

## Ann E. Stapleton

### UNCW-format compiled Curriculum Vitae

#### **Brief summary of five year period 2012-2017**

##### *Highlights/New for 2016-2017*

I am especially proud of being awarded the first UNCW mentor award, in 2012. More than 50 research students have been supported by my federal grants in the last five years, and I encourage networking among my students and the many other students in my field that I mentor at scientific conferences. I was the mentoring lead for the large 5<sup>th</sup> International Quantitative Genetics meeting in 2016; I raised more than \$100,000 in federal funds to support students at ICQG5 and the 2017 Quantitative Genetics Gordon Research Conference and Seminar. I am a permanent member of the MaGNET committee that administers new-student and broader impact awards for the Maize Genetics community. My research reassignment in 2015 was very productive; I was just awarded a \$499,194 grant from the USDA to support this new envirotyping research. I am also very proud of my 2016 award for ‘Volunteer of the Year’ from Science Olympiad.

##### *Teaching*

Between 2012 and 2016 I have had a partial teaching release each spring supported by my NSF cyberinfrastructure grant. When this ended, I took on the genetics lab coordinator position, starting in spring 2017. In Fall 2016 I developed an entirely new genetics lab curriculum using the national, UNCW and departmental learning goals – which was a rather labor-intensive activity. This new course design includes a multi-week project to analyze the genotype and phenotype relationships in unknown samples (with dogs, as they have excellent genomic and population data on easily measured morphological traits). I am also developing a manual for lab coordinators, lab preparators and my co-instructors. The department has been very supportive of this effort via an equipment grant to purchase instruments that can be shared between all our molecular teaching labs.

I have been involved in course-based undergraduate research (CURE) networks and I am senior advisor on the 2017 CURENet NSF grant proposal that Erin Dolan has coordinated. I have been cited by graduating students as an important influence every semester I’ve been at UNCW. My honors introductory biology students write to me years later to express their appreciation, and they serve as upperclass TAs for the entering class each year. A typical student comment is “I think it's because of taking Honors Bio 201 that I am having an easier time than some of my other classmates. I just wanted to thank you for challenging me and preparing me for future classes because I don't think I appreciated it at this time a year and a half ago”.

## *Research*

This year I have written grants to NSF, NIH and USDA and all five have been funded. Since 2012, I have received \$2,446,001 in federal funding to UNCW (as part of projects funded at over \$100 million in total). As is usual in my field, all of my research grants are collaborative projects with multiple universities. I have one field-based maize genetics project; I am mentoring Iowa State and Michigan State molecular biology researchers in quantitative genetics analysis of pathways for endoplasmic reticulum stress responses. The ISU and MSU researchers are experts in the mechanistics and genetics of the pathway in Arabidopsis, and together we are working on field-relevant pathway analysis in maize. This is funded by NSF PGRP, \$381,156 to UNCW, 2016-2019.

I am in the final year of a long-term \$100 million NSF-funded cyberinfrastructure project, now named CyVerse, with \$626,997 to UNCW in the last five years. I have mentored many excellent students in their first real-world paid project, and we have developed a robust, scalable workflow for testing genotype-phenotype association and prediction data analysis methods on the national high-performance computing systems.

I have a new collaborative infrastructure project (\$43,539 to UNCW) that is supported by and EAGER grant from NSF, the GETBIO project with University of South Dakota and South Dakota State and in collaboration with the professional society (American Society of Plant Biologists). This will extend our validation workflow and make it more accessible to plant biologists, and will allow automated discovery of best practices in broader impacts and teaching collections. This project thus builds on my expertise in both cyberinfrastructure and teaching.

In 2016-2017 I have submitted two new manuscripts for publication, with three more in the final process of editing with target submission dates early in 2017. It has been disappointing to have two major publications languish in the process of review for more than 14 months in 2015-2016; we have reluctantly concluded that unless we get some response from the editor we will pull one manuscript and send it to a more responsive journal.

I analyzed the impact of my publications with the NIH research rating system that is used internationally, iCite. Despite the limited coverage of that database (only 16 of my publications are indexed), my publications are rated 'highly influential', with a higher relative citation index than 75% of all publications in PubMed.

### Research Overview:

**Quantitative genetics of environmental interactions -- experiment and theory** The phenotypic effects of genetic variants are commonly modified by environmental inputs such as chemicals, temperature, and nutrient availability. In the past we have controlled those inputs by focusing on certain model traits--as Mendel did--and by careful control of environments, varying only one factor to the extent possible. Now, we understand that

we can learn how biological systems work (and how they fail, in the case of disease) by better understanding the effects of environmental inputs and genetic control of those inputs. I have advanced the field of genotype-environment genetics by designing experiments to test hypotheses about interactions between different abiotic input deprivations and publishing multiple papers in this research area.

Analysis of genetic control of multiple environmental interactions requires new approaches to data analysis. I have collaborated with statisticians to develop new theory and models for quantitative trait analysis, as documented in publications such as Boone, E. L., Simmons, S. J., Ye, K. and A. E. Stapleton (2006) Analyzing quantitative trait loci for *Arabidopsis thaliana* using Markov chain Monte Carlo model composition with restricted and unrestricted model spaces. *Statistical Methodology* 3(1): 69-78. We are currently developing statistical and mathematical models for dose-response surfaces to better understand our genetic architecture analysis of response surfaces; this work has resulted in a manuscript titled “Dose-response surface fits to drought and nitrogen limitation applied together allow mapping of loci that exhibit nonlinear responses, Chang et al.” (submitted). We have tested the integrative effects of plant hormones on stress responses and this work has been submitted for publication (Stutts et al. *Plant Growth Regulators Ameliorate or Exacerbate Abiotic and Biotic stress effects on Zea mays Kernel Weight in a Genotype-Specific Manner*); this project has also led to new non-parametric statistical advances, in a manuscript submitted to the *Journal of Statistical Computation and Simulation* (Wang et al., *Two Sample Order Free Trend Inference with an Application in Plant Physiology*).

This genotype-environment work is centered in my lab, and I have developed the concepts, been awarded funding, mentored research students, developed experimental designs, supervised experiments and data analysis, and, recently, supervised development of modeling theory and computational analysis of model parameter optimization. I am now extending this work in collaboration with a top crop modeling group, Dr. Mark Cooper’s team at DupontPioneer, developing novel analysis methods and integrating modeling with selection theory.

**Cyberinfrastructure for data analysis** I have an extensive and long-standing set of projects on cyberinfrastructure to enable democratic access to the high-performance computing resources need to analyze today’s very large datasets, which was first funded by the state of North Carolina and then by NSF. The iPlant (now CyVerse) project has more than 20,000 users. Recently, I have developed and supervised a team of computer science and statistics students to develop VALIDATE, infrastructure and examples for measurement of precision and accuracy of data analysis software tools. My CS and Stats/Math students get extensive mentoring as part of production-scale software development team, making them highly recruited for graduate programs and positions in industry. This work is documented in the marker publication Goff et al. (2011) and my long history in this field is evidenced by our first publication, Brown, J. L. et al. (2005) *GridNexus: A grid services scientific workflow system. International Journal of Computer & Information Science (IJCIS)* 6(2): 72-82. Our VALIDATE project is documented at <http://validate-10.readthedocs.io/en/latest/>. Collaborative work between

UNCW students and TACC researchers has resulted in a prestigious IEEE publication associated with a conference; these are highly competitive peer reviewed papers for conference acceptance, with a proceedings publication (Stubbs, J., Talley, S., Moreira, W., Stapleton, A. and Dooley, R. (2016). Endofday: A Container Workflow Engine for Scalable, Reproducible Computation, accepted in IWSG16).

### *Service*

I contribute to department administration through effective department service – I take pride in my assigned committees accomplishing their work. I have also contributed to faculty search committees every year.

I am especially pleased that the UNCW Data Science degree is now approved and the program will begin in Fall 2017. I wrote the Application A for this new graduate program, and worked with an outstanding MBA student to interview local business leaders and write the Application C. I have now turned the planning over to the two new department chairs and the new program coordinator. I look forward to hearing about the new students' progress in this program when they begin next year.

I have led events at the regional Science Olympiad for several years, and last year I was surprised at the award ceremony with the 'volunteer of the year' award. Science Olympiad is an outstanding activity for our youngest scientists and I plan to continue volunteering and recruiting new volunteers each year.

My major contribution to my profession is focused around mentoring graduate students and postdoctoral researchers at professional meetings. I organized a major scientific meeting, the Maize Genetics Meeting, with an all-volunteer steering committee. I served as the mentoring lead for the Fifth International Conference on Quantitative Genetics in June 2016; I wrote the mentoring sections of the funded grant proposals for student support. I was elected vice-Chair (2015) then Chair (2017) of the prestigious Quantitative Genetics and Genomics Gordon Research Conference.

I was invited by Dr. Rich Jorgenson to be a founding Associate Editor at Frontiers in Plant Genetics and Genomics, and I have continued in that role for the last four years. This journal has an innovative system for interactive peer review and strong technical support for editors and reviewers.

I am in the process of shifting my metagenomics work to a senior mentoring role; for example, I am the Hatch external reviewer for a USDA/University of Georgia scientist who is working on plant metagenomics. My role in our new ISU-MSU-UNCW NSF grant also reflects my interest in 'train-the-trainers' and high-level mentoring.

### **Brief summary of five year period 2006-2011**

A. courses taught and any material supporting exemplary teaching

*I am especially proud of the revisions to the large 201 labs that I have nurtured, of encouraging the department to adopt a single writing guide across all our courses, of the methods I use for teaching inquiry science (protocols, open-ended experiments, and lab reports), and of mentoring students who go on to careers in high school science teaching.*

I have taught required courses that are key to the department's undergraduate and graduate mission. Over the last five years I have taught Introductory Biology 204/201 Honors, Biology 325 Cellular and Molecular Biology Lecture and Biol 325 lab, Biology 340 Plant Physiology Lecture and Plant Physiology Lab, Biology 495 Senior Seminar, Biology 519 Topics in Cell and Molecular Biology, and a 585 special topics graduate course.

