

ANNUAL REPORT: June 1, 2016 – May 31, 2017
(i.e., Summer 2016, AY 2016-2017)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

*****PLEASE DO NOT INSERT TABLES FOR ANY CATEGORIES*****

NAME: _____ Hyatt Green _____

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

	Course No.	Title	Credit Hrs.	No. Students	No. of Lab. Sections
SUMMER:					
FALL:	EFB303	Introduction to Environmental Microbiology	4	49	2
SPRING:	EFB505	Microbial Ecology	2	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)

Course No.	Title	Credit Hrs.	No. Students
EFB796	R and Reproducible Research	3	11

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

4. Guest Lecture Activities

<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
EFB211	Diversity of Life II	1

II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor 20 and unofficial advisor 1

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

Joseph Nasta, MS Plant Science and Biotechnology, started as RPA May 17, 2017, actually enrolls Aug 21, 2017

CO-MAJOR PROFESSOR

MEMBER, STEERING COMMITTEE (other than those listed above)

Ryan Scheel, Ph. D., Environmental Chemistry, 2018 (anticipated)
Charlotte Atti, M.P.S., Plant Science and Biotechnology, 2017 (anticipated)
Gabrielle Fanfan, M.S., Plant Science and Biotechnology, 2017 (anticipated)
Sierra Jech, M.S., Environmental Chemistry, 2018 (anticipated)

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Jerome Barner (MP T. Horton), MS Ecology, degree completed Aug 2016.
Timothy Koch (MP P. Vidon), MS Environmental Science, degree completed Nov 2016.

III. RESEARCH COMPLETED OR UNDERWAY

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

Microbial Degradation of Persistence Organic Pollutants Across a Microbial Evolution and Growth Arena (MEGA) Plate -- 5%

Microbial Source-tracking on Onondaga Creek (ongoing), NY -- 5 %

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)

Utah Division of Water Quality, “*E. coli* Source Identification in Emigration Canyon, UT” Marian Rice (PI), Hyatt Green (Co-PI), \$136,474 (Contract still in negotiation), 07/01/2017-06/30/2020

SUNY-ESF, Center for Applied Microbiology, “Identification of Fecal Contaminants on the Onondaga Lake Shoreline”, Hyatt Green (PI), \$4,600, 07/01/201-06/30/2016

State Wildlife Competitive Grants Program, US Fish and Wildlife Service, "Multistate Recovery Actions For The Bog Turtle And Associated Headwater Wetland Species Of Greatest Conservation Need", Pennsylvania Fish and Boat Commission (PI), Large interstate consortia (Co-PI), Hyatt Green (Co-PI), \$117,000 to ESF (\$499,970 total), 10/01/2015-06/30/2018

SUNY-ESF Seed Grant, "Microbial Dark Matter in Green Lake, NY", Hyatt Green (PI), \$6,666, 06/01/2016-05/31/2017

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

US EPA (GLRI), "Expansion of Great Lakes Invertebrate Barcode Libraries", Hyatt Green (PI), Kim Schulz (Co-PI), Neil Ringler (Co-PI), Rebecca Rundell (Co-PI), Alexander Smith (Co-PI), \$396,495, 10/01/2017-09/30/2020

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

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

B. Non-refereed Publications

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

Distributions of Bacterial Generalists Among the Guts of Birds, Fish, and Mammals. International Symposium on Microbial Ecology. Montreal, CA, 2016

Sources of Fecal Bacteria to Onondaga Lake, NY State Biotechnology Symposium, SUNY-ESF, May 18, 2017

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

Microbial Dark Matter in Green Lake, NY. American Fisheries Society Chapter Meeting. SUNY-ESF, Syracuse, NY, 2016

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.

Onondaga Lake Watershed Bacterial Trackdown Working Group

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

American Society for Microbiology (ASM), member since 2007

International Society for Microbial Ecology (ISME), member since 2016

3. Other Professional Activities

a. Editorial activity

Journal (s)

Responsibility

Other (books, symposia, etc.)

b. Reviewer

Journal(s)

No. of manuscripts

Environmental Science and Technology

1

Environmental Pollution

1

Journal of Applied Microbiology

1

Agency

No. of proposals

California Sea Grant

1

Other

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.

