

**ANNUAL REPORT: June 1, 2014 – May 31, 2015**  
**(i.e., Summer 2014, AY 2014-2015)**  
**DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY**  
**SUNY-ESF**

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

**NAME: J Scott Turner**

**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:	EFB200	Physics of Life	3	13	0
FALL:	EFB200	Physics of Life	3	173	0
	EFB462	Animal Physiology	3	42	0
	EFB662	Animal Physiology	3	3	0
SPRING:					

**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>

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	2

## II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor 16 and unofficial advisor I have no idea what this means.

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

### CO-MAJOR PROFESSOR

Tiffany L Deater, PhD, Sept 2014

### MEMBER, STEERING COMMITTEE (other than those listed above)

Lauren Goldmann

### CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Andrew Hendricks

## III. RESEARCH COMPLETED OR UNDERWAY

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

None

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)

<b>Source</b>	<i>Title</i>	<i>Amount</i>	<i>Current year</i>	<i>Award period</i>	<i>Graduate Assistants supported</i>
<b>Human Frontiers Science Program</b>	<i>From swarm intelligence to living buildings. Novel concepts of managing internal climates</i>	<i>\$1,350,000</i>	3	December 2012 to November 2015	1
<b>New York State Energy Research &amp; Development Authority (through contract with Terrapin Bright Green)</b>	<i>Proof of concept: A termite-inspired "humidity sponge."</i>	<i>\$50,000</i>	1	May 2014 to November 2014 (ongoing)	0

<b>National Institutes of Health</b>	<i>Modeling termite construction behavior</i>	\$594,343	1	September 2014 to August 2019	1
<b>National Science Foundation</b>	<i>Biomimicry in Structural Topology: Manifesting Adaptable and Integrated Structural Form through Agent Based Modeling of Macrotermes Mounds</i>	\$449,384		August 2015 to August 2018	0

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

<b>Source</b>	<i>Title</i>	<i>Amount</i>	<i>Current year</i>	<i>Award period</i>	<i>Graduate Assistants supported</i>
<b>ICOB National Science Foundation</b>	<i>ICOB Concepts of Gas Exchange in Animal Burrow Systems</i>	\$620,428	0	September 2015 to September 2018	0

3.

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

None

**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

Turner, J. S. (2015). Homeostasis is the key to the intelligent building. *Intelligent Buildings International*: 1-5.

Brickner-Braun, I., D. Zucker-Milweger, et al. (2014). Ventilation of multi-entranced rodent burrows by boundary layer eddies. *The Journal of Experimental Biology* **217**(23): 4141-4148.

Turner, J. S. and B. Pinshow (2015). Transient-state mechanisms of wind-induced burrow ventilation. *The Journal of Experimental Biology* **218**(2): 170-175.

Petersen, Kirsten, Paul Bardunias et al. In press. Arrestant property of recently manipulated soil on *Macrotermes michaelseni* as determined through visual tracking and automatic labeling of individual termite behaviors. *Behavioural Processes*.

Turner, J. S. (submitted). Homeostasis and the physiological dimension of niche construction theory in ecology and evolution. *Evolutionary Ecology*.

Turner, J. S. (in press). Swarm cognition and swarm construction. Lessons from a social insect master builder. *Complexity, Cognition, Urban Planning and Design*. J Portugal and E Stolk (eds). Springer Proceedings in Complexity.

B. Non-refereed Publications

None

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

Homeostasis and the physiological dimension of niche construction theory in ecology and evolution. *Frontiers in Niche Construction: From Theory to Application in the Biological and Social Sciences*, Santa Fe Institute, Santa Fe, New Mexico. November 10 - 12, 2014.

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

Purpose and Desire. Biology's Second Law. Caray Institute for Ecosystem Studies. Millbrook, New York. 5 February 2015.

Introduction. Depolarizing the Environment. Conversations in the Disciplines. SUNY ESF, 13-14 February 2014.

Homeostasis and the physiological dimension of evolution. Kenyon College. 26 March 2015

V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

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

None

2. Industrial and Commercial Groups, etc.

Consultant on project "*Proof of concept: A termite-inspired "humidity sponge."*

Terrapin Bright Green and Freeform Construction, with NYSERDA.

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

*Member.* Science Advisory Board. Cheetah Conservation Fund.

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)

*Bio-Complexity*

*Intelligent Buildings International*

Other (books, symposia, etc.)

Responsibility

Editorial board

Guest editor to special issue on biomimetic architecture

b. Reviewer

<u>Journal(s)</u>	<u>No of manuscripts</u>
<i>Journal of Arid Enviroments</i>	2
<i>Comparative Biochemistry and Physiology</i>	1
<i>Biology and Philosophy</i>	1
<i>Proceedings of the Royal Society</i>	2
<i>Journal of Biomechanics</i>	1
<i>Insectes Sociaux</i>	1
<i>Journal of Experimental Biology</i>	2
<i>Intelligent Buildings International</i>	3
<i>Journal of Thermal Biology</i>	3
<i>Biology and Philosophy</i>	1

Agency

No. of proposals

Other

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.

