**Maria J. Pereira**
**Associate Professor**
**Biotechnology Program Director**

University of North Carolina at Pembroke
Department of Biology
P.O. Box 1510
Pembroke, NC 28372-1510

Office: (910) 521-6642
Home: (910) 521-1265
Fax: (910) 521-6649
Email: maria.pereira@uncp.edu

## EDUCATION

**Ph.D. in Agronomy**: Plant Breeding and Genetics area with emphasis in physiology. Major Professor: Paul L. Pfahler. Thesis: Genetic, physiological and morphological aspects of dwarfing in wheat. Agronomy Department, University of Florida, Gainesville, FL, 1998.

**M.S. in Agronomy**: major in Plant Breeding and Genetics; minor in Plant Pathology. Major Professor: David A. Knauft. Thesis: Tomato spotted wilt virus in peanut (*Arachis hypogaea* L.): Screening technique and assessment of genetic resistance levels. Agronomy Department, University of Florida, Gainesville, FL, 1993.

**B.S. (+honors) in Agronomy**. Agronomy Department, Eduardo Mondlane University, Maputo, Mozambique, 1988.

## TEACHING EXPERIENCE

(summarized)

**Associate Professor.** Department of Biology, The University of North Carolina Pembroke, Pembroke, NC, 2005-Present.
**Assistant Professor.** Department of Biology, The University of North Carolina Pembroke, Pembroke, NC, 2002-2005.

Online Course - designing and developing an online course in general biology geared towards freshman seeking credit science in the general education area, present.

Environmental Science - taught this new course in the summer of 2005. This course is aimed at students needing credit in the science area to fulfill the general education requirements**.** *A study of environmental science emphasizing the impact that an increasing human population has on the biosphere. The course deals specifically with the demands placed by humans on natural resources and the resulting acceleration of environmental deterioration, human attitudes toward the environment, and techniques and policies by which resources could be intelligently managed.*

Developmental Biology - developed this new course in fall of 2002. This course targets juniors and seniors wanting to go to medical/veterinary school. *A course on the classical, genetic, and molecular analysis of embryonic development with lab. Its purpose is to offer a blend of classical and modem topics, which are organized in three parts: 1. the natural sequence of developmental stages from gametogenesis and fertilization to histogenesis; 2. the differential gene expression; and 3. a series of core topics including pattern formation, sex determination, hormonal control, and growth. Examples are picked as they serve best to illustrate the general points to be made. Mammals or other vertebrates will be preferred whenever possible because we have a natural interest in their development.*

Principles of Genetics - develop this course as a graduate student assistant and have been teaching it and updating it at UNCP since 1999. This is a senior course offered in the Biology Department *as an introduction to the basic principles of heredity and molecular genetics. General aspects of plant and human genetics are included.*

Biotechnology I - developed and have been teaching this laboratory-oriented course with lecture and laboratory components. *Its purpose is to familiarize students with DNA techniques in biotechnology and writing scientific laboratory reports, and to encourage their interest in graduate research and careers in this area. The course is strongly recommended to students that want to gain laboratory experience and dexterity before taking other higher level required courses.*

Biotechnology II - developed and have been teaching this laboratory-oriented course with lecture and laboratory components. *Its purpose is to familiarize students with more advanced techniques in biotechnology, molecular genetics, and cell biology. The lecture portion of the course will cover concepts on which the techniques are based along with current and future applications. Students will gain experience with tissue and cell cultures, will learn techniques not covered in other required biology courses, and will become familiar with scientific write-up of laboratory reports.*

Principles of Biology - *an introduction to modern and classical biology concepts.*

**Visiting Assistant Professor**. Department of Biology, The University of North Carolina Pembroke, Pembroke, NC, 1998-2002.

Taught the above courses (Principles of Biology, Biotechnology I, Biotechnology II, Principles of Genetics ) with the exception of Developmental Biology and Environmental Biology.

