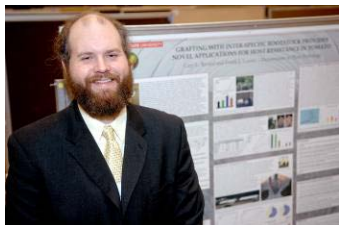


Fourth Annual Graduate Research Symposium

Congratulations to the winners of the Fourth Annual Graduate Research Symposium. The goal of the Symposium is to showcase the outstanding quality and diversity of graduate-level research at NC State. Each Director of Graduate Programs was invited to nominate up to five graduate students from their respective programs. Winners were announced from each of the seven categories. The Symposium was held March 18, 2009 at the McKimmon Center.

Agricultural Sciences

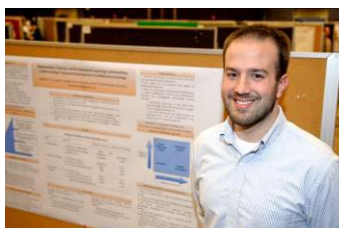


Cary Rivard (Plant Pathology) won first place for his work, "[Grafting with inter-specific rootstock provides novel applications for host resistance in tomato.](#)" During the 2005-2008 growing seasons, grafting was implemented as a crop management strategy. Quantitative PCR protocol was developed to monitor defense gene expression in tomatoes to determine the physiological state of induced resistance associated with grafting. The results indicate that "grafting is a highly effective management strategy" that is being readily adopted by NC tomato growers. Rivard's work suggests that further clarification of induced resistance will also "enhance application of host genetics in the field."

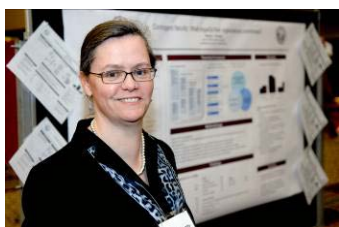


Ramon Molina-Bravo (Horticultural Science) received second place for "[Development of a Protocol to Assess Heat Tolerance in a Segregating Population of Red Raspberry \(*Rubus idaeus* L.\) for Quantitative Trait Analysis.](#)" Currently, no large-scale raspberry producers exist in the southeastern U.S. mainly due to a lack of cultivars adapted to the warm summers. Molina-Bravo developed a protocol to measure heat tolerance for raspberries using a chlorophyll fluorometer and applied his method to "a field-grown mapping population for genetic and quantitative analysis."

Education



Matthew Campbell (Mathematics Education) received first place for his presentation on "[Mathematics Teachers and Professional Learning Communities: Understanding Professional Development in Collaborative Settings.](#)" After observing two teams of teachers as they implemented principles of PLC in district-wide interventions, Campbell's findings question "PLCs as the sole source of professional development for mathematics teachers" and highlight other factors that could be attributed to teachers' engagement in effective mathematics professional development programs.



Maura J. Murphy (Adult and Higher Education) was awarded second place for "[Contingent faculty: What impacts their organizational commitment?](#)" Her study's goal was to understand how part-time and full-time contingent faculty compare to tenured/tenure-track faculty in terms of organizational commitment at four-year institutions. Murphy found evidence to support the claim "that institutional practices relating to recognition, support, compensation and shared governance will build the organizational commitment of contingent faculty."

Engineering



Sumit Gangwal (Chemical and Biomolecular Engineering) was awarded first place for his research with "[Dielectrophoretic and electrokinetic behavior of 'Janus' particles in AC electric fields.](#)" His findings on the assembly of Janus metallodielectric particles may have many applications in "liquid-borne microcircuits and materials with directional electric and heat transfer." Applications for the electrokinetic motion of the particles may be used in microactuators, microsensors, and microfluidic devices.



Gheorghe Bunget (Mechanical and Aerospace Engineering) received second place for the "[BATMAV, a Biologically-Inspired Micro-Air Vehicle for flapping flight.](#)" Micro-Aerial Vehicles (MAVs), like Bunget's, are important to "applications where maneuverability in confined spaces is necessary," such as inspecting the insides of pipes, exploring collapsed structures and surveilling indoors. The highlight of this MAV is its bat-like flight design, completed with flexible and foldable wings using the dual role of Shape Memory Alloy (SMA) wires to design superelastic joints and 'artificial-muscle' actuation. After extensive analyses of flight physics in small birds, bats and large insects, the bat model was selected for its "superior aerodynamic performance and maneuverability."