Typical students comments include:

Dr. Stapleton is a knowledgeable, kind and student-oriented professor who tailors this course to be a great learning experience.

I would recommend this course to other students, but I would also explain the great difficulty of this course to them.

I have done more work for this course than for any other.

This course requires a large amount of individual work to succeed.

The work required to do decent was very overwhelming. I have spent more time studying for this class than any of my other classes and I am not doing as well.

My teaching performance was evaluated by an expert reviewer, Dr. Dennis Kubasko from the School of Education. I asked him for suggestions for improvement, and he had no particular advice to offer. He summarized his classroom visit and portfolio review as: "Dr. Stapleton is a wonderful teacher and a true mentor for her students. She takes a vested interest in being an excellent instructor and her pedagogical competency was on display in the laboratory classroom I observed."

B1. all publications and presentations

*I have published ten articles in the past five years, including one in Science. I am especially pleased to have been invited to chair a session and present an overview and research directions talk at the prestigious Genetics and Genomics Gordon Conference.*

B1a. publications in chronological order

Stapleton, Ann E., and Susan J. Simmons (2006) "Complex Plant Control of Phyllosphere Diversity: Genotype Interacts with Ultraviolet-B Radiation", in *Microbial Ecology of Aerial Plant Surfaces*, ed. Mark Bailey, CABI Publishing.

**Casati, P.<sup>4\*</sup>**, Stapleton, A., Blum, J. E., Walbot, V. (2006) Genome-wide analysis of high altitude maize and gene knockdown stocks implicates chromatin remodeling proteins in responses to UV-B, *Plant Journal* 46:613-627. **ISI Top Ten Journal**

Simmons, S. J. and Ann E. Stapleton (2006) Bayesian hierarchical models to detect quantitative trait loci. *Chance* 19(3):11-14

**Harjes CE<sup>4\*</sup>**, Rocheford TR, **Bai L<sup>3\*</sup>**, Brutnell TP, **Kandianis CB<sup>3\*</sup>**, Sowinski SG, Stapleton AE, **Vallabhaneni R<sup>4\*</sup>**, Williams M, Wurtzel ET, Yan J, Buckler ES (2008) Natural Genetic Variation in Lycopene Epsilon Cyclase Tapped for Maize Biofortification. *Science* 319: 330-333 **ISI Journal Citation Reports Ranking:** 2006: 1 **Impact Factor:** 30.038

**Blanding CR<sup>2</sup>**, Simmons SJ, Casati P, Walbot V, Stapleton AE (2007) Coordinated regulation of maize genes during increasing exposure to ultraviolet radiation: identification of ultraviolet-responsive genes, functional processes and associated potential promoter motifs. *Plant Biotechnology Journal* 5: 677-695 **ISI Journal Citation Reports Ranking:** 2006: 14/147 (*Plant Sciences*); 27/140 (*Biotechnology & Applied Microbiology*) **Impact Factor:** 3.378

Balint-Kurti P, Simmons SJ, Blum JE, Ballare CL and Stapleton AE (2010) Maize Leaf Epiphytic Bacteria Diversity Patterns Are Genetically Correlated with Resistance to Fungal Pathogen Infection. *Molecular Plant-Microbe Interactions* **23**:473-484.

Note: This is a top-ranked journal in the field. In the acceptance letter the editor wrote: “Both reviewers found the manuscript to report on a very innovative and interesting study. I agree with their assessment – I found the work to be very interesting, and this subject matter will be a welcome contrast to the more reductionist studies that normally appear in MPMI.”

**Mariana Conte<sup>\*2</sup>**, Silvia de Simone<sup>\*4</sup>, Susan J Simmons, Carlos L Ballare and Ann E Stapleton 2010 Chromosomal Loci Important for Cotyledon Opening Under UV-B in *Arabidopsis thaliana* *BMC Plant Biology* 2010, 10:112 journal ISI ranking 16/173, impact factor 3.77

**Kristin M. Morrison<sup>1</sup>**, Susan J. Simmons, Ann E. Stapleton 2010 Loci controlling nitrate reductase activity in maize: ultraviolet-B signaling in aerial tissues increases nitrate reductase activity in leaf and root when responsive alleles are present. *Physiologia Plantarum* 140(4):334-41, journal ISI ranking 28/173 impact factor 2.71

Balint-Kurti, P., **Pridgen, P.<sup>1</sup>**, Stapleton, A. E. 2011 Antibiotic Resets the Maize Leaf Phyllosphere Community and Increases Resistance to Southern Leaf Blight *Acta Horticulturae* 905, <http://www.actahort.org/books/905/>. Note: this is the most highly cited journal in horticulture, but it is not eligible for ISI rating.

**Makumburage, G. B.**, Stapleton A. E. 2011 Phenotype uniformity in combined-stress environments has a different genetic architecture than in single-stress treatments. *Frontiers in Plant Science* **2**:12 doi: 10.3389/fpls.2011.00012.

B1b. presentations in chronological order

**Richbourg, L.<sup>2</sup>**, **Morrison, K.<sup>1</sup>**, Simmons, S., A. Stapleton UV modulation of nitrate reductase activity is controlled by multiple interacting genes. 49<sup>th</sup> Annual Maize Genetics Conference, St. Charles, IL 22-25 March 2007

Stapleton, A. E. Invited seminar presented to University of South Carolina Department of Biology, 19 January 2007, Stress Under the Sun: Understanding Plant Ultraviolet Radiation Responses.

Stapleton, A. E. Invited seminar presented to NCSU Department of Plant Pathology, April 9 2007, Genetic Architecture of Plant Control of Phyllosphere Diversity in Maize. Invited talk at Plant and Animal Genome XVI, Jan 12-16 2008 "Genetic Architecture of Long-Distance Regulation: QTL Analysis of Root Nitrate Reductase Activity Alterations by Leaf UV-B" Morrison, K;Richbourg, L. Stapleton, A.

Poster presentation "Loci controlling gene expression and morphological UV responses: pleiotropy links levels of regulation" Ann E. Stapleton, Susan J. Simmons, James. E. Blum, Yibing Fu 50<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2008 Washington, DC

Gave first public talk introducing the newly funded iPlantCollaborative (in place of PI) at 50<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2008 Washington, DC.

Invited seminar at UC-Davis Genome Center "Cyberinfrastructure: Moving from Multidisciplinary to Collaborative Projects" January 10, 2008

"Recursive partitioning provides simple and powerful identification of loci and epistasis", selected for platform talk at the Epistasis—Predicting Phenotypes and Evolutionary Trajectories Ninth Annual Plant Sciences Symposium Iowa State University May 31-June 3 2007

SAIL 09 May 13, 2009 Science Librarian conference invited speaker, topic: cyberinfrastructure and data lifecycles.

Meetings: Poster presentation: "Genetic Architecture of Multiple Stress Responses in Maize" Cuixian Chen, H. Lee Richbourg, Ann E. Stapleton Gordon Conference on Quantitative Genetics and Genomics, Galveston Island, TX

Poster presentation "Multiple Stress Dose Response Comparison of Two Genotypes" **Kalindi LaTorre**, Susan J. Simmons, Ann E. Stapleton 51<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2009 St. Charles, IL

Poster presentation "Relative Iron Concentrations Within Kernels Vary Between Inbred Lines and in Response to Drought and Low Nitrogen Conditions" **Abigail Michenfelder**, Ann E. Stapleton 51<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2009 St. Charles, IL

Poster presentation "Genetic Architecture of Multiple Stress Responses" Cuixian Chen, H. Lee Richbourg, Ann E. Stapleton 51<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2009 St. Charles, IL

Poster presentation "Coming of Age of the iPlant Collaborative" Stapleton, Ann E ; Steve Goff, The iPlant Collaborative 51<sup>th</sup> Annual Maize Genetics Meeting, Feb 27-Mar 2, 2009 St. Charles, IL

52<sup>nd</sup> Annual Maize Genetics Conference March 18-21 2010 Combining two stresses creates a joint-stress environment that has a different genetic architecture **H. Lee**

**Richbourg<sup>2</sup>**, James E. Blum, Cuixian Chen, **Andrew Capps<sup>2</sup>**, **Kalindi LaTorre<sup>1</sup>**, and Ann E. Stapleton

Invited presentation at the Illinois Corn Breeding School, Mar 1-2, 2010. Conference paper and presentation, <http://www.conferences.uiuc.edu/conferences>.

Invited speaker (one of ten) at the USDA NIFA PD's meeting 5/7/10, Washington DC.

I gave an invited talk at the Phyllosphere 2010 conference, "Host effects on the composition of the microbial community".

I gave an invited talk at the International Workshop on Postharvest Biological Control: Challenges and Opportunities; my title was 'Genetic Control of Plant Microflora'. I also facilitated the new research directions planning session.

I gave an invited talk at East Carolina University titled "Genetic Control of Maize Phyllosphere Diversity".

Presentation at New York University, Jan 1011 "What can iPlant do for me right now?"

Presentation at Gordon Conference on Genetics and Genomics, 2011 Combining two stresses creates a joint-stress environment that has a different genetic architecture **G. Buddhika Makumburage<sup>2</sup>** **H. Lee Richbourg<sup>2</sup>**, Cuixian Chen, **Andrew Capps<sup>2</sup>**, **Kalindi LaTorre<sup>1</sup>**, and Ann E. Stapleton

Presentation at Rice University Feb 2011 "What can iPlant do for me right now?"

Presentation at Colorado State University Feb 2011 "What can iPlant do for me right now?"

Presentation at Keystone Abiotic Stress and Global Agriculture meeting: Combining two stresses creates a joint-stress environment that has a different genetic architecture **G. Buddhika Makumburage<sup>2</sup>** **H. Lee Richbourg<sup>2</sup>**, Cuixian Chen, **Andrew Capps<sup>2</sup>**, **Kalindi LaTorre<sup>1</sup>**, and Ann E. Stapleton

Presentation at Portland State University Mar 2011 "What can iPlant do for me right now?"