**Instructor**. Agronomy Department, University of Florida, Gainesville, FL, Summer 1996.

Genetics - *an introductory course that examines principles of genetics and heredity with application to all organisms, including humans.*

## AUXILARY TEACHING ACTIVITIES

**UNCP Biofuels Project** (summarized)

***Mile stones***

-8/18/06 Beginning of the Project
-9/12/06 Visit to NC Zoo in Asheboro
-10/31/06 Obtained three reactor quotes and three trailer quotes
-1/11/07 Meeting with members of the digital academy for digitally wrapping the trailer
-1/30/07 Visit to the New UNCP Trailer and Piedmont Biofuels
-3/27/07 Arrival on campus of Trailer and Reactor combo
-3/28-30/07 Training at Physical Plant in how to use the reactor to make biodiesel from waste vegetable oil – Making the first batch, 37 gal of biodiesel
-4/13/07Meeting at Physical Plant with members of the Digital Academy
-4/16/07Meeting with the University Lawyer to define the State Laws and the type of Insurance Necessary for the trailer
-4/30/07Finish the second batch, 35 gal of biodiesel
-5/3/07First Meeting of the Biofuels Advisory Committee

**Biotechnology Needs Assessment Project** (summarized)

-Defined the 13 UNCP surrounding counties as a service area
-Identified all the cities within each county
-Calling each county Economic Developer and each county Rural Extension Office to identify all the Biotechnology - Companies in the service area
-Making a list of all companies to be contacted
-Getting CEo's names and contacts and mailing addresses for each company in the list

**Biotechnology Program Director** (summarized)

-As a program director my duties have been to advise (personally, by phone or email) prospective transfer students wishing to transfer as well as new students wishing to become part of the Biotechnology Degree program. Also, my responsibilities include advising all the Biotechnology majors and helping them identify the internship that fits their interests' best.
-Biotechnology Internships are selected between the advisor and the student. An open communication is established early-on between the agency/company hosting the student and the biotechnology program director.
-I have also being highly involved in developing Articulation Agreements between community colleges (RCC, FTCC, PCC, BCC) and the Biotechnology Degree Program at UNCP.

**Planning Curricula** (summarized)

-Curriculum changes were agreed upon between the Biology and Chemistry & Physics Departments towards improvement of the new Biotechnology Degree Program.
-Curriculum changes were defined for all the courses of the Biology Department.
-All curricula changes were approved through the sub-committee on curriculum, academic affairs committee and the faculty senate. Changes are to be implemented in the Fall 2007.

**Professional Development in Teaching** (summarized)

Spring 07, I participated in the "5th Annual Digital Academy," UNCP
Fall 06, I attended the workshop "Your Research Agenda," UNCP
I have been part of the "Blackboard User's Meeting," UNCP 2006-present

I attended the "Second Forum on Technology and Teaching, "UNCP, 2007
I participated in the "iPod Casting Training," UNCP, 2007
I attended a workshop at Carolina Central Community College on Biofuels Research, Spring 2007
Summer 06, I attended the "Fourth Annual School Summer Leadership Conference," UNCP

## SCHOLARLY RESEARCH

**Preparation and Submission of Grants**

- Agency: North Carolina Biotechnology Center (NCBC)
  Grant Category: Education and Training
  Grant Program: Education Enhancement Grant (EEG)
  Type of Project: Planning
  Category of Support: Salary, Travel, and Office Supplies
  Project Title: *Assessment of Skills and Competencies Needed by Biotechnology Companies in the University of North Carolina at Pembroke's (UNCP) Service Region*
  Project Director: Maria J. Pereira, Ph.D.
  Purpose: To assess the individual company needs for a workforce trained with specific skills and competencies necessary to be successful in the local biotechnology industry.
  Funding Request: $80,000
  Submitted: August 8, 2006

- Agency: North Carolina Biotechnology Center (NCBC)
  Grant Category: Biotechnology Research Grant (BRG)
  Category of Support: Salary, Travel, Student Research and Office Supplies
  Project Title: *Transesterification of Waste Vegetable Oil to Produce Biodiesel in Batch and Continuous Flow Reactors by Enzymatic Process*
  Project PI: Dr. Siva Mandjiny
  Project co-PIs: Drs. Maria Pereira and Tom Dooling
  Purpose: Two waste products, waste vegetable oil and chitin acquired from crab shells, with immobilized lipase will provide a cost effective and more efficient method of producing biodiesel.
  Funding Request: $70,000
  Submitted: February 8, 2007

