BRUNELLA BOWDITCH, Ph.D.

900 Lakewood Ave Lakewood N.J.
G.C.U.: (732) 987-2377
bbowditch@georgian.edu

BIOLOGIST

Education

GEORGIAN COURT UNIVERSITY **2019**
Master's in Theology (degree completion expected May 2019)

GEORGIAN COURT UNIVERSITY
Mercy Certificate **2017**

THE GEORGE WASHINGTON UNIVERSITY, Washington, D.C. **1989**
Ph.D. in Botany, emphasis in evolution and flavonoid chemistry

- **Dissertation:** "Chemotaxonomy and Phylogeny of the *Leucanthemum vulgare* Group of Species," D. Lipscomb and E.F. Wells.
- **Relevant Courses:** Methods of Reconstructing Evolution, Advanced Plant Biochemistry, and Plant Anatomy.

THE GEORGE WASHINGTON UNIVERSITY, Washington, D.C. **1986**
Master of Science in Botany, emphasis in flavonoid analysis

- **Thesis:** "Chemotaxonomy of *Leucanthemum* Mill. genus: *Leucanthemum praecox* Horvatić," E.F. Wells.
- **Relevant Courses:** Systematic Botany, Advanced Plant Ecology, and Plant Physiology

UNIVERSITA' DI ROMA LA SAPIENZA, Rome, Italy **1984**
Bachelor of Science in Biology, emphasis in systematic botany

- **Thesis:** "A Study of Urban Flora: an Annotated Flora of the University Campus, Botanic Garden, and Greenhouses," P. Marchi.
- **Relevant Courses:** Plant Systematics, Paleobotany, and Histology and Embryology

Teaching Experience

GEORGIAN COURT UNIVERSITY, Lakewood NJ **2008-present**
Associate Professor of Biology

- Organize and instruct lectures and laboratory sessions.
- Teach Anatomy and Physiology I and II
- Teach Biological Diversity and Evolution
- Teach Cornerstone General Education course
- Teach Capstone general Education course

TRINITY UNIVERSITY, Washington, D.C. **2003–2007**
Associate Professor of Biology

- Organize and instruct lectures and laboratory sessions.
- Teach Introduction to Biology I/II, Evolution, General Biology, and Senior Seminar.

THE GEORGE WASHINGTON UNIVERSITY, Washington, D.C. **2002**
Visiting Professor of Biology

- Substituted for Dr. D. Lipscomb during absence; instructed course in evolution.
- Continued 18S ribosomal DNA Ciliate sequencing project.

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Teaching Experience (continue)

TRINITY UNIVERSITY, Washington, D.C. **1992–2001**

Tenure-track Assistant Professor, 1994-2001

- Instructed lectures and laboratory sessions for Biology I/II, Comparative Vertebrate Anatomy and Embryology, Invertebrate Zoology, Evolutionary Biology, Genetics, Plant Diversity, and Senior Seminar. ~Continued~

- Co-taught Introductory Seminar: The Human Genome Project for first-year students.

Full-time Visiting Professor, 1993-1994

- Coordinated lecture and lab sections for four courses: Comparative Vertebrate Anatomy and Embryology, Evolutionary Biology, Genetics, and Flowering Plants.

Adjunct Professor, 1992-1993

- Conducted lectures and oversaw laboratory sections for course in evolutionary biology.

THE GEORGE WASHINGTON UNIVERSITY, Washington, D.C. **1985–1991**

Adjunct Instructor, 1988-1991

- Taught and organized lectures and laboratories for introductory biology course.
- Authored and administered lecture exams and quizzes, ordered supplies, and maintained equipment.

Graduate Teaching Fellow, 1985-1987

- Instructed laboratory sessions for introductory biology courses.
- Organized laboratory materials and wrote, monitored, and graded exams and quizzes.

Additional Professional Experience

SMITHSONIAN INSTITUTION, Laboratory of Molecular Systematics, Washington, D.C. **1990–1993**

Post-Doctoral Fellow

- Learned and mastered variety of molecular techniques.

ROME HERBARIUM, Universitá di Roma, Rome, Italy **1979–1984**

Herbarium Assistant, Department of Botany, 1980-1984

- Collected, identified, mounted, and preserved specimens obtained in Botanic Garden, campus grounds, and university greenhouses.

Karyotyping Assistant, Department of Botany, 1979-1980

- Performed all phases of plant karyotyping, including collecting root tips and photographing and measuring chromosomes.