Presentation at Oregon State University Aug 2011 "What can iPlant do for me right now?"

Presentation at University of Oregon Aug 2011 "What can iPlant do for me right now?"

Presentations at Northern Arizona University on "Genetic Control of Maize Phyllosphere Diversity" and "What can iPlant do for me right now?" Jan 2012.

B2. grants and contracts



*I was inducted into the UNCW million dollar club in 2010.*

**CoPI** UNC Office of the President Fostering Undergraduate Partnerships Through a Graphical User Environment for the North Carolina Computing Grid \$557,534 Co-PI with Dr. Ron Vetter, Chair of Computer Science Department, UNCW 2006-2007

**PI** NSF International Directorate for the Americas International: Plant Genetic Control of Phyllosphere Microbial Diversity \$20,000.

**PI** USDA NRI Genetic Analysis of Ultraviolet Radiation Responses in Zea mays \$130,000.

NSF IOB 0645967 PI Stapleton Characterization of an Arabidopsis thaliana UV-B photoreceptor candidate gene. \$16,000 8/31/2006-8/30/2007

NSF PSCIC PI R. Jorgenson The iPlant Collaborative: A Cyberinfrastructure-Based Community for a New Plant Biology \$50 million for five years. UNCW subcontract \$331,986 Stapleton role: Oversee the design of policies and procedures for the application and selection process for discovery environment teams and for selection criteria and deliverables for small action teams--in close consultation with the PI and the project evaluation team. Science advice for genotype-phenotype grand challenge.

NSF OISE U.S.-U.K. Planning Visit: Biochemical characterization of a candidate plant UV-B photoreceptor \$10,296 7/15/2008-6/30/2010.

NCBC EEG PI Pyott, coPIs Taylor, van Tuinen, Lema, Shafer, Stapleton Instrumentation to Incorporate Biotechnology Skills Across the Undergraduate Biology Curriculum” \$89,151 3/16/2009 – 3/15/2010.

NSF PGRP PI Ann E. Stapleton, coPIs Barbara Methe, JCVI, Brad Goodner, Hiram College, Stuart Gordon, Presbyterian College “Plant host control and feedback responses to phyllosphere microbes: Change in metagenomes and plant traits in response to environmental stress” \$601,475 9/1/2011-8/31/2013.

B3. involvement in undergraduate and graduate thesis, honors, and DIS research

*I have been recognized by the Division of Student Affairs as ‘having made a difference’ to graduating seniors every year since I have been at UNCW. I am especially proud of the career success of my research students! They are all in graduate programs or have excellent science-related jobs.*

Graduate Students Supervised: MS Bio advisees in the last five years include Lee Richbourg 2006-2008, Stephanie J. Cummings 2006-2008, C. Tyler Smitherman 2008-2010, Andrew Capps 2008-2009, and Heather Manching 2010-present.

PhD Thesis Committee: Amanda Kahn, Nathan Gavin

MS Thesis Committee: Nathan Gavin, Katherine Braly

Undergraduate Honors Research: Kristin Morrison, Akshay Menon, Abigail Michenfelder, Kalindi LaTorre, Myles Fenske, Latasha L. Smith  
Undergraduate Honors Committees: Cheston Saunders, Brian Kelley, Sarah Agey, Jenny Kellen, William Kise, Travis Monasco, Mariah Bell  
Undergraduate Internships (Bio498): Brian Brewer  
Undergraduate DIS: Patrick Pridgen, Latasha L. Smith, Molly Cothran, Erin Dingess, Amy Borsay, Jessica Ball  
Work-study research: Julie Geyer  
Volunteer research: Lara Holland (UNC-CH), Stacey Schriber (U Chicago postgrad, now in medical school), Matthew Dillon (UNCW Math), Jamie Bibo (UNCW Film), Alex Cole (UNCW Communications), Emily Merritt, Amanda Jones  
CS undergraduate students supervised in research: Bill Shipman, Maurice Benson  
CS graduate research: Jason Vandeventer

B4. service activities to the Department, College, University, and community

*I have made major contributions to science service, especially to peer evaluation of funding decisions and to data analysis cyberinfrastructure.*

I have served on the departmental scholarship, peer evaluation, and chair's advisory committees and on two search committees.

I have headed the Crews Scholarship committee since 2010. I have served member of the Honors Council twice; this is a substantial time commitment, especially at the end of spring semester when I attend many honors thesis defenses. I am on the Hosier undergraduate research scholarship committee. I have lead freshman convocation groups twice. I was a major contributor to the formation and ongoing work of CSURF (Center for Support of Undergraduate Research and Fellowships), including developing the coordination plan and the web page, and I served on the CSURF advisory board.

I have served on the university Parking Appeals, Financial Aid, Academic Research Computing and Hearings Committees and on Faculty Senate.

National/international professional service:

I have reviewed manuscripts for the journals Plant Physiology, Genetics, the Journal of Natural Resources and Life Sciences Education, Functional Plant Biology, Journal of Experimental Botany, Photochemistry and Photobiology, BioInformatics (6), Journal of Agronomy, Canadian Journal of Botany, Journal of Applied Microbiology, Genetics, Plant Cell Physiology, Plant Physiology, Plant Cell, New Phytologist, Field Crops Research, Microbial Ecology, Journal of Photochemistry and Photobiology B, Folia Microbiologica, and G3 Genes Genomes Genomics (new GSA journal).

I am an Associate Editor for Frontiers in Plant Genetics and Genomics, Rich Jorgenson, Editor-in-Chief.

I have reviewed grant proposals for the Army Research Office, NSF PGRP, NSF EF, NSF ECB, USDA NRI Plant Genome and the Israeli-Bi-National Science Program.

I was on the review panel for the USDA and I served on NSF review panels in 2008 and 2011. I am often asked to serve on panels but have substantial conflicts of interest (due to my iPlant participation) that make me ineligible to serve.

I gave a presentation titled ‘Increasing international and public-private collaborations in maize genetics: working group report’. Allerton 2007 Maize PI’s Retreat, 20-22 March 2007 and wrote a white paper for the steering committee.

Reviewed two chapters of the UNEP EEAP assessment report on stratospheric ozone depletion in 2007 and the UNEP EEAP 2010 Quadrennial Report on “Environmental Effects of Ozone Depletion and Interactions with Climate Change”. Reviewed a book chapter for a Springer publication on the Genetics and Genomics of the Triticeae. Reviewed a Biological Sciences textbook chapter for Pearson in 2010.

I was invited to be the discussion leader for one of the four sessions at the Quantitative Genetics and Genomics Gordon conference in 2011. I gave a presentation to introduce the topic area and provide background for the research talks that were in my session; I also selected the student and postdoc talks for my session. I was nominated for vice-chair of the conference (but luckily a European was elected, as the next conference will be in Europe).

My work with the iPlant Collaborative is a service; I have not included further description of that work here as it is funded by a subward from an NSF-supported center contract (see grants section above).

Local community professional service:

I gave an Odyssey workshop Oct 2007 and Osher Pathways presentations March 2009 and October 2011. I have served as a science fair judge twice, hosted local high school teachers in my courses, led the AP Biology review sessions, and was interviewed by a local videographer about gene therapy. I have mentored three local high school students for senior projects or science fair projects.

### **Tenure package text 2001-2006**

## **Recommendation for Reappointment, Promotion, and/or Tenure**

### **Education**

<u>Institution</u>	<u>Concentration</u>	<u>Dates</u>	<u>Degree</u>
University of Chicago	Genetics	1984-1990	PhD
University of Michigan, Ann Arbor	Biology	1979-1983	BS

### **Professional History (other than UNCW)**

<u>Position/Rank</u>	<u>Institution</u>	<u>Dates</u>
Assistant Professor	University of Tennessee-Chattanooga	1996-2001
Visiting Professor	University of Buenos Aires, Argentina	1998, 2000
Postdoctoral Associate	Stanford University	1991-1996
Postdoctoral Associate	University of North Carolina Chapel Hill	1990-1991
Research Intern	DuPont	1985
Research Assistant	University of Michigan Ann Arbor	1983-1984

### **Contribution to Teaching**

I have taught a wide range of classes, from introductory biology (both the cellular/molecular and the evolution, diversity and plant biology sections), to upper level physiology and senior seminars, to graduate courses. My goal is to support the department's teaching needs; I have thus focused on teaching required classes.

My teaching style is designed to foster student learning, which is defined as “a relatively permanent change in cognition, resulting from experience and directly influencing behavior”. I use a variety of methods to ensure that students engage with the class material, ranging from reading texts and primary literature, writing of questions about concepts, and essay exams, to powerpoint lectures and animations. Informal and formal teaching about the process of science is a key part of my teaching; this ranges from emphasizing real examples, teaching lab classes and training new undergraduate DIS students doing research in my lab, to training and mentoring students doing thesis work with me. I keep in touch with my students as they advance in their careers and I am very proud of their accomplishments.

#### A. Required subcategories:

##### 1. Courses taught (a non-chronological list of course numbers and titles)

Bio 585 Bioinformatics, team-taught with Dr. Thomas Hudson, Computer Science in Spring 2006, enrollment 3.

Bio 204H Honors Principles of Biology: Cells, lecture and lab, Fall 2004, enrollment 19.

Bio 519 Topics in Molecular Biology graduate course and lab, Fall 2003 (enrollment 8), Fall 2004 (enrollment 14), Fall 2005 (enrollment 5), Fall 2006 (enrollment 5)

Bio 355 Plant Physiology, lecture and lab Fall 2002 (enrollment 8); renumbered to Bio 340, Fall 2004 (enrollment 12).

Bio 205 Principles of Biology: Plants Spring 2002 (enrollment 46), Spring 2003 (enrollment 47), Spring 2004 (enrollment 58).

Bio 205 Principles of Biology: Plants Laboratory Fall 2001, enrollment 24.