- Agency: University of North Carolina Pembroke
  Grant Category: Faculty Research and Development Grants Program
  Category of Support: Faculty Research
  Project Title: *Biotechnology Needs Assessment in the SE North Carolina*
  Project PI: Dr. Maria Pereira
  Purpose: Evaluate the biotechnology company needs and incorporate those findings into the Biotechnology curriculum requirements.
  Funding Request: $5,000
  Submitted: February 23, 2007

- Agency: University of North Carolina Pembroke
  Category: Academic Affairs
  Support: Biodiesel Research
  Project Title: *UNCP Biofuels Project*
  Project co-PIs: Drs. Maria Pereira, Siva Mandjiny and Thomas Dooling
  Purpose: Evaluate the different chemical processes that convert waste vegetable oil into biodiesel. Analysis of possible uses of the biodiesel by-product, glycerol.
  Funding Awarded: $30,000
  Date Received: August 18, 2006

**Supervision of Student Research Projects**

***Glycerol as a Fertilizer***

After the methanol has been recovered from the glycerol we are proposing to conduct a greenhouse study where the potted plants [soybean and clover (legumes – *Fabaceae*) and wheat and oats (small grains - *Gramineae*)] will be fertilized with different concentrations of glycerol. The controls in this study will be 0 0 0 NPK and the traditional 10 20 10 NPK. Summer 2007.

***Glycerol as an Energy Source for Bacteria***

Glycerol is an intermediate molecule in the process of glycolysis. Bacteria convert sugars to ATP through a glycolysis process. The products of glycolysis are further metabolized to complete the breakdown of glucose. In certain microorganisms lactic acid is the final product and the process is referred to as homolactic fermentation. In others, glucose is converted to ethanol a process, termed alcoholic fermentation. In aerobic microorganisms, the glucose is oxidized to make ATP, process called aerobic respiration.
We are proposing to identify/create a strain of bacteria that will convert glycerol to glucose - reverse glycoloysis. Microorganisms that do homolactic and alcoholic fermentation as well as those that do aerobic respiration will be tested. Summer 2007.

***Glycerol to Ethanol***

Glycerol can be converted to ethanol and hydrogen using *Enterobacter aerogenes*. This conversion is a fermentation process which can be quite efficient when yeast and tryptone are added. High purity ethanol can be obtained through this process.
In the industry, ethanol it is separated by distillation instead, and during the separation benzene is added to eliminate the water. The ethanol obtained through this industrial process has traces of the benzene and other organic compounds that are toxic. Summer 2007.

***Marigold Project***

Students in the Marigold Project, a combined grant between UNCP and NCSU Studies on agronomical and environmental aspects influencing the growth and production of lutein and zeazantin on marigold petals using a split-plot block designing with nesting treatments to evaluate the carotenoid content of 2 marigold varieties, 3 levels of fertilizer, 3 methods of drying the flower petals and 4 planting dates. Biology Department, The University of North Carolina Pembroke, Pembroke, NC, 2004-2005.

Isolation of genomic DNA, primer designs and PCR products for engineering a plasmid construct. Biology Department, The University of North Carolina Pembroke, Pembroke, NC, 2005.

**Synthesizing and Applying Knowledge to the Solution of Practical Problems**

Fall06-Spring 07, A tremendous effort has been put forward in creating basic knowledge in the biofuels area of research. Practical problems have been encountered during the production of biodiesel which required an in depth investigation of the literature in search for the practical solutions. The syntheses of this knowledge is being transformed into the creation of several student projects that will take place in the summer of 2007.

Fall 06, Elaboration of a "Biotechnology Facility Executive Summary," a compilation of documents and notes being published since 1980.