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Administrative Leadership Positions

Program/Division Chair Positions:

- Chair of **Biology** Department, **Undergraduate** Program, Georgian Court University 2008-2013
- Chair of **Biology** Department, **Graduate** Program, Georgian Court University 2008-2013
- Chair of the **Allied Health Program**, Georgian Court University 2008-2013
- Chair of the **Clinical Laboratory Science Program**, Georgian Court University 2008-2013
- Chair, Biology Program, Trinity University, Washington, D.C., 1996-2002; 2004-2007.
- Chair, Natural Science and Mathematics Division, Trinity College, Washington, D.C., 1996-1999.
- Acting Chair, Biology Program, Trinity College, Washington, D.C., 1994-1996.

Academic Committee participation and Chair Positions:

- Elected member of the General Education Committee Georgian Court University 2011. 2013-present.
- Member of Program Review Committee Georgian Court University 2010- 2013
- Member of the Graduate Counsel 2010-2013.
- Member of Curriculum Committee Covered for Dr. Wootton, during her sabbatical Fall 2008
- Member of the Hiring Committee for a Nursing Faculty member 2010-2011.
- Member of the Search Committee for a Nursing Faculty member 2009-2010.
- Member of the Search Committee for an Exercise Science Faculty member 2010-2011 (position currently on hold).
- Chair, University Curriculum and Academic Policy Committee, Trinity University, Washington, D.C., 2006-2007.
- Chair, Curriculum and Academic Policy Committee for School of Arts and Sciences, Trinity College, Washington, D.C., 1995-1998.

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Research Interests and Scholarly Activities

GEORGIAN COURT UNIVERSITY, Lakewood NJ. 2008-present

- Research in recording the diversity of life on the Georgian Court University campus with the aim of showing students the evidence of evolution through observed characters as well as the theological dimension of the beauty of creation.
- Research in developing a photographic atlas showing diagnostic characteristics of Angiosperm families growing in the Georgian Court University campus, to be used in botany courses.

- Research on the flavonoid chemistry of *Leucanthemum vulgare* introduced to NJ. After determining the chromosome number and proper identification of the species HPLC data of taxon is conducted.
- Research on comparison of flavonoid content present in European and NJ oxeye daisies.
- Research on the flavonoid chemistry of the *Leucanthemum atratum* group collected in Italy.
- Both projects were and are currently conducted in collaboration with members of the Chemistry department at GCU and two Biology students.

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Research Interests and Scholarly Activities (continue)

- Involved in mentoring a senior student in research regarding NJ bog growing carnivorous plants. The project involves morphology, chemical and evolutionary analysis. This project is in collaboration once again with the Chemistry Department.

- Involved in scholarship of teaching by developing and updating the Anatomy and Physiology sequence at GCU to serve the new Nursing and Exercise programs.

- Developed Power Points for both the lecture and laboratory component of the Anatomy and Physiology sequence.

- Involved in a joint scholarly activity with faculty members in the art and Chemistry Departments to develop a new Art and Science course for non-science major students.

- Currently working on preparing a laboratory manual for BI120 Biological Diversity and Evolution, based on microscope slides and material present in the laboratory at GCU.

THE GEORGE WASHINGTON UNIVERSITY, Washington, D.C. **1993–2007**
Participate in evolutionary discussion group. In weekly meeting directed by Dr. Diana Lipscomb, group of graduate students, faculty, research scientists, and Weitroup fellows discuss current topics in field of evolution. Discuss papers on systematic theory and animal and plant systematic

TRINITY UNIVERSITY, Washington, D.C. **1993–1997**
Actively involved in two research projects as postdoctoral fellow and during initial university employment:

- Randomly Amplified Polymorphic DNA (RAPD) analysis of *Euphorbia esula* (leafy spurge) populations collected in Western and Eastern Europe, including Russia, to determine origins of previously analyzed American populations, in collaboration with S. Nissen, R. Masters, M. Rowe (University of Nebraska) and E.A. Zimmer (Smithsonian Institution).
- Monocot phylogeny using 18S rDNA gene, in collaboration with W. J. Kress and E.A. Zimmer (Smithsonian Institution) and M. Donoghue (Harvard University).

TRINITY UNIVERSITY, Washington, D.C. **1998–2006**
Assisted Dr. Diana Lipscomb in research on Phylum Ciliophora, with emphasis on unicellular organisms that cannot be maintained in culture. Investigated problematic sequencing and developed successful protocol to obtain gene amplification and sequencing of 18S Ribosomal DNA. Amplified DNA in three segments, developed primers specific to taxa, and sequenced specimens with acrylamide gels in ABI sequencer. Presented data at evolution meeting in Knoxville, Tennessee; secured grant and obtained capillary sequencer.