Bio 495 Senior Seminar Transgenic Organisms: Gene Therapy to GMOs. Spring 2003 (enrollment 8).

Bio 495 Senior Seminar Genomics in Medicine and Biology Spring 2004 (enrollment 11), Spring 2005 (enrollment 13), Spring 2006 (enrollment 3).

Pre-UNCW

*University of Tennessee Chattanooga*

UTSU 200 Introduction to Women's Studies, Women In Science section.

University Honors 120 Development of Scientific Thought.

Environmental Science 533 Environmental Genetics graduate course.

Biology 570r Seminar.

Biology 420 Molecular Genetics.

Biology 326 Genetics Lab 24 students, taught every semester.

Biology 325 Genetics 100-200 students, taught every semester.

*University of Buenos Aires*

Graduate course, with Dr. Carlos Ballare, UBA "Ultraviolet Radiation and Responses of Terrestrial Plants" 1998 and 2000.

*University of California Berkeley*

X107A Principles of Molecular Biology.

Sample course materials (a small number of representative items is sufficient)

Syllabi and sample handouts and exams for Bio495, Bio519, Bio340, Bio204 and Bio 205 are included in the Supporting Documentation section.

Summary of student evaluations

I came to UNCW with extensive teaching experience and with a teaching style that emphasizes student participation. Most UNCW students are used to a more traditional lecture format. I have adjusted my teaching style to include more lecture format during class time, to make UNCW students more comfortable with my classes. This transition is reflected in my SPOT scores over time. I include below some excerpts from a survey I sent to all my former students for which addresses were on record; full survey responses are included in the Supplemental Documentation section. Dr. Kate

Bruce kindly provided a summary of student comments from the honors Biology 204 course I taught; her letter is included in the Supplemental Documentation section.

I intend my classes to develop the intellectual capacity of my students and to give them tools and abilities which they will use beyond their college years. I have been cited every semester since I came to UNCW as a professor who made a difference in the lives of graduating students. The comments from my former students illustrate that my classes have indeed made a difference, and that they appreciate what they learned from me years later.

Sample answers from a survey of former UNCW students:

*How would you compare Professor Stapleton with other teachers in the same area?*

I haven't had many experiences with other teachers in the area of Biology, however she does a tremendous job of designing her lessons to reach a variety of students and accommodate multiple learning techniques. Like I mentioned before, she would include visual aspects, auditory aspects, as well as hands-on labs and interactive assignments. I've had another biology professor where all he would do is lecture for 1.5 hours straight, and for someone who is a visual or kinesthetic learner, concepts were, at times, hard to grasp and retain. Dr. Stapleton took care to cater to her students and their needs.

*How would you compare Professor Stapleton with other teachers in other areas?*

It is difficult to teach a required basic studies course because some students are not necessarily interested in the subject matter, but are solely in the class because they have to be. As such, Dr. Stapleton tried hard to make the information interesting and to present it in a meaningful way. She is one of the better teachers, I think, at really engaging students, especially during labs. It was evident that her students' success was important to her.

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*How would you describe your working relationship with Professor Stapleton?*

In my personal opinion, Dr. Stapleton is one of those professors that are easy to get along with and are easy to get in contact with if problems or concerns arise. Her office was always open in case a student was unsure of whether their lab report was "A" material or if they just needed to ask questions on some of the topics discussed in the daily homework reading. In terms of the labs, Dr. Stapleton always walked around and made sure that all questions were answered before we proceeded on to the next step of, in many times, a multi-step lab. She even took around two hours of her time to guide me through the steps of the online fly genome lab. With the flexibility, availability, and guidance of Dr. Stapleton, there really is no reason that anyone should have had a difficult time.

*How would you compare Professor Stapleton with other teachers in the same area?*

I have only taken one other biology course, so I am not certain whether I can reliably answer this question. I will say this: Dr. Stapleton and my animal biology

professor, were two of the finest professors that I have encountered at the university. Both had unique teaching techniques that allowed the individuals who studied and knew the material to accomplish their goals and succeed in the courses. Out of the two; however, Dr. Stapleton was more readily available for questions and explanations. She seemed like she cared whether her students succeeded and would constantly help if the need arose. Her labs were also more hands-on, a key ingredient for learning in the sciences. I am glad that I had the opportunity of taking courses taught by both of these incredible individuals.

*How would you compare Professor Stapleton with other teachers in other fields?*

Out of all of the classes I have taken at the university, the professors that taught in the science fields were the most effective at helping students maintain the information. Dr. Stapleton is no exception as she was an amazing teacher. As hard as it is to compare professors from many fields, I felt that the individuals that taught in the other departments cannot compete with the education that I received from those from the sciences. Dr. Stapleton had an effective approach to teaching that allowed the students to learn the information twice: once from the book and the other from the class lectures. She was available outside of class and stressed that fact in case the time came when one of the topics covered was challenging. Other professors may have been decent teachers inside of class, but individuals like Dr. Stapleton are the ones that students can keep in contact with even years after graduation.

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*How satisfied are you with the education you received in Professor Stapleton's classes?*

Extremely satisfied. Again, I really liked the fact that we were able to gain experience in important areas such as writing lab reports. Besides just learning about cells, I also learned a lot about scientific writing. I think that is one of the most helpful skills that I learned.

*How would you compare Professor Stapleton with other teachers in the same area?*

I would say that she is better than other professors in leading and designing lab activities. I really liked all the labs we did and found them to be extremely interesting. I also liked how we learned to write up a real lab report. I liked how Dr. Stapleton was always enthusiastic, and she really helped to guide her students in learning more than just cell biology.

*How would you compare Professor Stapleton with other teachers in other areas?*

I feel Dr. Stapleton was more organized than any other teacher I've had. She planned out the semester very well. I also feel Dr. Stapleton is one of the most enthusiastic teachers that I've had, and I liked how she devoted time to the beginning of every class where students could ask her questions.

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*How would you compare Professor Stapleton with other teachers in the same area?*

Compared to other professor's in the same area, I would rate Professor Stapleton above them in terms of her enthusiasm for the subject and her willingness to aid students

in their understanding of important topics. She was readily available to me and clearly explained ideas that were complicated.

*How would you compare Professor Stapleton with other teachers in other areas?*

Compared to other teachers in other areas, Professor Stapleton is a more effective teacher because she very organized, fair in her grading practices, engaging and readily available to students.

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*How would you compare Professor Stapleton with other teachers in the same area?*

My ability to answer this question is limited for the simple reason of not taking other plant biology classes. However, with respect to biology and other professors at UNCW, Professor Stapleton's ranks high in my opinion as one of the best in university education. She is one of a kind and she is a great asset to UNCW and science alike.

*How would you compare Professor Stapleton with other teachers in other areas?*

To me, a comparison to other teachers in other areas reveals that Professor Stapleton again is an excellent educator, person, and mentor. She is committed to her students, the university, and science. One particular example of Dr. Stapleton's dedication is her ability to work tirelessly with us, the students, to achieve our dreams. A personal conversation with past students will only support such claims. I had such a conversation with a past graduate student of hers, whose story was written up in UNCW's bulletin. It gave me one more reason to be proud to know the woman, Professor Ann E. Stapleton.

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*How satisfied are you with the education you received in Professor Stapleton's classes?*

I wish I would have had more time to examine the actual science. I got a lot of information at one time. But the practical information I learned will be invaluable in my high school classroom.

*How would you compare Professor Stapleton with other teachers in the same area?*

She is actively supportive of education, but she doesn't give any credit away. She is a teacher that you have to work hard for but don't mind it because you know that she will give personal attention to your particular work.

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*How satisfied are you with the education you received in Professor Stapleton's classes?*

In truth, the class moved a bit faster than I could manage. The class I took with her ("Topics in Molecular Biology") took off a bit faster than I may have been prepared for, but she was willing to guide me through it. It pushed me further than any class I had ever taken. Now I feel comfortable conversing with other scientists about aspects bioinformatics, often more so than they are. That is satisfying.

*How would you compare Professor Stapleton with other teachers in the same area?*



I assume “area” refers to biology. She was one of the few biologists that I interacted with at UNCW that was comfortable working with bioinformatics. As a student coming from the Computer Science department (as well as Biology) this was a key factor. She even went the extra step of pushing my career, just because she felt she could help, and still guides me today.

*How would you compare Professor Stapleton with other teachers in other areas?*

I’ve known few professors with such care for their students.

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#### Academic advising within the department

I currently have ten undergraduate advisees, and I am supervising one DIS/honors program student and two graduate students. My most recent honors student, Kristin Morrison, won the Biology Achievement award (given to the best graduating senior) in April 2006; Kristin has just begun her PhD work in the Department of Genetics at Case Western Reserve University.

I have had a typical advising load of 10-15 students each year. I have written more than twenty recommendation letters for students since 2001. I encouraged two of my undergraduate students to apply for competitive summer internships for research; they were both accepted into their first choice program, one at NCSU and one at Stanford. I am always willing to talk with students about career choices; I especially encourage undergraduates to get involved as young professionals, with special emphasis on summer internships and research experience. I typically talk with about 20 students per year about graduate school, careers, and research experience, in addition to my formal advising during pre-registration.

I encouraged my graduate student Carletha Blanding to apply for an NSF-sponsored workshop at CIMMYT in Mexico in March 2004; there were only 14 US graduate student spaces. She was accepted into this very competitive program; she was the only masters student accepted. My first UNCW masters student, Yibing Fu, has just completed his first year in the agricultural engineering PhD program at the University of Florida.

A complete list of my research students and their current positions is included in the Supplementary Documentation.

#### Courses developed/revised/new to the individual or to the university

All the courses I have taught at UNCW are ‘new to the individual’. I have concentrated on teaching classes that contribute to the department mission, such as basic studies classes, required graduate classes, and upper level undergraduate classes that meet the physiology requirement.

In 2004 and 2005 I sheperded a new course, BIO291, through the departmental and college curriculum committees; the course is listed in the catalog for the first time this year. This course was created to support involvement of freshman and sophomore students in research and other scholarly activities early in their college careers.