**Genetics of Dwarf Wheat**

Collaborative studies on the effect of dwarfing on coleoptile length in wheat. Biology Department, University of North Carolina at Pembroke (UNCP), Pembroke, NC and Agronomy Department, University of Florida, Gainesville, FL, 1998-2002.

**Plant Physiology and Genetics**

Ph.D. research: improve stand establishment of genetically different dwarf wheat isolines based on their physiological responses. Agronomy Department, University of Florida**,** Gainesville, FL, 1993-1998.

**Tissue Culture**

Independent class: research was conducted to improve the regeneration capacity of alfalfa, performing tissue culture and somatic embryogenic techniques. Agronomy Department, University of Florida, Gainesville, FL, 1994.

**Pollen Research**

Research assistant: the potential pollen viability was determined using various *in vitro* and *in vivo* procedures which were developed to study the genetics and physiological aspects of pollen transmission using sesame as the test model. Agronomy Department, University of Florida, Gainesville, FL, 1992-1994.

## EXTENSION EXPERIENCE

**Extension Associate.** Assisted an extension specialist in research that produced recommendations for pesticide application in peanuts in relation to sweetpotato white flies, including adults, pupae and eggs. Entomology and Nematology Department, University of Florida, Gainesville, FL, 1991.

**Extension Scientist for F.A.O.** INIA/ECA/FAO-0633. Coordinator for the National Project for "On-Farm Testing and Demonstration of Improved Maize Production Technology to Traditional Family in Mozambique." National Institute for Agronomic Research (INIA), Maputo, Mozambique, 1988-1990.

## OTHER PROFESSIONAL EXPERIENCE

**Techniques in Biotechnology**. Biology Department, UNCP, Pembroke, NC, 1998- Present. Labs being taught: Cloning experiments; Restriction mapping of linear and circular chromosomes; Genomic library construction and analysis; Cloning by PCR, Southern, Northern and Western hybridization; Human DNA fingerprinting; ELISA; Microsattelite instability.

**Development Biology**. Biology Department, UNCP, Pembroke, NC, 1998- Present. Labs being taught: Fertilization and early development of sea urchins; Transcription and translation in the regulation of development of sea urchins; Extracellular matrix and its role in early development; Effects of no sodium and several sodium concentrations on sea urchins development.

**Molecular Biology**. Agronomy Department, University of Florida, Gainesville, FL, 1997-1998. Independent class: Isolation of mRNA from the unpollinated and pollinated peanut flower.

## OTHER EXPERIENCE

**Computer Skills Excellent.** Smartboard, Blackboard, Visual Page, PageMaker6.5, Word processing, PowerPoint and statistical analysis, 1992-Present.

**Developing Courses for Web-based Delivery** satellite "event," 1998.

**Associate Editor.** Associate Editor for the Soil and Crop Science Proceedings, 1992-1995.

## PROFESSIONAL DEVELOPMENT IN RESEARCH

**Current Topics in Genetic Research.** Latest developments in genetic technology, medical genetics, gene therapy and ethics. Sponsored by the National Human Genome Research Institute (NHGRI) and the National Institute of Health (NIH), Bethesda, MD, 8/2-5/1999.

**Use of Plant Keys to Identify Plants**. Southwest Florida Research & Education Center, Sarasota County, FL, 11/6/1996.

**ICBR Molecular Markers Workshop**. Tools for Developing Molecular Markers, Interdisciplinary Center for Biotechnology Research (ICBR), University of Florida, Gainesville, FL, 10/30-11/3/1995.

## LANGUAGES

*English* - read, speak and write fluently

*Portuguese* - read, speak and write fluently

*Spanish* - read and speak fluently and write moderately

## UNDERGRADUATE RESEARCH POSTER PRESENTATION

Easterlin, M.L. M.L. Grimsley, M.E. Zets, L.Holmes, S. Mandjiny, and **M.J. Pereira**. Purification and extraction of high value phytochemicals from marigold flower blooms of the species *Tagetes erecta*. Presented at “Research in the Capital” an undergraduate research symposium for the NC General Assembly, April 12, 2005.