Date

Place

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

D. Foreign Travel (Where, When, Purpose)

Manchester, UK. September 2014. To confer with research partners.

Namibia. April 2015. To conduct field research

**VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)**

A. Department-level

B. College-level

*Chair*, Technology Committee.

*Member*. Executive Committee.

*Member*, Planning committee for Conversations in the Disciplines.

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.

- 1 EFB 200 Physics of Life was offered for the sixth time. Its enrollment continues to be strong. Last June, I offered an online version of the course during Summer Session 2. Enrollment was modest.
- 2 EFB 462 was offered for the first time in Fall as a fully online course. The course itself was successful, but my planned supplemental recitation did not draw enough students to make it viable. Instead, I offered a weekly "Physiology Table" at Gateway Center, which drew a small, but faithful participation. Production for Animal Physiology Online continues.
- 3 Work continued on my research project funded by the Human Frontiers Science Program (HFSP), for which I am the Principal Investigator. We conducted a major research expedition to Namibia in April 2015, during which time we had as many as 16 members of our research team. We are currently in Year 3 of the project, and we intend to ask for a no-cost extension to carry the work on for a fourth year.
- 4 I am a subcontracting scientist on a newly funded grant from the National Institutes of Health awarded to Drs Justin Werfel and Radhika Nagpal of Harvard University. This proposal will bring in more than 4500k over the next five years. The project explores the behavioral interactions between termites and soils, with the goal of being able to program semi-autonomous robot swarms to do construction.
- 5 I am a subcontracting scientist on a newly funded grant from the National Science Foundation awarded to Dr Andrea Surovek of the South Dakota School of Mines. The project is concerned with mechanical engineering of termite inspired structures. My role is to serve as a scientific advisor and to aid in the development of international research experiences for undergraduates.
- 6 I was a facilitator for the October 2014 visit by several students in Landscape Architecture (under the direction of Drs Margaret Bryant and Matt Pottieger) to the Cheetah Conservation Fund (CCF) in northern Namibia. This was to further the ongoing Memorandum of Understanding between ESF, Ben Gurion University, the National Museum of Namibia and the Cheetah Conservation Fund in Namibia.
- 7 I continue filming and production of an online biophysical field methods course (shot on location in Namibia) with Prof Berry Pinshow of Ben Gurion University.
- 8 While in Namibia in April, I began negotiations with the Gobabeb Research and Training Centre (Namib desert), the Cheetah Conservation Fund (CCF) and the Polytechnic of Namibia for a research education consortium in cooperation with several international partners, including Harvard University, Ben Gurion University, Nottingham Trent University and the South Dakota School of Mines.
- 9 I have served as chair of the newly established standing Committee on Technology. We continue our work. This last year, we offered six Brown-Bag Workshops for ESF faculty and staff.
- 10 As part of my chairmanship of the Technology Committee, I serve as a member of the Executive Committee of Faculty Governance.
- 11 I served on the planning committee for the February 2015 *Conversations in the Disciplines: Depolarizing the Environment*. I was instrumental in recruiting our national speaker, Dr Steven Hayward.

**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)**

- 1 I have completed the book project that was begun during my sabbatical in 2010 (working title: *Purpose and Desire. Biology's Second Law*), and I am in discussions with publishers.
- 2 I hope to develop the research / education consortium described above.
- 3 I have been invited to write a review for the *European Journal of Physics* on the Physics of the Organism-Environment Interface.
- 4 I have been invited to participate in the Villefranche Conference on the Singularity in July.
- 5 I intend to finish production on my joint online course (with Prof Berry Pinshow, Ben Gurion University) *Biophysical Field Methods Online*, and launch it by the end of the 2015 calendar year.
- 6 I will begin planning for my next sabbatical leave. Possibilities include stints as a visiting scholar at the Stellenbosch Institute for Advanced Study, the Santa Fe Institute, or the Polytechnic of Namibia.

**B. PROJECTED ACTIVITIES FOR NEXT YEAR**

1. Summer 2015

- a. Course(s) to be offered
  - EFB462 Animal Physiology Online
  - EFB 200 Physics of Life (online)
- b. Proposed research activity
  - Continue work on HFSP project
  - Continue work on NIH project
  - Continue work on NSF project
- c. University, professional society, and public service
  - Begin my second term as Chair of the campus governance Technology Committee.

2. Fall Semester 2015

- a. Course(s) to be offered
  - EFB462 Animal Physiology Online
  - EFB 200 Physics of Life
- b. Proposed research activity
  - Continue work on HFSP project
  - Continue work on NIH project
  - Continue work on NSF project
- c. University, Professional society, and public service
  - Continue my second term as Chair of the campus governance Technology Committee.

### 3. Spring Semester 2016

a. Course(s) to be offered

none planned at present

b. Proposed research activity

Continue work on HFSP project

Continue work on NIH project

Continue work on NSF project

c. University, professional society, and public service

Continue my second term as Chair of the campus governance Technology Committee.