

ANNUAL REPORT: June 1, 2015 – May 31, 2016
(i.e., Summer 2015, AY 2015-2016)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: Danilo D. Fernando

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

	<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>	<u>No. of Lab. Sections</u>
SUMMER:					
FALL:	EFB 427/627	Anatomy and Development of Plants	3	11	2
SPRING:	EFB 326	Diversity of Plants	3	48	4
	BTC 497	Research Design & Prof Dev't	1	18	0

NOTE: PLEASE INDICATE WHICH COURSE(S) HAD A SERVICE-LEARNING COMPONENT AND BRIEFLY EXPLAIN THE NATURE OF THIS COMPONENT. For examples of service-learning in courses, see: <http://www.esf.edu/students/service/courses.htm>. Service-learning is a form of structured experiential education in which students engage with the community to be active learners, to enrich their sense of civic responsibility, and to explore practical application for course content. Faculty oversight, reflective thinking, and reciprocity are key components of service-learning.

2. Non-Scheduled Course Offerings (e.g., 496, 899, 999)

	<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>
Fall 2014				
	BTC 298	Research Apprenticeship/Biotech	1	1
	BTC 420	Internship in Biotechnology	3	2
	EFB 420	Prof Internship/Envr Biology	4	1
	EFB 495	Undergraduate Exp/Coll Teaching	3	1
	EFB 498	Independent Research/Envi Bio	3	3
	EFB 899	Masters Thesis Research	3-6	2
Spring 2015				
	EFB 298	Research Internship/Envrn Biology1		2
	EFB 495	Undergraduate Exp/Coll Teaching	3	3
	EFB 498	Independent Research/Envi Bio	3	2
	EFB 798			
	EFB 899	Masters Thesis Research	4-10	2

3. Continuing Education and Extension (short courses, workshops, etc.)

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4. Guest Lecture Activities

<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
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EFB 210	Diversity of Life	2
EFB 535	Flowering Plants: Diversity, Evolution and Systematics	1

II. STUDENT ADVISING

- A. Number of undergraduates for whom you are the student's official advisor 18 and unofficial advisor 0
- B. Graduate Students: (list name, degree sought, starting date, month & year; if a degree was completed, please give date and full citation for the thesis or dissertation).

MAJOR PROFESSOR

Michael J. Serviss, MS Program, Started on August 2014

Joshua Weber-Townsend, MP Program, Started January 2015.

CO-MAJOR PROFESSOR

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MEMBER, STEERING COMMITTEE (other than those listed above)

Pallavi Subramanya Bharadwa, Ph.D Program, Started on August 2012 – Biology Dept, SU

Yao Xiao, Ph.D Program, Started on August 2013 – Biology Dept, SU

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Served as Chair to MS thesis defense of Eva Salinas, Forest Resources Management. May 5, 2016.

III. RESEARCH COMPLETED OR UNDERWAY

- A. Departmental Research (unsupported, boot-legged; title - % time spent)

The effects of anti-gibberellic acid on antheridia and archegonia formation in ferns (10%)
 Pollen tube development and nuclei visualization in *Wollemia nobilis* and *Podocarpus* sp. (10%)

- B. 1. Grant-supported Research (source, subject, amount - total award and current year, award period starting and ending dates; list graduate research assistants supported by each grant)

Genetic, Reproductive and Habitat Analysis to Support American Hart's-Tongue Fern Reintroduction and Restoration in the Great Lakes Region. USF&WS-GLRIP, \$99,600. May 1, 2012 to June 30, 2014. PI: DD Fernando, Co-PI: DJ Leopold. This project has been extended to June 30, 2015 to cover the reintroduction aspect of the project.

Reproductive, Genetic and Ecological Assessments of the Invasive Potential of Hardy Kiwi (*Actinidia arguta*) in the Northeast United States. Natural Heritage Program – NYSDDED LIISM. \$75,062. January 1, 2014 to December 31, 2015. Extended to June 30, 2016 with \$10,000 additional funding.

Range-Wide Genetic Analyses of American Hart's-Tongue Fern (*Asplenium scolopendrium* var. *americanum*) - Part II: Michigan, Tennessee, Alabama and Ontario (Canada). USF&WS Cortland Office; \$18,923. Research Assistant: Joshua Weber-Townsend (summary salary). PI: DD Fernando. June 8, 2015 to June 7, 2016.

Ex situ conservation of American hart's-tongue fern. Sponsor: Landscape Architecture WMBE - \$14,569. PI: DD Fernando.

Flower and Fruit Development in *Actinidia arguta*: Digging Deeper into the Developmental Basis of Ovule and Carpel Abortion. The Arnold Arboretum of Harvard University, \$1,500; March 2016 - March 2017.