Date

Place

**Session chair for NY State Biotechnology Symposium, 9th Annual
SUNY-ESF (Gateway)**

May 18-19, 2017

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

Finger Lakes HUB Workshop, May 25, 2017

D. Foreign Travel (Where, When, Purpose)

Montreal, CAN, August 21-26, International Symposium on Microbial Ecology

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

GPAC, Evaluation of graduate applicant ranking system, Spring 2017

Biotechnology Major Representative for EFB Spring Open House 2017

EFB202 Project Judge at Cranberry Lake, Aug 2016

Instructional Support Specialist Hiring Committee Summer 2017

Attended search talks for Toxicologist position

B. College-level

C. University-wide, including Research Foundation

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.

Benefits to Students: Currently, I advise 19 undergraduates, but hope to take on more next year as advising week is probably my favorite part of the term because I get to see students outside my role as instructor. With my support (usually in the form of letters) my advisees have secured competitive summer internship positions at the National Aquarium (Baltimore, MD), Wind Cave National Park (SD), and the Darrin Fresh Water Institute (Bolton Landing, NY). In terms of teaching EFB303: Introduction to Environmental Microbiology seems to keep attracting more students year-after-year: 44, 49, and 69 students enrolled in 2015, 2016, and 2017 respectively. This level of enrollment necessitates opening up a third lab section next fall. In spring 2017, I offered for the second time EFB505: Microbial Ecology (2cr.). While EFB303 is an intro course only touching on major topics, EFB505 introduces both graduates and undergraduates to the latest discoveries and methods in microbial ecology discussing seven technical papers---both classics and papers published in the past two years. Although I received very little feedback from the students, I was very pleased with the level of discussion and quality of the final papers. EFB796: R and Reproducible Research was offered for the third time in spring 2017. Again very little feedback from the course, but I can say these last students on average produced the highest quality final projects I've seen to date.

Departmental and University Service: I recently joined the Graduate Program Advisory Committee (GPAC) in an ongoing effort to assess the effectiveness of our departmental graduate applicant ranking system. Although I am currently in the process of gathering existing data from the graduate school and other sources, the final analysis could potentially change the which students we accept and which students are offered assistantships. It was also a pleasure to represent the Biotechnology major during Spring 2017 Open House and meet graduating high school seniors and other prospective students. It was also a pleasure to finally see Cranberry Lake Biological Station in August 2016 and some of the final projects students complete as part of EFB202. We are scheduled to visit CLBS again this August. This summer I am also serving on the hiring committee for the new instructional support specialist, which will support Microbiology as well as other courses. I am currently on five graduate committees and was on two graduate examination committees (both passed) in the last period.

Professional Advancement: Last August I presented a metagenomics study at the 16th International Symposium on Microbial Ecology in Montreal, Canada. Stemming from this conference is an active collaboration with researchers at the University of Queensland, Australia in a search for “new” methanogens. I recently chaired and presented in the session titled “Developments in Microbial Source-Tracking” at the 9th annual NY State Biotechnology Symposium. I also attended the Finger Lakes HUB workshop in late May where it was clear that there are many opportunities for research related to the cyanobacterial blooms and the identification of contaminant sources through microbial source-tracking (MST). I am also working with the microbial source-trackers at Univ. of Buffalo and NY DOH to better identify funding opportunities and possible collaborations on NY state water quality issues. Additionally, Salt Lake County wants us to perform \$136,474 of MST on the theologically important Emigration Creek as well as other tributaries east of Salt Lake. Data from two past MST projects, one on Onondaga Creek and one on the north shore funded by ESF’s Center for Applied Microbiology are being analyzed. Preliminary results from the creek study were presented in May 2017. I have initiated negotiations with the College on setting up a services and facilities account through which I intend to funnel much of the MST work, which is in fairly high demand. While the current lab is not completely ideal for molecular work, I am positive we can keep generating good data until new facilities are completed. The bog turtle eDNA work funded by US FWS (\$117,000) is going well. It is taking place within a large consortium of groups in NY, NJ, PA, MD, RI, and CT in an effort to protect bog turtle habitat. We are currently in the method development stage optimizing the extraction of DNA from bog samples---a less-than-ideal substrate. My student will present the results of this work at Ecological Society of America in Portland, OR this August. The ESF Seed grant I received last year to study ‘microbial dark matter’ and mercury methylation in Green Lake, Fayetteville, NY (\$6,666) should prove to be an excellent return on investment. After sampling the lake last May with members of the Driscoll lab we found significant levels of the genes responsible for Hg-methylation, *hgcAB*—further evidence for water column Hg-methylation. My student presented this work at three meetings this spring: the SUNY Undergraduate Research Conference (SURC), ESF’s Spotlight on Research, and the SU Biology Spring 2017 Poster Session. Currently, I have two students working on the project under the Seed Grant but am preparing an NSF proposal (pre-proposal accepted) to fund further investigations into the identity of the Hg-methylators and to form an overall model of Hg-cycling in this unique meromictic system. Finally, a graduate student has begun work in my lab on the microbial evolution and growth arena (MEGA) plate project. Assuming trial runs using antibiotics as the stressor go well, his eventual goal is to investigate the evolution of microbes’ ability to degrade persistent organic pollutants (POPs).