In Fall 2005 I taught Bio519 lecture and lab, and Biology 204 Honors lecture and lab. For Bio519 I chose all new literature for each weekly review, as this field changes

rapidly and last year's literature was outdated; lectures were also extensively revised to reflect new concepts and literature. The Bio204 class was a new preparation and was taught in a combined lecture-lab format, with extensive lab exercises. I wrote lectures, lab handouts, computer exercises and set up the labs each week. I also taught two lectures on DNA typing for forensics in Antje Almeida's Forensic Chemistry class and consulted on the development and setup of the DNA typing lab for that class.

In Fall 2004 I taught a double load, as no required graduate class was offered and I volunteered to teach Bio519. This was the second time I taught Biology 519 lecture and lab; I had more than the scheduled number of students (the limit was ten and I had 14 students in the class). The class and lab were tailored to the thesis research areas of the students, which meant extensive preparation was needed—I incorporated large amounts of recent literature in areas outside my particular specialty into the class. In Fall 2004 I also taught Plant Physiology 340 lecture and laboratory for the second time. In Spring 2005 I taught Biology 495 Genomics for the second time.

In Spring 2004 I taught Biology 205 and Biology 495. Biology 205 was completely revised to use lecture format and the common textbook. Biology 495 was a new topic (Genomics) and thus an entirely new preparation.

I taught Biology 205 and Biology 495 in Spring 2003. In Fall 2003 I taught Biology 519 lecture and lab; this was a new preparation, and the class was tailored to the thesis research areas of the students, which meant extensive preparation was needed—I incorporated large amounts of recent literature in areas outside my particular specialty into the class. Both the students and I enjoyed this class very much, and we learned a great deal.

#### Special initiatives/incentives in teaching; cite specific examples

I guest lectured in Dr. Song's Environmental Microbiology graduate course in 2006, and in the Forensic Chemistry course in 2005 and 2004.

I helped arrange a UNCW CTE workshop given by Dr. Alison Morrison-Shetlar, Director of the Center for Teaching Excellence at the University of Florida and a nationally known expert on interactive teaching in large classes.

I gave a CTE Workshop Jan 22, 2002 titled "Getting It Together: Integrating Cooperative Learning into Your Class".

For BIOL 205-003 Spring 2002 I wrote and adapted new inquiry labs and supervised TA preparation with the new labs and new format. I worked with Dr. Richard Huber, School of Education, on development and use of qualitative methods to analyze the outcome of these changes.

In Spring 2002 I worked with Dr. J. Mintzes on integrating cases studies into Biology classes; we received funding from CTE and I used three cases in my Bio205 sections.

#### Pre-UNCW

From 1997 to 2000 I was an active participant in Biology teaching listservs; I provided assistance, lab handouts, teacher prep information and syllabi in genetics and molecular genetics to 21 faculty teaching at universities nationwide.

I gave an invited talk for postdocs and graduate students at the University of Missouri-Columbia on "Teaching and Research at a Comprehensive University" in 1997.

3. Efforts to improve teaching, evidence of self-learning, and evidence of commitment to fostering the intellectual development of students

I am strongly committed to undergraduate student research, as my work in developing the Center for Undergraduate Research and Fellowships (C-SURF) and my participation in Honors College indicates. My research students have gone on to graduate and medical school and to successful careers in science; a list of their accomplishments is included in the supplemental materials.

Grants and fellowships related to teaching

CTE Grant "Web-Based Case Studies in Biology" with PI Dr. Mintzes, and participants Dr. Melroy, Dr. Potts, Dr. Stapleton and Dr. Hagley \$3,000

#### Pre-UNCW

UC Foundation Instructional Excellence Grant 1996-1997

5. Honors, listings, or awards related to teaching

I have been recognized for my teaching and mentoring by graduating seniors every semester since 2001.

#### Pre-UNCW

Nominated for 1998 University of Tennessee National Alumni Association Outstanding Teacher Award.

6. Membership in professional societies primarily devoted to teaching

National Collegiate Science Teachers Association

7. Attendance at professional meetings or sessions primarily devoted to teaching

#### Pre-UNCW

I was invited to sit on a workshop panel for a Council on Undergraduate Research meeting in 2000.

8. Completion of continuing education, workshops, symposia, or other specialized training programs primarily devoted to teaching

I attended a CTE program on peer evaluation of teaching, Best Practices in Peer Assessment of Teaching.

### Pre-UNCW

Chosen to attend the competitive-admission NSF-sponsored workshop “Case Studies in Science Summer Workshop” at the University of Buffalo in 2000, encouraged my workshop co-teacher to contribute a case to the repository and edited the case for her (Seeds of Dissent, a Case Study in Patenting Genetic Material, <http://ublib.buffalo.edu/libraries/projects/cases/ubcase.htm#genetics>).

### **Research, Scholarship, and Artistic Achievement**

I have a long-standing and internationally recognized research program focused on understanding plant ultraviolet radiation stress responses. I use genetic model plants and advanced genomics methods to dissect the components of UV stress responses. Application of genomics tools and development of new tools motivates my collaborations with computer scientists and statisticians. As trophic level responses are key in plant adaptations to global change, I am also examining plant control of the microbes that live on leaves and how those populations change with increasing UV.

Required subcategories:

Refereed publications (including juried or peer-reviewed performances, exhibits, artistic works, productions or writings)

a. Published

Undergraduate student co-authors in bold type; journals ranked as the “ten hottest journals of the millennium” by ISI are indicated. Reprints along with citation and journal ranking information are included in the supplemental documentation.

Casati, P., Stapleton, A., Blum, J. E., Walbot, V. (2006) Genome-wide analysis of high altitude maize and gene knockdown stocks implicates chromatin remodeling proteins in responses to UV-B, *Plant Journal* 46:613-627. ISI Top Ten Journal

Boone, Edward L., Susan J. Simmons, Keying Ye and Ann E. Stapleton (2006) Analyzing Quantitative Trait Loci for *Arabidopsis thaliana* using Markov Chain Monte Carlo Model Composition with Restricted and Unrestricted Model Spaces. *Statistical Methodology* 3(1): 69-78.

Kunzelman, Jennifer I., Michael J. Durako, W. Judson Kenworthy, Ann E. Stapleton, and Jeffrey L.C. Wright (2005) Irradiance-induced changes in the photobiology of *Halophila johnsonii* Eiseman. *Marine Biology* 148:241-250.

Brown, Jeffrey L., Clayton S. Ferner, Thomas C. Hudson, Ann E. Stapleton, Ronald J. Vetter, **Andrew Martin, Jerry Martin, Allen Rawls, William J. Shipman,** and **Michael Wood** (2005) GridNexus: A Grid Services Scientific Workflow System. *International Journal of Computer & Information Science (IJCIS)* 6(2): 72-82.

**Wrede, C. S.,** Blum, J. E., Brown, J. L. and Stapleton, A. E. (2004) Comparison of transmembrane helix frequencies using whole-genome and maize expressed sequence curve fits. *Maydica* 49(2):67-76.

Blum, J. E., Casati, P., Walbot, V. and Stapleton, A. E. (2004) Split-plot microarray design allows sensitive detection of expression differences after ultraviolet radiation in the inbred parental lines of a key maize mapping population. *Plant Cell and Environment* 27(11):1374-1386. ISI Top Ten Journal

Hudson, T., Stapleton, A., and J. Brown (2004) Codifying bioinformatics processes without programming. *Drug Discovery Today: BIOSILICO* 2 (4):164-169.

**Kadivar, Hajar** and Ann E. Stapleton (2003) Ultraviolet radiation alters maize phyllosphere bacterial diversity. *Microbial Ecology* 45:353-361.

**Long, Lacy M., H. Prinal Patel,** Wendy C. Cory and Ann E. Stapleton (2003) The maize epicuticular wax layer provides UV protection. *Functional Plant Biology* 30:75-81.

**Cartwright, Heather N., Clairalyn Baucom, Prachee Singh, Kandie L. Smith,** and Ann E. Stapleton (2001) Intraspecific comparisons reveal differences in the pattern of ultraviolet radiation responses in four maize (*Zea mays* L.) varieties. *Journal of Photochemistry and Photobiology* 62: 88-96.

#### Pre-UNCW

Stapleton, A. (1999) Measurement of UV-induced DNA Damage in Maize Using Antibodies. in *DNA Repair Protocols: Eucaryotic Systems* Vol. 113, ed. D. Henderson Humana Press pp. 157-163.

Walbot, V. and Stapleton, A. (1998) Reactivation potential of epigenetically inactive Mu transposable elements of *Zea mays* L. decreases in successive generations. *Maydica* 43:183-193.

Landry, L., Stapleton, A., **Lim, J.,** Hoffman, P., Hays, J., Walbot, V., and Last, R. (1997) Photoreactivation repair of ultraviolet radiation-induced DNA damage is essential for *Arabidopsis* survival. *Proceedings National Academy Science USA* 94:328-332. ISI Top Ten Journal

Stapleton, A., **Thornber, C.** and Walbot, V. (1997) UV-B component of sunlight causes measurable damage in field-grown maize (*Zea mays* L.): Developmental and cellular heterogeneity of damage and repair. *Plant Cell Environment* 20:279-290 (chosen for cover photograph). [ISI Top Ten Journal](#)

Ballare, C., Scopel, A., Stapleton, A., and Yanofsky, M. (1996) Solar UV-B radiation affects seedling emergence, DNA integrity, plant morphology, growth rate and attractiveness to herbivore insects in *Datura ferox*. *Plant Physiology* 112:161-170. [ISI Top Ten Journal](#)

Stapleton, A., and Walbot, V. (1994) Flavonoids protect maize DNA from the induction of ultraviolet radiation damage. *Plant Physiology* 105:881-889. [ISI Top Ten Journal](#)

Stapleton, A., and Phillips, R. (1993) A fertile field: maize genetics '93. *Plant Cell* 5:723-727. [ISI Top Ten Journal](#)

Stapleton, A., Mori, T., and Walbot, V. (1993) A simple and sensitive antibody-based method to measure UV-induced DNA damage in *Zea mays*. *Plant Molecular Biology Reporter* 11(3):227-234.

