

ANNUAL REPORT: June 1, 2015 – May 31, 2016
(i.e., Summer 2015, AY 2015-2016)
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	20	0
	EFB462	Animal Physiology	3	5	0
FALL:	EFB200	Physics of Life	3	148	0
	EFB462	Animal Physiology	3	33	0
	EFB662	Animal Physiology	3	2	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>
SPRING	EFB496	Design With/In Nature (with Dr Margaret Bryant)	3	1

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).
 Tiffany Deater, PhD, 2014.

MAJOR PROFESSOR

CO-MAJOR PROFESSOR

Tiffany L Deater, PhD, Sept 2014

MEMBER, STEERING COMMITTEE (other than those listed above)

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

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)

Source	<i>Title</i>	<i>Amount</i>	<i>Current year</i>	<i>Award period</i>	<i>Graduate Assistants supported</i>
Human Frontiers Science Program	<i>From swarm intelligence to living buildings. Novel concepts of managing internal climates</i>	<i>\$1,350,000</i>	<i>3</i>	<i>December 2012 to November 2016</i>	<i>1</i>
National Institutes of Health	<i>Modeling termite construction behavior</i>	<i>\$594,343</i>	<i>1</i>	<i>September 2014 to August 2019</i>	<i>1</i>
National Science Foundation	<i>Biomimicry in Structural Topology: Manifesting Adaptable and Integrated Structural Form through Agent Based Modeling of Macrotermes Mounds</i>	<i>\$449,384</i>		<i>August 2015 to August 2018</i>	<i>0</i>
Centre for Nature Inspired Engineering	<i>Self-organizing urban design Calibrating analogues against scales.</i>			<i>June 2016-December 2016</i>	

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

Source	Title	Amount	Current year	Award period	Graduate Assistants supported
ICOB National Science Foundation	<i>ICOB Concepts of Gas Exchange in Animal Burrow Systems</i>	\$620,428	0	September 2015 to September 2018	0
PEER (USAID)	<i>Livestock behavioral adaptation to increasing temperatures in arid-land farming systems</i>	\$147,000		January 2017 to December 2019	0
SNAPP	<i>Synthesized Accounts of Natural Grazing Attributes of Livestock for climate-smart agricultural production</i>	\$150,000		January 2017 to December 2019	

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. (in press). *Purpose and Desire. Biology's Second Law*. New York, HarperOne.

Turner, J. S. (2016). Homeostasis and the physiological dimension of niche construction theory in ecology and evolution. *Evolutionary Ecology* 30(2): 203-219.

Turner, J. S. (2016). Swarm cognition and swarm construction. Lessons from a social insect master builder. *Complexity, Cognition, Urban Planning and Design*. J. Portugali and E. Stolk. Berlin, Springer: 111-126.

Turner, J. S. (2016). Semiotics of a superorganism. *Biosemiotics* 1: 1-18.

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*.

Adams, A. M., E. Marais, et al. (in press). Similar burrow architecture of three arid-adapted scorpion species implies similar ecological function. *The Science of Nature*.

B. Non-refereed Publications

None

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

The Singularity. VilleFranche Conference. June 2015. Nice, France.

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

Termites as models of swarm cognition. CoCo/EvoS joint seminar. Binghamton University. 1 February 2016.

Life in the transients. Center for Environmental and Applied Fluid Mechanics. Johns Hopkins University. 12 February 2016

V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

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

None

2. Industrial and Commercial Groups, etc.

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

Member. Science Advisory Board. Cheetah Conservation Fund.

Member. Jury Panel Option Studio on Biosynthetic Robotoc Fabrication: Digital Handcraft and Weird Tectonics. Cornell University School of Architecture. 14 May 2016

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

<i>Journal(s)</i>	<i>No of manuscripts</i>
<i>Current Environmental Engineering</i>	1
<i>Biology and Philosophy</i>	1
<i>Comparative Physiology and Biochemistry</i>	1
<i>Philosophy and Technology</i>	1
<i>Interface. Journal of the Royal society</i>	1
<i>Nature</i>	1
<i>Oxford University Press</i>	1
<i>Acta Biotheoretica</i>	1
<i>Biology and Philosophy</i>	1

<i>Agency(s)</i>	<i>No of manuscripts</i>
<i>John Templeton Foundation</i>	1
<i>National Science Foundation</i>	1

Other

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
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C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.

D. Foreign Travel (Where, When, Purpose)

Namibia. March 2016. To conduct field research

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

B. College-level

Chair, Technology Committee.

Chair, Presidential Advisory Group: *Building a Culture of Media at ESF*.

Member, Executive Committee.

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 seventh time. Its enrollment continues to be strong. Last July, I offered an online version of the course during Summer Session 2. Enrollment was modest.
- 2 EFB 462 Animal Physiology continued to be offered as a fully online course, in Fall and in Summer Session 1. Enrollment continues to be strong, but participation in the supplemental recitation again did not draw enough students to make it viable. Production for Animal Physiology Online continues. I am also offering the course on udemy.com
- 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 March 2016. We are currently in Year 4 of the project, under a no-cost extension from HFSP.
- 4 I am a subcontracting scientist on a 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 \$450k 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 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. We undertook our first field expedition in March 2016.
- 6 I undertook a new joint course with Dr Margaret Bryant (LSA) titled *Design With/In Nature*. The purpose of the class was to explore the phenomenon of design from the perspectives of a biologist and an architect. Enrollment was 22, mostly drawn from LSA students.
- 7 I launched a new hybrid online/field course, *Biophysical Field Methods*, in collaboration with Prof Berry Pinshow (Ben-Gurion University of the Negev), Dr Eugene Marais (National Museum of Namibia) and Dr Gillian Maggs-Kölling (Gobabeb Desert Research and Training Centre, Namibia). The course has an onloine component, which culminates in a capstone field research experience at the Gobabeb Desert Research and Training Centre in Namibia. The course consisted of students from ESF, Ben-Gurion University, the National University of Science and Technology (Namibia), University of the Northwest (South Africa), and the Ministry of Environment and Tourism (Namibia).
- 8 I was an invited participant in the VilleFrache conference on The Singularity, in Nice, sponsored by Peter Thiel (PayPal) and David Berlinski. This was an exclusive group of thought leaders.
- 9 I continued to serve as chair of the standing Committee on Technology. 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 was chair of the Presidential Advisory Group on Building a Culture of Media at ESF. Our report was delivered to the President in April 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)

- 1 My third book (working title: *Purpose and Desire. Biology's Second Law*) will be published in September 2017 by HarperOne, an imprint of HarperCollins. My summer will be devoted to delivering the finished manuscript to the publishers in September 2016.
- 2 I will be on sabbatical leave from January through August 2017. Two months will be spent at the Gobabeb Desert Research and Training Centre in Namibia, and six months will be spent as a Resident Fellow at the Stellenbosch Institute for Advanced Study (STIAS) in Stellenbosch, South Africa. While in Namibia, I intend to carry out experimental work related to a developing new research theme called *Life in the Transients*. I also hope to develop an online short course in *Paleoclimates*, featuring Dr Eugene Marais of the National Museum of Namibia. While at STIAS, I will begin work on my fourth book, with the working title *Life in the Transients*.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2016

- a. Course(s) to be offered
 - EFB 462 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
 - Wrap up my second term as Chair of the campus governance Technology Committee.
- d. Other
 - Deliver finished manuscript of *Purpose and Desire* to HarperOne.

2. Fall Semester 2016

- a. Course(s) to be offered
 - EFB 462 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

3. Spring Semester 2017

- 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
None
- d. Other
Sabbatical leave, January through August 2017