Additional experience attending Hennig Society international meetings throughout world. Scientists from all parts of world present research findings and engage in roundtable discussions with meeting participants. Discussions include taxa findings and matters concerning evolution reconstruction theory and analysis of new data.

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Educational and Research Grants Received

- **Georgian Court University Summer Research Grant.** 2018. "BI120 Laboratory Manual". $4,600.00
- **Georgian Court University Summer Course Development Grant** 2017. Development of a new General Education course for Honors students – Science in Art. $ 2,000.00.
- **Georgian Court University Summer Research Grant.** Flavonoid analysis of the *Leucanthemum* genus. 2008. $5K.
- **Department of Defense Educational Improvement Grant.** "Closing the Gap: Strengthening Mathematics and Science Education through Technology," 2001-2003, $69K.
- **Foundation Grant,** written in collaboration with Chemistry Program to purchase HPLC,1996, $16K.
- **USDA Nebraska Regional Grant,** in collaboration with University of Nebraska faculty and Nebraska USDA, 1993-1995, $79K.
- **USDA Grant 91-38300-6116,** 1991-1993, $75K.
- **Sigma XI Grant for Laboratory Equipment**

Publications

Lipscomb D., Bowditch B., Riordan G.P. 2012. A molecular and ultrastructural description of Spathidiopsis buddenbrocki and the phylogenetic position of the family Placidae (Ciliophora). Journal of Eukaryotic Microbiology (59) 1 pp 67-79.

Lindholm Kivimaki K., Bowditch M. B.[2], Riordan G. P.[,] Lipscomb D. L. 2009[1] Phylogeny and Systematic Position of Zosterodasys (Ciliophora, Synhymeniida): A Combined Analysis of Ciliate Relationships Using Morphological and Molecular Data. Journal of Eukaryotic Microbiology.

Rowe M. L. Lee D. J. Nissen S. BowditchB. Masters R. A. 1997. Genetic variation in North American leafy spurge (Euphorbia esula) determined by DNA markers. Weed Science 45: 446-454.

Rosoel C., W.J. Kress, and B.M. Bowditch. 1996. Genetic variation in *Phenakospermum guyannense* (*Strelitziaceae*), a bat pollinated arborescent herb. Plant Systematics and Evolution 199: 1-15.

Farris J.S., M. Kallersjo, M. Allard, A. Anderberg, B. Bowditch, et al. 1995. Cladistics. Explanations.

Bowditch, B.M., D.G. Albright, J.K. Williams. 1993. The use of RAPD marker in comparative genome studies. Methods in Enzymology Vol. 224, Zimmer E. A., E. White, T. Cann R., Wilson A. eds.

Bowditch, B.M., E.F. Wells, and K. Brown. 1991. Rapid Methods for determination of flavonoids using ion-pair high-performance liquid chromatography. Phytochem. Bull. 23:10-13.

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Published Abstracts

Grady A, Weber A, Bowditch B. 2010. Species identification, of New Jersey oxeye daisies Leucanthemum Miller Compositae. Botany 2010 Meeting, Providence RI.

Soltysik K, Weber A, Bowditch B. 2010 Phytochemical data on the *Leucanthemum atratum* group *Compositae* . Botany 2010 Meeting, Providence RI

Lipscomb D. and Bowditch B. 2001. Taxon Sampling, Alignment and the Tree of the Ciliated Protists. Evolution meeting Knoxville, TN.

Clayton R. and B. Martire. 1988. Flavonoids found in Bowditch M.B., E.A. Zimmer and J. Williams. 1991. RAPD analysis of the *Euphorbia esula* complex.

Martire B., K. Brown and E. F. Wells. 1990. A new HPLC method to separate and identify flavonoids. Phytochemical Bulletin 22: 16.

Martire B. and E. F. Wells. 1989. Chemotaxonomy and evolution of the *Leucanthemum* Mill. genus: *Leucanthemum vulgare* aggregate species and *Leucanthemum discoideum*. Amer. J. Bot. 76: 194.

Martire B. and E. F. Wells. 1988. Chemotaxonomy of the *Leucanthemum* Mill. genus: *L. praecox* Horvatić, L. tridactylites (Fiori) Bazzichelli. Amer. J. Bot. 75: 132.
a population of Tarnished Plant Bug, *Lygus lineolaris* Palisot de Beauvois (Heteroptera: Miridae) living on *Erigeron annuus* (L.) Persoon (Compositae). Supplement of the Ecological Society of America 69: 100-101.