Stapleton, A. (1992) UV and plants: burning questions. Invited review for *The Plant Cell* 4:1353-1358. [ISI Top Ten Journal](#)

Stapleton, A., and Bedinger, P. (1992) Immature maize spikelets develop and produce pollen in culture. *Plant Cell Reports* 11:248-252.

Stapleton, A., and Petes, T. (1991) The *Tn3* beta-lactamase gene acts as a hotspot for meiotic recombination in yeast. *Genetics* 127:39-51.

Healy, A. M., Zolnierowicz, S., Stapleton, A., Goebel, M., DePaoli-Roach, A. A., and Pringle, J. R. (1991) CDC55, a *Saccharomyces cerevisiae* gene involved in cellular morphogenesis: identification, characterization, and homology to the B subunit of mammalian type 2A protein phosphatase. *Molecular Cellular Biology* 11:5767-5780.

Petes, T., Detloff, P., Jinks-Robertson, S., Judd, S. R., Kupiec, M., Nag, D., Stapleton, A., Symington, L., Vincent, A., and White, M. (1989) Recombination in yeast and the recombinant DNA technology. *Genome* 31:536-540.

Accepted for publication

Simmons, S. J. and Ann E. Stapleton (2006) Bayesian hierarchical models to detect quantitative trait loci. *Chance*, in press.

Stapleton, A. E. and Simmons, S. J. (2006) Plant Control of Phyllosphere Diversity: Genotype Interactions with Ultraviolet-B Radiation *in* *Microbial Ecology of Aerial Plant Surfaces*, Ed. M. Bailey, APS Press, in press.

Under consideration

Submitted:

Blanding, Carletha R., Susan J. Simmons, Paula Casati, Virginia Walbot, and Ann E. Stapleton (2006) Coordinate regulation of maize genes during increasing exposure to ultraviolet radiation: identification of UV-responsive genes, pathways, and associated potential promoter motifs. Submitted to Plant Molecular Biology.

Manuscripts in Preparation:

Recursive Partitioning Outperforms Composite Interval Mapping When Phenotype Measurements Are Skewed Susan J. Simmons, Narelle Kruger, and Ann E. Stapleton

Ultraviolet-B Radiation effects on diurnal dimer levels in two soybean isolines that differ in flavonoid concentration. **Linda C. Pope**, Ann E. Stapleton, and Joseph Sullivan

Detection of Loci by Recursive Partitioning and Confirmation of a Candidate Gene Controlling UV-B-induced Cotyledon Opening in *Arabidopsis thaliana* **Mariana Conte**, Silvia de Simone, Susan J. Simmons, Carlos L. Ballaré and Ann E. Stapleton.

Leaf surface wax affects microbial community diversity in maize. **Julia Estrada** and Ann E. Stapleton.

Genetic Architecture of Nitrate Reductase Activity in Maize: Loci Controlling Enzyme Activity With and Without Ultraviolet-B Radiation **Kristin Morrison** and Ann E. Stapleton

Highland maize accessions differ in physiological and transcriptome responses to ultraviolet radiation. Casati, P., Blum, J., Walbot, V. and A. E. Stapleton.

Publications (or performances, exhibits, artistic works, productions or writings) not listed in the refereed category (e.g., abstracts, book reviews)

a. Published

Wrote white paper for USDA NREL UV-B Monitoring Program's workshop on the Molecular Aspects of Plant Secondary Metabolism in Responses to UV-B Radiation at San Antonio, along with co-author Dr. Joseph Sullivan, University of Maryland (2006).

Gridnexus lesson plans: Biology Applications [www.gridnexus.org](http://www.gridnexus.org) (2006).

Ann E. Stapleton, Susan J. Simmons, **Leilani A. Robertson**, and James B. Holland Mapping when phenotype measurements are not well behaved: comparison of recursive partitioning with composite interval QTL mapping. 48<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 11-14 March 2005

**Carletha Blanding**, Paula Casati, Virginia Walbot, and Ann E. Stapleton Identification of early expressed genes and genes expressed differently in B73 and Mo17 after UV radiation. 48<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 11-14 March 2005.

**Mariana Conte**, deSimone, Silvia, Simmons, Susan, Ballare, Carlos, and Ann E. Stapleton Genome Scans by Recursive Partitioning Allow Sensitive Detection of QTL, Gordon Conference on Quantitative Trait Genetics and Genomics February 2005.

**Carletha Blanding**, Paula Casati, Virginia Walbot, and Ann E. Stapleton Identification of early expressed genes and genes expressed differently in B73 and Mo17 after UV radiation. 47<sup>th</sup> Annual Maize Genetics Conference, Mexico City, Mexico 11-14 March 2004.

Sullivan, Joseph H., Gitz, Dennis C. and Ann E. Stapleton (2003) Short-term responses of barley to changes in ambient levels of UV-B radiation and their role in UV protection. SPIE Proceedings.

**Fu, Yibing, Blanding, Carletha**, and Ann E. Stapleton Whole-genome mapping of maize UV responses. 46<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 13-16 March 2003.

Stapleton, Ann E., **Johnson, Kenisha V.**, Brown, Jeffrey L., Hudson, Thomas C. ElucidateIt: A Bioinformatics Workflow and Analysis System 45<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI, 13-16 March 2003.

**Fu, Yibing, Blanding, Carletha R.**, and Stapleton, Ann E. Whole-Genome Mapping of Ultraviolet Radiation Responses 45<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI, 13-16 March 2003.

Research grants or research fellowships

a. Awarded (include dates and amounts)

**PI NSF IOB:** Characterization of an *Arabidopsis thaliana* UV-B photoreceptor candidate gene \$16,000 September 1 2006-August 31, 2007, current

**PI NSF International:** Plant Genetic Control of Phyllosphere Microbial Diversity \$20,000 current

**coPI UNC Office of the President:** Fostering Undergraduate Research Partnerships through a Graphical User Environment for the North Carolina Grid Ron Vetter, Project Director co-PIs Jeffrey L. Brown, Clayton Ferner, Ned Martin, Ann E. Stapleton at UNCW, collaborative project with six universities, I am the bioinformatics lead \$557,634 current



**PI** USDA NRI Genetic Analysis of Ultraviolet Radiation Responses in Zea mays  
\$130,000 current

**PI** NSF/AAAS WISC Program Whole-Genome Mapping of UV-B Photoreceptor Loci in Arabidopsis \$4,000

**PI** NSF Plant Genome Research Program Genebeans: A Modular System That Makes Genomic-Scale Analysis Accessible to Biologists \$91,882

**Senior Associate** USDA Resolving Gene-Specific Expression Patterns after RNA Profiling on cDNA Microarrays collaboration with Dr. Virginia Walbot, Stanford University; co-wrote the proposal and included some of my preliminary data. \$341,327 to Stanford (no UNCW subcontract allowed by Stanford)

**coPI** CMS Pilot Project "A multi-investigator request for computer software and hardware enhancement of the CMS DNA analysis core facility" 2002

**PI** UNCW Summer Research Award 2002 \$3,000

**PI** UNCW Charles Cahill Research Grant Why Plants Don't Sunburn: Validation of a New Mapping Technique for Ultraviolet Radiation Response Control Factors in Maize 2001-2002 \$2,500

#### Pre-UNCW

**coPI** Merck/AAAS Synergy: Undergraduate Research for Chemistry and Biology, with Dr. Wendy Cory, UTC 2000-2001 \$30,000

**PI** Wheeler Odor Research Foundation Grant 2000-2001 "Bioinformatics-Based Discovery and Molecular Analysis of G-Protein Coupled Receptors for Semiochemicals in Maize" \$20,000 (second and third years declined as grant could not be moved to UNCW)

**PI** UTC Faculty Research Grant 2000 "Development of an Efficient DNA Analysis Strategy for Phylogenetics Using Stoneflies (Plecoptera)" \$1,500

**PI** UC Foundation Faculty Development Award 1999 \$2,000

**coPI** UTC Technology Innovation Fund Grant Award, with Drs. Schorr, Litchford, Spratt and Tucker, for Departmental Computer Science Laboratory \$5,000

**PI** USDA Seed Grant 1997-2000 "Physiological and Genetic Analysis of Ultraviolet Radiation Responses in Maize" \$50,000

**PI** UC Foundation Summer Fellowship 1997 \$3,000

**PI** CECA Research/CCI Grant 1996-1997 \$1,000

**PI** NIH Postdoctoral Fellowship 1991-1994

Predocotrual Fellowship NIH Genetics Training Grant 1987-1988

Predocotrual Fellowship USDA Molecular Genetic Training Program for Agriculture 1984-1987

Lucille P. Markey Predocotrual Fellowship 1984-1987

b. Applied for (include dates and status)

**PI** NSF 2006 MO: The Maize Phyllosphere: Metagenomic and Functional Gene-Based Characterization of Agronomic and Global Change Effects \$583,217 to be submitted

**PI** NSF 2005 MO: Corn phyllosphere diversity and metagenomics—the interplay of environmental and host factors affecting leaf surface microbial communities \$775,873 not awarded

**PI** CGIAR Generation Challenge Programme Preproposal 2006 Extending the genetic base of maize: initiating introgression of perennialism and other favorable trait alleles from *Zea diploperennis* into a representative set of *Zea mays* inbreds \$206,102 not awarded

**CoPI** with Laurie Patterson, Computer Science, PI: NSF Increasing and retaining computer science majors through virtual learning communities and a multidisciplinary computational sciences minor, \$588,724 submitted June 2005, favorable reviews; resubmitted in June 2006.