Humanities and Design

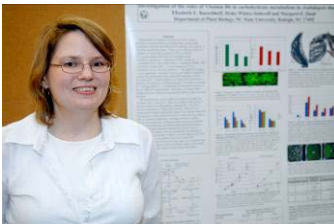


Alberto Rigau (Graphic Design) was awarded first place for his research on "[In what ways can design address consumption induced behaviors and provide a set of tools to help consumers manage, control, and personalize fiscal activities?](#)" As credit cards have increasingly become essential to Americans' financing, Rigau set out to find ways to address consumer behaviors through design and to propose "a set of tools to help consumers manage, control and personalize fiscal activities." His study serves to investigate those "moments in which design intervention can bring about reflective thought about spending habits."

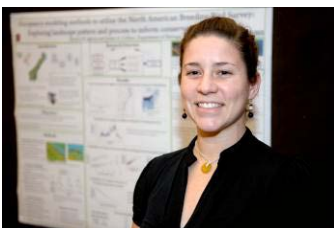


Jennifer Salazar (Landscape Architecture) won second place for her poster presentation on "[Designing dog parks for the people who use them: A case study of parks in Raleigh and Durham, NC.](#)" The study was devised to explore why people use dog parks and whether the "parks are adequately designed as spaces for people." After conducting face-to-face interviews, Salazar concluded that "improving dog park design by providing key features, such as adequate seating and shaded areas, will enhance the park users' experience and increase social interactions among pet owners."

Life Sciences

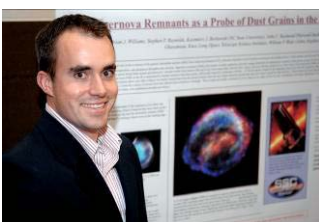


Elizabeth E. Rueschhoff (Plant Biology) was awarded first place for her "[Investigation of the roles of Vitamin B6 in carbohydrate metabolism in *Arabidopsis thaliana*.](#)" Focusing on two different mutants of vitamin B6 synthesis, *pdx1.3* and *sos4*, Rueschhoff is working to understand the mechanism that allows these mutants to display the same phenotype despite having different levels of B6. Her research may assist "to develop crops that are more resistant to biotic and abiotic stress, such as plant pathogens or drought, and to develop crops with higher nutritional value."

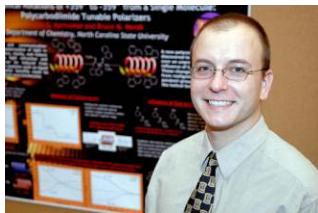


Monica Iglecia (Zoology) received second place for her poster presentation on "[Occupancy modeling methods to utilize the North American Breeding Bird Survey, explore landscape pattern and process, and inform conservation planning.](#)" Through her methodology, the NABBS can estimate vital parameters, which are "well-suited to inform conservation planning and development of decision-support tools for conservation design" for a number of avian species in the southeastern United States.

Mathematical and Physical Sciences



Brian Williams (Physics) won first place for his research "[Using Supernova Remnants as a Probe of Dust Grains in the Interstellar Medium.](#)" Interstellar dust grains, such as those Williams studied using supernova remnants, catalyze "formation of H₂ molecules important in star formation" and serve as "the building blocks of stars, planets, and life itself." However, relatively little research exists on the origin, composition and abundance of interstellar dust grains. The results of Williams' in-depth observations and testing suggest "re-working of fairly well established astrophysical theory."



Justin G. Kennemur (Chemistry) was awarded second place for his poster presentation on "[Selective Optical Rotations of +359° to -359° from a Single Molecule: A Polycarbodiimide Tunable Polarizer.](#)" Kennemur studies polycarbodiimides, which are helical polymers capable of obtaining "high single-handedness when polymerized using chiral catalyst systems." One new polymer shows "reversible conformational switching capabilities that can selectively modify the polarization of light from +359° to -359° as a function of temperature and solvent." This research may have important applications in "efficiently controlling and harnessing light" for energy conservation.

Social Sciences and Management



Erin Banks (Psychology) was awarded first place for her poster presentation of her research, "[Being Healthy Counts to H.I.M.: An examination of health behavior among participants in a diabetes prevention and health promotion program.](#)" From this quasi-experimental study of older African American participants, the findings will contribute to further "health-related research and interventions literature for African Americans" and research addressing the role of churches in conveying health information and behavioral change.



Roxana Toma (Public Administration) was awarded second place for her poster presentation on "[Administrative Corruption in Post-Communist Transition: Measurement and Implications for Romania.](#)" Toma analyzed perceptions of corruption in the Romanian civil service and the factors that facilitated these perceptions. Her research resulted in a variety of policy implications -- citizen education, human resource reforms, including merit-based employment practices and worker empowerment, and positive information and social capital fostered by the government to show its willingness to fight corruption.