil sampling and for the use of soil test conversion models in New York."

"Scott's ability to integrate diverse interests is unique in my experience with students. Soil science, applied economics, and sailing were connected for him, all parts of who he is," said Dr. Gary Fick, Grandt's academic advisor in Crop and Soil Sciences. "He approaches each subject with enthusiasm and skill. He has great leadership qualities too."

Ketterings agreed, "It was great to work with Scott and see his progress over the years. He took on a complicated research topic, was able to break it down into manageable pieces, worked with other team members to conduct the research, and then put together a really nice manuscript that is currently in review by a scientific journal. In addition, he presented his work at extension and research events."

Though much of his coursework was in economics and management, Grandt saw the agronomy research as a way for helping farmers. His soil science classes gave him the knowledge he needed to conduct his research and understand nutrient cycling. His statistics and Geographic Information System classes helped him with data analysis throughout the research.

"Often times there is a balance between cost and accuracy that must be balanced on the farm," he said. "Coming into this research with a strong understanding of how marginal costs and marginal benefits impact business decisions, allowed me to better frame my research project's questions around helping farmers strike a better balance between improved accuracy, without ignoring the costs."

"My research hopefully will help producers improve the accuracy and usefulness of their

soil testing programs," continued Grandt. "Having accurate soil test results helps farmers apply fertilizer to meet crop needs only, ensuring both adequate yields and environmental protection."

Throughout his time with NMSp he received a well-rounded experience. When he wasn't busy leading his own research project and finding ways to link it to other projects being conducted at NMSp, he was able to work side-by-side with the staff there, and help with other research projects in the field.

"Spirited discussions, an open door policy and a focus on applied research is what allows this group to be so effective," said Grandt of the NMSp team. "Quirine was an amazing advisor and friend and helped me grow tremendously as a researcher and student. The rest of the team was extremely helpful as well."

This summer Grandt is working in New York City with Citigroup in its Capital Markets Division as an analyst. With the knowledge he gained during his undergraduate research, he can figure out the best way to break large, complex problems into smaller manageable parts. Grandt also credits the research with helping him understand mathematics. "Poor statistical design and implementation can ruin a research project. Likewise, misapplying mathematical techniques in the real world can also lead to unreliable results."

With the rest of his career ahead of him, Grandt believes he will be able to attribute his newfound research skills to whatever lays ahead.

"Going through the scientific process of discovery and being forced to think critically helped me to grow tremendously," he said. "Being able to take a large complex problem and break it into smaller parts is important to so many different things in life that even if my career isn't in applied agricultural research the skills I have learned will be useful."



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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 PRODAIRY. 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://nmsp.css.cornell.edu>) or contact Quirine Ketterings at gmk2@cornell.edu or (607) 255-3061.