**PI** NSF DBI 2004 QueryConnect: A Visual Flow System to Ease Genomic-Scale Analysis \$603,859 not awarded

**PI** NSF 2003 Discovery, Mapping and Comparative Analysis of Ultraviolet-Response-Control Loci in Maize and Arabidopsis \$755,963 not awarded

**PI** NSF 2003 UBM: Analysis of Large Genomic Datasets from Plants \$89,590 not awarded

**PI** NIH 2003 Loci for UV Responses: Scale and Species Comparisons \$997,336 not awarded

**PI** TMRI/Syngenta 2003 Collaborative Research with Universities Mapping of stress-altered transcripts in maize and Arabidopsis not awarded (TMRI closed)

**PI** NSF 2002 RUI Discovery, Mapping and Comparative Analysis of Ultraviolet-Response-Control Loci in Maize and Arabidopsis \$444,364 not awarded

**PI** NC Office of the President 2002 Genomics Research Support Grants GeneBeans: A Modular System That Makes Genomic-Scale Analysis Accessible to Biologists \$450,000 not awarded

**PI** HFSP 2001 Discovery, Mapping and Comparison of Ultraviolet-Response Control Loci in Maize and Arabidopsis with Dr. Arjas, Finland and Dr. Strid, Sweden letter of intent (HFSP is an international collaborative grant program for innovative projects which requires a team of scientists from different countries.) not awarded

**PI** USDA 2001 Discovery, Mapping and Comparative Analysis of Ultraviolet-Response-Control Loci in Maize and Arabidopsis \$323,379 not awarded

Pre-UNCW

**coPI** Environmental Protection Agency 2000 STAR proposal with Dr. Virginia Walbot, Stanford University not awarded

**PI** Howard Hughes 1999 Undergraduate Science Education with Dr. Wendy Cory and Dr. Elizabeth Guthrie UTC not awarded

**coPI** NSF Major Research Instrumentation Proposal 1999 with Dr. Wendy Cory, Dr. Elizabeth Guthrie and Dr. Greg Grant UTC not awarded

Grants or research fellowships for off-campus study or professional development

a. Awarded (include dates and amounts)

UNCW International Programs Grant for International Travel \$700

b. Applied for (include dates and status)

None.

Presentations (including readings, lectures) at professional meetings

(since 1998, student co-presenters in bold type)

I gave an invited seminar at the “Aspects of Plant Secondary Metabolism in Response to UV-B Radiation” workshop February 2-3, 2006, in San Antonio, Texas.

I gave an invited talk at the NC Plant Molecular Biology Consortium meeting, September 30-October 2, 2005.

I was an invited speaker at the Phyllosphere 2005 conference, Oxford, UK July 24-27 2005.

Ann E. Stapleton, Susan J. Simmons, **Leilani A. Robertson**, and James B. Holland  
Mapping when phenotype measurements are not well behaved: comparison of recursive

partitioning with composite interval QTL mapping. 48<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 11-14 March 2005.

**Carletha Blanding**, Paula Casati, Virginia Walbot, and Ann E. Stapleton Identification of early expressed genes and genes expressed differently in B73 and Mo17 after UV radiation. 48<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 11-14 March 2005.

**Mariana Conte**, deSimone, Silvia, Simmons, Susan, Ballare, Carlos, and Ann E. Stapleton Genome Scans by Recursive Partitioning Allow Sensitive Detection of QTL, Gordon Conference on Quantitative Trait Genetics and Genomics February 2005.

**Carletha Blanding**, Paula Casati, Virginia Walbot, and Ann E. Stapleton Identification of early expressed genes and genes expressed differently in B73 and Mo17 after UV radiation. 47<sup>th</sup> Annual Maize Genetics Conference, Mexico City, Mexico 11-14 March 2004.

**Fu, Yibing, Blanding, Carletha**, and Ann E. Stapleton Whole-genome mapping of maize UV responses. 46<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI 13-16 March 2003.

Stapleton, Ann E., **Johnson, Kenisha V.**, Brown, Jeffrey L., Hudson, Thomas C. QueryConnect: A Modular System to Ease Genomic-Scale Analyses NSF Plant Genome Research 6<sup>th</sup> Annual Awardee Meeting September 18-19 2003.

Stapleton, Ann E., **Johnson, Kenisha V.**, Brown, Jeffrey L., Hudson, Thomas C. ElucidateIt: A Bioinformatics Workflow and Analysis System 45<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI, 13-16 March 2003.

**Fu, Yibing, Blanding, Carletha R.**, and Stapleton, Ann E. Whole-Genome Mapping of Ultraviolet Radiation Responses 45<sup>th</sup> Annual Maize Genetics Conference, Lake Geneva, WI, 13-16 March 2003.

#### Pre-UNCW

**Cartwright, H., Patel, H.P.**, and Stapleton, A. (2000) Wax helps: the *glossy1* mutant is more sensitive to ultraviolet radiation by some physiological measures. Council on Undergraduate Research 2000 National Meeting, College of Wooster, Wooster, OH.

**Cartwright, H., Patel, H.P.**, and Stapleton, A. (2000) Wax helps: the *glossy1* mutant is more sensitive to ultraviolet radiation by some physiological measures. 42<sup>nd</sup> Annual Maize Genetics meeting, Coeur d'Alene, ID.

Conner, J., **Singh, P., Baucom, C.**, and Stapleton, A. (1999) Adapt or fry: physiological and genetic analysis of responses to ultraviolet radiation. 41<sup>st</sup> Annual Maize Genetic Conference, Lake Geneva, WI.

Hajek, K, and Stapleton, A. (1998) Increased transcription of maize retrotransposons in response to ultraviolet radiation. Annual Meeting of the American Society of Plant Physiologists, Madison, WI.

On-going research projects, programs and goals

### **Current Research Projects**

Genome-wide mapping of loci that control UV responses in maize: The project “Grouping by Genomic Location: Using Pleiotropy to Dissect Ultraviolet Radiation Responses” has been funded by USDA NRI and a UNCW Faculty Research grant. I am mapping intermediate and downstream phenotypes using the maize IBM94 mapping lines. Intermediate phenotypes include gene expression control loci; I am using the new maize long-oligo chips to map control loci for expression changes after UV treatment. Downstream phenotypes include growth and morphological changes. There is a good deal of physiology and little mechanistic information currently available for ultraviolet radiation responses in plants, so this top-down approach will be very useful in understanding how the different traits are related.

UV effects on phyllosphere microbial diversity: Leaves host a large variety of different microbes. We have examined the community composition using molecular diversity of the rDNA in different maize genotypes, with and without UV stress, in the IBM mapping line parents and F<sub>1</sub>. We are currently mapping the maize loci that control microbial diversity using RI lines. I received NSF support for travel to Argentina and for supplies to support collection of samples and analysis of microbial diversity in the maize mapping genotypes. I completed sample collection and processing in Buenos Aires, and I am now completing the data analysis. A manuscript describing the first portion of this work is in press.

QTL mapping method development: Genome scans can be used as a clustering tool, to group responses by their controlling genomic regions. I am collaborating with a statistician, Dr. Susan Simmons, to determine how to compare QTLs in a quantitative way, and how to best compare traits measured on different scales and with different variance structures. We have implemented recursive partitioning and Bayesian mapping methods and are developing new hierarchical Bayesian methods.

Interdisciplinary project in bioinformatics tool development: Biologists will need do quantitative analysis and implement new methods for pattern detection as the amount of data increases. In order to make this kind of analysis accessible to students and busy biologists, we need to create user interfaces and appropriate software. Our Bioinformatics Interest Group (myself, Dr. Jeffery Brown, Math Department, and Thomas Hudson, Computer Science Department) received funding from NSF for bioinformatics interface development. This led to an expansion of the project to include scientific computing and extension of the project to six NC universities, with \$557,634 in funding from the UNC Office of the President High Performance Computing program. Dr. Ron Vetter, Computer Science Department chair, is PI. The project is titled Fostering Undergraduate Research Partnerships through a Graphical User Environment for the

North Carolina Grid; I am co-PI and bioinformatics lead on this project, and set up collaborations with PhD student Norma Houston and faculty member Dr. Becky Boston at NCSU along with Marti McClelland at NCCU for the bioinformatics portion of the project. See [www.gridnexus.org](http://www.gridnexus.org) for details.

Isolation and molecular characterization of UV-B mutants in *Arabidopsis thaliana*. The Ballare lab (IFEVA, UBA, Argentina) is isolating the mutants and doing the crosses; I am doing the molecular cloning of the mutated genes. We have several candidate mutants, which I have already cloned. There is no UV-B photoreceptor known, we would be the first to find such a gene. We have mapped QTL for this phenotype in four populations with two replications of the experiment; manuscripts describing these results are in preparation.

Analysis of a candidate UV-B photoreceptor gene: There is no UV-B photoreceptor known in molecular detail. I used a bioinformatics approach to combine existing data and gene annotations to rank candidate photoreceptor genes. I have just received NSF funding to do the follow-up genetics, biochemistry and photobiology to determine if the top candidate is indeed the photoreceptor.

### **Future Research Interests**

Future research interests include

- analysis of multiple stress responses, including ozone and increased CO<sub>2</sub>, on leaf microbial communities,
- hierarchal modeling of the effects of multiple stresses and crossover genotype by environment interactions,
- mapping of loci that control the extent of variation (loss of canalization) in stress-associated traits,
- new statistical and computational methods and software development, including methods to handle block data (multivariate measures not taken on the same individuals) and improved methods to handle individual plant data.

Optional subcategories:

1. Membership in professional societies

American Association for the Advancement of Science (AAAS), current

American Society for Plant Biology

International Society for Plant Molecular Biology

## Genetics Society of America

Supervision of graduate or undergraduate theses or extensive projects that involve research or artistic efforts

### Graduate Students Supervised:

Lee Richbourg, began MS Biology program Fall 2006

Stephanie Cummings, began as non-degree student Fall 2006

Carletha Blanding, Maize Gene Expression UV Response Patterns Reveal Coordinate Regulation Of Many Genes.