2. Research Proposals pending (include information as in B.1., above).

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3. Research Proposals submitted, but rejected (include information as in B.1., above)

Multi-Scale Genetic Analysis of Sugar Maple (*Acer saccharum*) in the Adirondacks: Applications for Management and Harvesting Practices. Pre-proposal submitted to NSRC (\$125,000); PI: DD Fernando; CO-PI: DH Kiernan.

Genetic diversity and phenology of sugar maple (*Acer saccharum*): Effects of land management practices, fragmentation and climate change. Pre-proposal submitted to Strategic Environmental Research and Development (DOD); PI: DD Fernando.

IV. PUBLICATIONS (Full bibliographic citation, i.e., do not use "with Jones," or "Jones, et al."; please list only publications published, in press, or actually submitted during this reporting period --- **do not list manuscripts in preparation**).

A. Refereed Publications

Fernando DD, Discenza JJ, Bouchard JR, and Leopold DJ. 2015. Genetic analysis of the threatened American Hart's-Tongue Fern (*Asplenium scolopendrium* var. *americanum*): Insights into its mating system and implications for conservation. *Biochemical Systematics and Ecology* 62:25-35.

Bouchard JR, Fernando DD, Bailey SB, Weber-Townsend J and Leopold DJ. Contrasting genetic variations between central and peripheral populations of *Dryopteris fragrans* (fragrant wood fern): implications for past and future climate change. Submitted to *Annals of Botany*.

B. Non-refereed Publications

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C. Papers Presented at Science Meetings (give title, date, occasion, and location)

- Assessing variations of a rare fern the Northern Forest to understand plant responses to climate change (Invited Presentation). December 10, 2015. Research webinar presentation sponsored by NSRC. Presenters: DD Fernando and SB Bailey.
- Populations at the edge of range: Are they worth conserving? Insights from *Dryopteris fragrans* (Invited Presentation). May 11, 2016. EvoDay Symposium 2016: Evolution and Conservation, Cornell University.

D. Public Service Presentations (lectures, seminars, etc. to and for the public; give group or occasion, date(s), and attendance)

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V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

1. Government Agencies (Federal, State, Local):

2. Industrial and Commercial Groups, etc.

B. Unfunded Service to Governmental Agencies, Public Interest Groups, etc.

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VI. PROFESSIONAL DEVELOPMENT

A. Professional Honors and Awards (for teaching, research, outreach, etc.)

B. 1. Activities in Professional Organizations (offices held, service as chairman, member, participant or consultant)

2. Professional Society Membership

3. Other Professional Activities

a. Editorial activity

Journal (s)

Responsibility

Other (books, symposia, etc.)

b. Reviewer

Journal(s)

No. of manuscripts

Tree Physiology

2

Forests

2

Scientia Horticulturae

2

American Journal of Botany

1

BMC Evolutionary Biology

1

Tree Genetics and Genomes

1

PLOS One

1

Plant Reproduction

1

Agency

No. of proposals

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Other

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.

Date

Place

C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.

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D. Foreign Travel (Where, When, Purpose)

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VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

Director, EFB Graduate Program

Member, Graduate Program Advisory Committee

Chair, Joseph and Ruth Hasenstab Memorial Fellowship Award Committee

EFB New Graduate Student Orientation, August 21, 2015

B. College-level

Member, Graduate Council

C. University-wide, including Research Foundation

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VIII. SUMMARY OF SIGNIFICANT ACTIVITIES AND ACCOMPLISHMENTS DURING THIS REPORTING PERIOD, ESPECIALLY THOSE MOST NOTEWORTHY AND RELATIVE TO THE COLLEGE'S AND DEPARTMENT'S MISSION.

One paragraph on each of the following (i.e., three paragraphs total) would be most helpful: this past year, what have you done for our students, department/college, and self professionally? NOTE: The information in this section (along with the supporting specific information elsewhere in this report) should be your strongest case for being considered for a discretionary raise (when available), which I'll continue to award based on your contributions to the department and college this reporting period.