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)

In the future, we will exploit the MEGA plate for both teaching *and* research. As has been demonstrated before, it is a great tool to demonstrate microbial evolution visually in a short period of time as well as provide insights into the molecular-level changes that occur in response to selective pressures. If funded, the Green Lakes project should fund a PhD student and will further establish this nearby site as a test bed for a diversity of studies concerning Hg as well as uncharacterized bacteria in its lower depths. While the ‘eat local’ movement swept the brewing industry over a decade ago, brewers still use non-local strains of yeast and bacteria. At the same time, we know there is immense unknown fermentive diversity in nature. In a collaboration with Griffin Hill Farm Brewery, we will bioprospect for local yeasts and bacteria with desirable production characteristics (e.g., ethanol tolerance, short lag time) and flavor profiles. Recent discovery of ‘comammox’ bacteria that carryout ammonium and nitrite oxidation in the same cell suggests that N-cycling models may need to be updated to provide better climate prediction model input. I will be visiting the Newcomb campus this June to assess how I can leverage its location in the heart of the Adirondacks to study microbial N-cycling and its potential effects on forest management and climate predictions. Likewise, I will be visiting Thousand Islands Biological Station in July to explore the possibility of aquatics-oriented eDNA projects. After seeing presentations by DEC at the recent Finger Lakes HUB workshop, I see many opportunities for research in this area. Little is known about cyanobacterial bloom strain variation within and between lakes, which is likely to determine the precise set(s) of environmental conditions responsible for blooms. While the Finger Lakes are relatively unpolluted compared to other lakes in NY, high nutrient and pathogen loads can contaminate inflows from time to time exacerbating cyanobacterial blooms. MST methods have been used in other areas to help manage these exact problems and will likely be helpful here as well.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2017

a. Course(s) to be offered

None

b. Proposed research activity

Green Lakes work

- **Submit NSF proposal**
- **Build column sampler**
- **Optimize CARD-FISH and SEM protocols**
- **Sample Green Lakes in June**
- **Submit paper to AEM**

Bog turtle work

- **Optimize extraction protocol**
- **Sample bogs**
- **Analyze bog samples**
- **Present at ESA**

MEGA plate

- **Write project proposal (grad student)**
- **Complete trial runs**
- **Start NSF proposal**

c. University, professional society, and public service

- **Continue grad ranking system analysis with GPAC**

2. Fall Semester 2017

a. Course(s) to be offered

EFB303: Intro. to Environmental Microbiology

b. Proposed research activity

MEGA plate

- **Submit NSF proposal**
- **Complete experimental runs (3)**

Bog turtle work

- **Submit paper to Molecular Ecology**

Yeast Bioprospecting (if funded)

- **Collect samples and enrich**
- **Determine ethanol tolerance**
- **Determine sugar utilization profiles**

c. University, Professional society, and public service

- **Finish grad ranking system analysis with GPAC**
- **Serve on grad committees**

3. Spring Semester 2018

a. Course(s) to be offered

EFB796: R and Reproducible Research

b. Proposed research activity

MEGA plate

- Complete experimental runs (3)
- Test/sequence isolates if necessary

Bog turtle work

- Sample bogs
- Analyze samples

Yeast Bioprospecting (if funded)

- Run trial fermentations

Comammox Project (if funded)

- Collect samples

c. University, professional society, and public service

- Take on tasks with GPAC
- Serve on grad committees