## PRESENTATIONS IN PROFESSIONAL CONFERENCES

"Coleoptile length in dwarf wheat isolines: Gibberellic acid effects as a seed treatment." American Society of Agronomy National Meeting, Indianapolis, IN, 2002.

"Coleoptile length in dwarf wheat isolines: Effects of gibberellic acid and glucose in the germination medium." American Society of Agronomy National Meeting, Charlotte, NC, 2001.

"Temperature and gibberellic acid effects on coleoptile length and diameter in dwarf wheat," American Society of Agronomy National Meeting, Minneapolis, MN, 2000.

"Variance components and heritability of seed weight and coleoptile length in dwarf wheat," American Society of Agronomy National Meeting, Salt Lake City, UT, 1999.

"Low temperature-gibberellic acid effects on the first leaf length of dwarf wheat," Soil and Crop Science Society of Florida Annual Meeting, Daytona Beach, FL, 1997.

"The effect of low temperature and gibberellic acid on the coleoptile length of dwarf wheat," American Society of Agronomy National Meeting, Anaheim, CA, 1997. .

"Effect of various light periods on coleoptile length in dwarf wheat," American Society of Agronomy National Meeting, Indianapolis, IN, 1996.

"Cultivar differences in tomato spotted wilt virus tolerance in peanut," Soil and Crop Science Society of Florida Annual Meeting, Daytona Beach, FL, 1994.

"Performance of maize varieties under high and low input conditions at two locations in Southern Mozambique," The Third Regional Maize Workshop of Eastern and Southern Africa, Kenya, 1989.

## POSTER PRESENTATIONS IN PROFESSIONAL CONFERENCES

"The effect of low temperature and gibberellic acid on the coleoptile length of dwarf wheat," American Society of Agronomy National Meeting, Anaheim, CA, 1997.

## PROFESSIONAL CONFERENCES ATTENDED

The 2nd Annual Agricultural Genomics: New Technologies, Functions, and Advances in Plant Biotechnology. San Diego, CA, 2000.

Soil and Crop Science Society of Florida Annual Meeting, Daytona Beach, FL, 1995.

Soil and Crop Science Society of Florida Annual Meeting, Daytona Beach, FL, 1994.

Soil and Crop Science Society of Florida Annual Meeting, Daytona Beach, FL, 1993.

## DEPARTMENTAL SEMINARS

"Cell fate, potency and determination," Biology Departmental Seminar, UNCP, Pembroke, NC 2000.

"Cloning in humans for disease therapy," Biology Departmental Seminar, UNCP, Pembroke, NC 2000.

"Dwarf wheat and its morphological and agronomical impacts," Biology Departmental Seminar, UNCP, Pembroke, NC 1998.

"Genetic, physiological and morphological aspects of dwarfing in wheat," Ph.D. Exit Seminar, University of Florida, Gainesville, FL, 1998.

"Tomato spotted wilt virus in peanut (*Arachis hypogaea* L.): Screening technique and assessment of genetic resistance levels," M.S. Exit Seminar, University of Florida, Gainesville, FL, 1993.

## PUBLICATIONS

### Refereed Journals

**Pereira, M. J.**, P. L. Pfahler, R. D, Barnett, A. R. Blount, D. S. Wofford, and R. C. Littell. Coleoptile length of dwarf wheat isolines: Gibberellic acid, temperature and cultivar interactions. Crop Sci. 42:1483-1487, 2002.

Pfahler, P.L., **M.J. Pereira**, and R.D. Barnett. Genetic variation for *in vitro* sesame pollen germination and tube growth. Theor Appl Genet. 95:1218-1222, 1997.

Pfahler, P.L., **M.J. Pereira**, and R.D. Barnett. 1996. Genetic and environmental variation in anther, pollen and pistil dimensions in sesame. Sex. Plant Reprod. 9:228-232, 1996.

### Non-refereed Journals

**Pereira, M.J.**, P.L. Pfahler, D.A. Knauft, and G.W. Simone. Cultivar differences in tomato spotted wilt virus tolerance in peanut. Soil Crop Sci. Soc. Florida Proc. 54:12-16, 1995.