For the Students: This past academic year, I taught EFB 427/627 (Anatomy and Development of Plants), EFB 326 (Diversity of Plants), BTC 420 (Research Apprenticeship), BTC 497 (Research Design and Professional Development), EFB 495 (Undergraduate Experience in College Teaching) and BTC/EFB 498 (Independent Research in Biotechnology/Environmental Biology). I also gave a few lectures in other classes (EFB 210 and EFB 535), and served as curriculum adviser to several undergraduate students. Overall, at least 100 undergraduate students have been served through this capacity. I did not have a graduate Teaching Assistant for EFB 427/627 which had two lab sections and a total of 11 students, which meant that I did most of the pre-lab preparations, actual lab instructions of at least 6 hours per week, and marked all of the lab reports (5 per student) for this course. In addition to the formal interactions with the students in all the courses I taught this past academic year, I also interacted with many of them out of the lecture and lab periods through involvement in their respective lab projects and/or writing assignments. Many of the students also came in during my office hours for clarifications, questions and/or conversations on various topics including practical applications of concepts covered in the lectures and labs. I updated the laboratory manuals in both

of my major courses (EFB 427 and EFB 326) and the revisions included suggestions from the graduate and undergrad TAs, as well as from the students who went through them. I have trained several undergraduate students in my lab through independent research, internship and apprenticeship. As for graduate students, I have advised many graduate students from the department regarding their program requirements, filing up of the required forms and shifting from one major or degree program to another. I have worked with my graduate students on various aspects of the laboratory and/or field components of their research projects, draft manuscripts, grant/fellowship applications, and poster/oral presentations.

For the department/college: I served as EFB's Graduate Director for the 9th year and my major responsibilities included the following: 1) acted on various petitions concerning different aspects of EFB graduate program requirements and policies; 2) reviewed and signed on various forms required for the completion of different degrees and majors (e.g., 2A, 3B, 4 and 6A); 3) replied to inquiries concerning EFB graduate program (through email, phone, and/or personal appearances) from several potential applicants and current graduate students; 4) processed a total of 110 applications (10 for spring 2015 and 100 for fall 2016) that involved the review of each application for initial assessment and designation of faculty reviewers, followed up on the completion of the reviews on each application, summarized the reviews for each application, and submitted EFB's recommendation for each accepted and rejected applications to the Dean of Instructions and Graduate Studies; 5) provided informal orientation to new graduate students regarding EFB graduate program and new faculty about the graduate application and review procedures; 6) I also worked with EFB Secretaries on the update and improvement of the various facets of the EFB's Graduate Webpage, graduate application filing system, and continued the survey on the most effective means of attracting/recruiting graduate students; and 7) As a member of EFB's Graduate Program Academic Committee and ESF's Graduate Council, I provided connections between the department and college on issues pertaining to graduate degree program offerings and requirements, admission/review process, policies, and other related matters.

For professional accomplishments: The following are what I consider as significant: 1) Recruitment of a new Ph.D. student (Masoumeh Khodaverdi) who will start her program this fall 2016; 2) Invited research webinar presentation (Assessing variations of a rare fern the Northern Forest to understand plant responses to climate change) sponsored by NSRC; 3) Invited presentation (Populations at the edge of range: are they worth conserving? Insights from *Dryopteris fragrans*) for the EvoDay Symposium at Cornell University; 4) Recipient of the 2016 Jewett Prize from The Arnold Arboretum of Harvard University through my project on "Flower and Fruit Development in *Actinidia arguta*: Digging Deeper into the Developmental Basis of Ovule and Carpel Abortion"; and 5) last but not the least, I have continued writing and revising all the chapters of the textbook (Sexual Reproduction in Forest Trees) that I am co-authoring with Dr. John Owens through Cambridge University Press. Target date of completion is August 2016.

IX. A. FUTURE PLANS, AMBITIONS, AND POTENTIAL CONTRIBUTIONS FOR YOUR OWN PROFESSIONAL DEVELOPMENT AND THE ENHANCEMENT OF THE PROGRAM IN ENVIRONMENTAL AND FOREST BIOLOGY (brief summary)

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2016

a. Course(s) to be offered

b. Proposed research activity

Genetics, Mating System and Reintroduction of American hart's-tongue fern

Genetics and Reproductive Biology of *Actinidia arguta* in the Northeast US

Write papers and grant applications

Finalize and Submit book – Sexual Reproduction in Forest Trees

c. University, professional society, and public service

2. Fall Semester 2016

a. Course(s) to be offered

EFB 427/627: Plant Anatomy and Development

b. Proposed research activity

Genetics, Breeding System and Reintroduction of American hart's-tongue fern

Genetics and Reproductive Biology of *Actinidia arguta* in the Northeast US

Write papers and grant applications

c. University, Professional society, and public service

3. Spring Semester 2016

a. Course(s) to be offered

EFB 326: Plant Evolution, Diversification and Conservation

BTC 497: Research Design and Professional Development

b. Proposed research activity

Genetics, Breeding System and Reintroduction of American hart's-tongue fern

Genetics and Reproductive Biology of *Actinidia arguta* in the Northeast US

Write papers and grant applications

c. University, professional society, and public service