Yibing Fu, Pattern of Genomic Loci Controlling Morphological Responses to UV-B Radiation in Maize (*Zea mays L.*)

### Graduate DIS:

Jennifer Kunzelman, Differences in UV-A Pulse-Amplitude-Modulated Chlorophyll Fluorescence in Maize Mapping Parent Inbreds With and Without UV-B Exposure

**PhD Thesis Committee: Amanda Kahn**

Masters Thesis Committees: Fay Belshe, Jennifer Kunzelman, Patrick Kennedy

### Honors:

Kristin Morrison, Quantitative Trait Loci Mapping of the Effects of UV-B Radiation on Nitrate Reductase Activity in Maize

### Undergraduate DIS:

Chet Saunders, Does catalase activity change with UV irradiation of the shoot in B73 and Mo17?

Julia Estrada, Does leaf cuticular wax change the diversity of the microbial community on maize leaves, and is this affected by UV radiation?

Robin Scanlon, How does the maize phyllosphere archaeal and fungal community composition change with UV radiation exposure?

Kristin Morrison, Does nitrate reductase activity increase with increasing levels of UV-B in maize inbreds?

Lisa Forehand, Is there any difference in insect attractiveness after UV-B in leaves of B73 and Mo17?

Russ Peterson, Is the pAS59 clone a maize single-copy gene, and is expression in B73 and Mo17 different?

Michelle Gooch, Does UV increase radical levels in plant tissues, as measured by ESR?

Carletha Blanding, Dose-response curves for UV-induced biomass changes.

Michelle Guidici, Comparison of growth under UV-B in two Arabidopsis lines.

Liz White, Does the flavonoid pathway confer UV resistance to seedling leaves, as measured by biomass?

### Lab Volunteers:

Kalindi LaTorre, UV-B dose-response curves for reactive oxygen species in maize: using the confocal microscope and a fluorescent dye to measure a key signaling intermediate.

Edward E. Richards, Interaction between nitrogen stress and UV-B stress in maize.  
Lauren Dooley, Do the Arabidopsis mutants with an insertion in the At1g3830 gene show increased sensitivity to UV?  
Helen Miller, Loci that control UV-induced changes in leaf growth.  
Kim Hardwick, How does UV affect the surface structure of maize leaves in B73 and Mo17?

Grid Bioinformatics undergraduate students:

Bill Shipman, Implementation of five key analysis programs in Gridnexus and analysis of gene networks in maize using Mfinder and a matrix of all similarities between all genes.

Tristan Carland, Gene Ontology analysis: use of GO terms in microarray data analysis; also contributed to implementation of modules in Gridnexus.

Amy Curley, Programming an exhaustive search for the minimal marker set to identify organisms—application to recombinant inbred lines.

Maurice Benson, Implementation of Gridnexus analysis modules using BioPortal output.

Undergraduate Honors Committees: Gennifer Miller, Kyle Rommel, Heather Stoker, Andrew Ostrowski, Jeffrey Overton, Katie Roeger, Andreas Linke, Kathryn Boe, Tyler Davis, John Knowles Christopher Tate, Martyn Knowles, Katie Day , Melissa Meadows, Chris Wrede

Special research or artistic efforts (e.g., participating on a team at an off-campus laboratory, performing in a statewide orchestra)

I have been invited to speak to the Biology department at the University of South Carolina in Spring 2007.

I gave an invited seminar on my research to the USDA-ARS and NCSU Genetics Department June 3, 2004.

I presented my research at BASF Plant Sciences, Research Triangle Park, NC on May 7, 2003.

I gave two invited seminars on my research in March 2002, at the Department of Botany, North Carolina State University and the Department of Biology, East Carolina University.

#### Pre-UNCW

Invited seminar titled “Adapt or Fry: Physiological and Genetic analysis of UV Radiation Responses in Maize”, Washington and Lee University, Lexington, VA February 2001.

Invited seminar entitled “Adapt or Fry: Physiological and Genetic analysis of UV Radiation Responses in Maize”, Richmond University, Richmond, VA February 2001.



Invited seminar titled “Adapt or Fry: Physiological and Genetic analysis of UV Radiation Responses in Maize”, Hiram College, Hiram, OH February 2001.

Presented an invited seminar on my research to the Department of Ecology at the University of Memphis November 18, 1999.

## **Service**

Required subcategory: Service to the university

University committee memberships, leadership positions, or administrative duties

I serve on the university Parking Appeals Committee.

I serve on the university Financial Aid committee.

I am a member of the Honors Council and served as the council representative for multiple honors theses for the last three years. The Director of Honors, Dr. Kate Bruce, wrote “you have been such an asset to the Honors Scholars Program for the last three years....We have relied on your input for long range planning, especially for the link to the Center for Support for Undergraduate Research and Fellowships (C-SURF).”. Dr. Bruce’s letter is included in the Supplementary Documentation.

I initiated the Center for Support of Undergraduate Research and Fellowships (C-SURF) at UNCW, including organizing the information for the web page and supervising student design of the page ([www.uncw.edu/csurf](http://www.uncw.edu/csurf)), and serving as a founding chair of the CSURF advisory board.

I served on the Fulbright selection committee for UNCW in 2004.

I gave a short presentation entitled “What is Bioinformatics” to a meeting organized by Vice Chancellor Tyndall on planning for university needs in bioinformatics in 2002.

College or school committee memberships, leadership positions, or administrative duties

I reviewed proposals for Dean Seiple for the Summer Research Initiative Awards.

Department committee memberships, leadership positions, or administrative duties

I served on the cell biology search committee in Spring 2006; I hosted a reception and candidate for that search. I participated in both other searches in Spring 2006. Served on the departmental scholarship committee, which has an increasing workload as new

scholarships are made available. I judged the department “Best Poster” competition. Attended May graduation ceremonies.

2003-2004 I served on search committee for Plant Ecology position, attended December graduation, and was a member of the scholarship committee. I wrote the course description for Bio291 and presented the course to the department curriculum committee; the course was approved and is in the catalog for 2006-2007. I assisted with the revision of the application form for scholarships. Attended May graduation ceremonies.

2002-2003 I was a member of the department seminar committee, the honors committee and the scholarship committee. I assisted with the search process for the Marine Microbiology position. I assisted with evaluation of student work for Dr. Emslie’s graduate class. I spoke to the Honors 120 seminar class and to the Biology club so they could learn more about my research. I wrote a short nontechnical article about my research for the alumni magazine. I attended May graduation ceremonies.

2001-2002 I chaired the department seminar committee; I invited outside speakers and scheduled graduate thesis seminars, including planning and invitations for CMS seminars and for the next fall’s schedule. I hosted the Honors 120 seminar class in my lab so they could learn more about my research. I attended December graduation ceremonies.

Optional subcategories:

Service to the university

I spoke to parents at Orientation twice during Summer 2006, describing UNCW student involvement in research and professional activities.

I assisted in development of the graduate certificate program in Statistics.

Service to professional or scholarly organizations

Local host for the Association of Southeastern Biologists meeting in Chattanooga April 2000—responsible for commercial exhibitor recruiting, arrangements, and all sponsorships.

Local host for the American Association of Plant Physiologists Southern Section meeting, March 2000.

a. Leadership in professional or learned societies

Nominated for the Maize Genetics Executive Committee in 2006. This is the major professional organization and advocacy group in my field.

b. Professionally related activities (e.g., manuscript editor or editorial board member, artistic juror, grant or accreditation reviewer, advisor/leader/director in workshops or consultations)

i. Paid

Note: the following section has been edited to remove confidential information.

I was panel manager for the USDA, with the following comment from the staff:

“ I have had the privilege of working with many outstanding panel managers in my 13 years at USDA and I would rank you among the top 1%. I was delighted that you were able to serve, and thank you for your willingness to take time from your own research to help guide the review process.”

ii. Pro Bono

Manuscripts reviewed for:

Proceedings of the National Academy of Sciences USA  
Functional Plant Biology  
Photochemistry and Photobiology  
Plant Physiology  
Plant Cell Reports  
Plant and Cell Physiology  
Global Change Biology  
Plant Molecular Biology  
Plant Cell and Environment  
Environmental and Experimental Botany  
Planta  
Plant Cell  
Journal of Applied Microbiology  
BioInformatics  
Genetics  
Journal of Natural Resources and Life Sciences Education  
Journal of Experimental Botany  
Canadian Journal of Botany  
The UN Environmental Programme--Ozone Depletion Report

Site visit team member for ARO.

I reviewed grant proposals for the National Science Foundation (four divisions) and for the USDA (five programs), for the Department of Energy Basic Biosciences Division, and for the Israeli Science Program.

I served on USDA CSREES NRI Panels and was acting Panel Manager.  
Panelist for the NSF AAAS/WISC program.

Member of the Committee of Visitors for NSF.

Community service

a. Professionally related activities (e.g., boards, offices, presentations, workshops, continuing education programs, newspaper or magazine articles for the lay public)

i. Pro bono

### UNCW

I worked extensively each week in Fall 2004 with Darren Gemzik, 6<sup>th</sup> grade science teacher at Leland Middle School, Leland, NC, on new hands-on activities that he could integrate into his curriculum for ecology and earth science.

I answered questions for a Seahawk editor about flowers for Valentines Day.

I answered plant biology and molecular biology questions for two high-school biology teachers, and four high school students.

I was interviewed by a Seahawk writer for a story about my research.

### Pre-UNCW

Board Member and head of the Science Education committee of the Sequatchie Valley Institute, a 501(3)c nonprofit for environmental education in Dunlap, TN 1999-2001.

Local host for the Association of Southeastern Biologists meeting in Chattanooga April 2000—responsible for commercial exhibitor recruiting, arrangements, and all sponsorships.

Local host for the American Association of Plant Physiologists Southern Section meeting, March 2000.

Led a workshop entitled "Environmental Effects of Ultraviolet Radiation" in the THEC program "Alternatively Charged! An Adventure in Sustainability" which was organized by C. Kimmons, Sequatchie Valley Environmental Education Center in 1998.