Bueno, A., **M.J. Pereira**, and D. Mariote. Actual situation and corn research program in Mozambique. Serie Investigacao Nº3, 1989.

Bueno, A., **M.J. Pereira**, and D. Mariote. Performance of maize varieties under high and low input conditions at two locations in Southern Mozambique. Serie Investigacao Nº2, 1989.

Bueno, A., **M.J. Pereira**, and D. Mariote. Corn varieties and hybrids evaluated in Mozambique during 1988/89 season. Serie Investigacao Nº1, 1989.

### Abstracts

**Pereira, M. J.**, P. L. Pfahler and R. D. Barnett. Coleoptile length in dwarf wheat isolines: Gibberellic acid effects as a seed treatment. Agronomy Abstr. CD-ROM, c01-pfahler102937-O.pds, 2002.

**Pereira, M. J**., P. L. Pfahler and R. D. Barnett. Coleoptile length in dwarf wheat isolines: Effects of gibberellic acid and glucose in the germination medium**.** Agronomy Abstr. CD-ROM, c04-pfahler092655-O.pds, 2001.

**Pereira, M. J.**, P. L. Pfahler, R. D. Barnett and A. R. Blount. Temperature and gibberellic acid effects on coleoptile length and diameter in dwarf wheat. Agronomy Abstr. 104, 2000.

**Pereira, M. J.**, P. L. Pfahler, R. D. Barnett and A. R. Blount. Progress in reducing the negative effects of genetic dwarfing on coleoptile length in wheat. 6th International Wheat conference, Budapest, Hungary. 63, 2000.

**Pereira, M.J.**, P.L. Pfahler, and R.D. Barnett. Effects of pollen and pistil genotype on *in vivo* pollen tube growth in sesame. Proceedings of Pollen-Stigma Conference:14, 1999.

**Pereira, M.J.**, P.L. Pfahler, A.R. Blount, and R.D.Barnett. Variance components and heritability of seed weight and coleoptile length in dwarf wheat. Agronomy Abstr. 73, 1999.

Pfahler, P.L., **M.J. Pereira**, and R.D. Barnett. Coleoptile and root length of dwarf wheat isolines; Effects of gibberellic acid and polyethylene glycol in the germination medium. Agronomy Abstr. 73, 1999.

**Pereira, M.J.**, P.L. Pfahler, and R.D. Barnett. The effect of low temperature and gibberellic acid on the coleoptile length of dwarf wheat. Agronomy Abstr. 89:73, 1997.

Pfahler, P.L., **M.J. Pereira**, and R.D. Barnett. Rye coleoptile selection studies under drought-simulated conditions. Agronomy Abstr. 89:73, 1997.

Pfahler, P.L., **M.J. Pereira**, and R.D. Barnett. 1996. *In vitro* germination and tube growth of sesame pollen. Agronomy Abstr. 88:78, 1996.

**Pereira, M.J.**, P.L. Pfahler, and R.D. Barnett. Effect of various light periods on coleoptile length in dwarf wheat. Agronomy Abstr. 88:78, 1996.

## AWARDS, HONORS and ACHIEVEMENTS

Humane Society Award ($200), 2005.

Biological Honor Society , April 2002.

2000 Faculty Travel and Publication Award, 2000.

1999 Faculty Travel and Publication Award, 1999.

Paul Robins Harris Memorial Scholarship Award 1997-1998.

Charles E. Dean Scholarship for Outstanding Student in Agronomy Award, 1997-1998.

IFAS Travel Grant Award, 1997.

Graduate Student Council Travel Award, 1997.

Graduate Student paper competition-3rd place, Soil and Crop Science Society of Florida Annual Meeting, 1997.

Gamma Sigma Delta, 1995.

Sigma Xi, 1995.

## PROFESSIONAL SOCIETIES

American Association for the Advancement of Science, 2001.

National Association of Biology Teachers, 2000.

American Association of University Woman, 2000.

Agronomy Society of America, 1996-Present.

Crop Science Society of America, 1996-Present.