Papers Presented at Professional Meetings

"The use of RAPD markers as evidence for hybrid speciation in *Heliconia*." AIBS. 1992.

"RAPD technology applied to *Euphorbia esula*." AIBS. 1991.

"A new HPLC method to separate and identify flavonoids." AIBS annual meeting August, 1990.

"Chemotaxonomy and evolution of the *Leucanthemum* Mill. genus: *L. vulgare* aggregate species and *L. discoideum.*" GWU, 1989; AIBS annual meeting August, 1989.

"Chemotaxonomy of the *Leucanthemum* Mill genus: *Leucanthemum praecox* Horvatic' and *Leucanthemum tridactylites* (Fiori) Bazzichelli." AIBS annual meeting, 1988.

"Chemotaxonomy of the *Leucanthemum vulgare* aggregate species." George Washington University, 1987.

"Chemotaxonomy of *Leucanthemum praecox* Horvatić."Consortium of Universities, Washington, D.C.

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Papers Presented by Invitation

"Angiosperm phylogeny" Symposium. Invited to participate in open panel discussion. Hennig Society meeting, Fullerton, California. 1993.

"RAPD analysis of the *Euphorbia esula* complex". USDA Agricultural Research Service Foreign Disease - Weed Science Research, Fort Detrick, Frederick, Maryland. 1993.

"Cladistic analysis of the *Leucanthemum vulgare* complex." Hennig Society meeting, Paris, France. 1992.

"A new HPLC method to separate and identify flavonoids." Washington Area Plant Physiology Society. Spring, 1990.

"Chemotaxonomy and evolution of the *Leucanthemum* Mill. genus: *L. vulgare* aggregate species and *L. discoideum*." USDA Agricultural Research Service Foreign Disease - Weed Science Research, Fort Detrick, Frederick, Maryland. 1989.

Honors & Awards

- **King Fellowship for Doctoral Candidates in Biological Sciences,** George Washington University, Washington, D.C., 1988-1989.
- **Graduate Teaching Fellowship,** George Washington University, Washington, D.C., 1985-1988.

Professional Affiliations

- **Hennig Society,** Member.
- **Sigma Xi,** Associate Member.
- **American Botanical Society,** Member.
- **American Society of Plant Taxonomists,** Member.
- **Botanical Society of Italy,** Member
- **American Association for the Advancement of Science,** Member.

Technical and Equipment Skills

- DNA Extraction
- PCR
- PAUP Programs
- UV Spectrophotometric Data
- Spectrophotometric Enzyme Assay
- Squashing
- Mounting
- Sputter Coaters
- Critical Point Dryer
- CsCI Banding
- Gel Purification
- Southern Blot
- HENNIG86 Programs
- Cochicine Treatment
- Fixation
- Karotype Plate Photography
- Light Microscopes
- Sequencing
- RAPD
- Liquid Chromatography
- Column Chromatography
- Acid Hydrolysis
- Dehydration
- Specimen Preservation
- Vacuum Operators

Language Skills

Fluent in Italian.

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Critical concerns advocacy, stemming from the education obtained through the Mercy Certificate Program and Master's in Theology at Georgian Court University

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November 2017 Trip to Texas and Mexico to become aware of the immigrant population conditions.

Interviews which lead to the publication of 2 articles:

1) **December 13, 2018: The Monitor**: David Karas. GCU professor brings border visit lessons to classroom.

http://www.trentonmonitor.com/main.asp?SectionID=4&SubSectionID=88&ArticleID=17065

2) **November 20, 2017. Crux. Taking the Catholic Pulse**: Melissa Vida, To understand border issues, Americans immerse themselves for a week.

https://cruxnow.com/church-in-the-usa/2017/11/20/understand-border-issues-americans-immerse-week

May 2018 "Immigration Advocacy Program" in Washington D.C.: accompanied G.C.U. students to the Program which included two days on Capitol Hill.

June 30th, 2018: participated in the demonstration in Princeton in support of "Families Belong together".

Fall 2018 "Critical Concerns" week at G.C.U. which will be on immigration, agreed to participate in the organizing committee starting June 2018.

I have educated all the students I have taught since my trip to the boarder regarding the current immigration situation. I have explained that the majority of people wanting to come into the U.S. are women and children, fleeing for their lives. (I have taught a general education class, this summer, which is especially appropriate for these types of conversations).

I have tried to share all I have learned with family and friends on the immigrant issue.