

ANNUAL REPORT: June 1, 2009 – May 31, 2010
(i.e., Summer 2009, AY 2009-2010)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: J Scott Turner

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

| | <i>Course number</i> | <i>Title</i> | <i>Credhrs</i> | <i>No of students</i> | <i>No of lab sect</i> |
|----------------|----------------------|--|----------------|-----------------------|-----------------------|
| SUMMER: | | | | | |
| FALL: | EFB 200 | <i>Physics of Life</i> | 3 | 129 | |
| | EFB 462 | <i>Animal Physiology: Environmental & Ecological</i> | 3 | 73 | - |
| | EFB 662 | <i>Animal Physiology: Environmental & Ecological</i> | 3 | 5 | - |
| 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. EFB courses currently listed with service-learning components include: 416/6/1, 486, 518, 521, 532, 446/646.

None

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

| | <i>Course number</i> | <i>Title</i> | <i>Credhrs</i> | <i>No of students</i> | <i>No of lab sect</i> |
|----------------|----------------------|---------------------------------|----------------|-----------------------|-----------------------|
| SUMMER | EFB 899 | <i>Masters Thesis Research</i> | 1 | 1 | |
| FALL: | EFB 420 | <i>Internship</i> | 3 | 1 | |
| | EFB 899 | <i>Masters Thesis Research</i> | 3 | 1 | |
| | EFB 999 | <i>Doctoral Thesis Research</i> | 1 | 1 | |
| SPRING: | | | | | |

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

None

4. Guest Lecture Activities

None

| Course No. | Title | No. of Lectures |
|------------|-------|-----------------|
|------------|-------|-----------------|

II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor 27 and unofficial advisor I have no idea what this means

B. Graduate Students: (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

| Name | Degree sought | Starting date (Mo & Yr) | Degree completed? | Thesis or dissertation citation |
|------------------|---------------|-------------------------|-------------------|---------------------------------|
| Wendy Park | PhD | Jan 2004 | No | N/A |
| Benjamin Robedee | MSc | Sep 2008 | No | N/A |

CO-MAJOR PROFESSOR

None

MEMBER, STEERING COMMITTEE (other than those listed above)

I'm away from my files. Can't the OIGS provide these data?

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Bernd Freymann. PhD. University of Groningen. Groningen, The Netherlands.
For ESF, I'm away from my files. Can't the OIGS provide these data?

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 | Title | Amount | Current year | Award period | Graduate Assistants supported |
|------------------------------------|--|-----------|--------------|----------------------------|-------------------------------|
| National Geographic Society | <i>Mound building termites and the water economy of southern African arid savannas</i> | \$19,500 | 1 | August 2008 to August 2009 | 0 |
| US Army Research Office | <i>Collective structural defense of the mound-building termites of the genus Macrotermes</i> | \$300,000 | 2 | June 2008 to May 2011 | 1 |
| John C Templeton Foundation | <i>Biology's Second Law: Evolution, Purpose and Desire</i> | \$50,000 | 1 | 2 years | - |

2. Research Proposals pending (include information as in B.1., above).
None

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

| Source | Title | Amount | Current year | Award period | Graduate Assistants supported |
|------------------------------------|---|-----------------|--------------|--------------|-------------------------------|
| National Science Foundation | <i>PIRE: A termite-inspired center of excellence in Namibia</i> | \$2,500,000 | Rejected | 5 years | 3 |
| National Science Foundation | <i>The water economy of the mound building termites of southern African arid savannas</i> | About \$500,000 | Rejected | 3 years | 2 |

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

J S Turner. 2010. *The Tinkerer's Accomplice. How Design Emerges from Life Itself.* Seidosha.

J S Turner and R C Soar. 2010. Beyond biomimicry. What termites can tell us about realizing the living building. Chapter 15 in: *Industrialised, Integrated, Intelligent sustainable Construction.* ISBN 978-0-86022-698-7. Ian Wallis, Lesya Bilan, Mike Smith & Abdul Samad Kazi (eds). I3CON/BSRIA. London.. pp 233-248.

J S Turner. Submitted. Termites as models of swarm cognition. *Swarm Intelligence.* Invited contribution to special volume on swarm cognition.,

J S Turner, R M Soar, E Marais, G Shihepo. In press. Insolation and morphogenesis of the mound of *Macrotermes michaelseni*. *Cimbebasia Memoirs* (in press)

J S Turner. In press. Water dynamics of mound building and repair for *Macrotermes michaelseni*. *Cimbebasia Memoirs* (in press)

J S Turner, W L Park, E Marais, A Mudengi, M Vinte. In press. Observations on water, soil movements and mound reconstruction in *Macrotermes michaelseni* colonies in northern Namibia. *Cimbebasia Memoirs* (in press)

J S Turner and E Marais. In press. The annual variation of temperature in the mound and nest of *Macrotermes michaelseni* in northern Namibia. *Cimbebasia Memoirs* (in press)

J S Turner. In press. Observations on annual variation of moisture in the mound and nest of *Macrotermes michaelseni* in northern Namibia. *Cimbebasia Memoirs* (in press)

J S Turner. In press. Agents of biological design. Why are living things well-crafted for the things they do? *Proceedings of the Retrospective Symposium on the Wistar Conference on Mathematical Challenges to the Neodarwinian Interpretation of Evolution.* Discovery Institute.

B. Non-refereed Publications

The following are video productions created for EFB 200 Physics of Life.

Production videos

| | | |
|--|--|--------------------------|
| <i>Succulents and Flow</i> | <i>The Reynolds Number and Flow Around Objects</i> | <i>The Maple Samara</i> |
| <i>Fireworks</i> | <i>The Falling Bodies Experiment</i> | <i>The Frill is Gone</i> |
| <i>The Structure of Natural Sounds</i> | | |

Full length lectures

Thermodynamics of Gaia

Video lectures

| | | |
|----------------------------------|--------------------------------------|------------------------------------|
| <i>The Radiant Energy Budget</i> | <i>Waves</i> | <i>Light</i> |
| <i>The Reynolds Number</i> | <i>Density of Fluids</i> | <i>Solid and Fluid Materials</i> |
| <i>Flexural Stiffness</i> | <i>Fun with the Young's Modulus</i> | <i>Stress and Strain</i> |
| <i>Unit Conversions</i> | <i>Cantilevers in Animals</i> | <i>Rotational Motion</i> |
| <i>Moments of Inertia</i> | <i>The Maple Samara (2)</i> | <i>Cantilevers</i> |
| <i>Mass, Weight and Pressure</i> | <i>Forces Acting on Solids</i> | <i>Torque and Angular Momentum</i> |
| <i>Energy and Work</i> | <i>Center of Mass</i> | <i>Force, Work and Power</i> |
| <i>Units and Dimensions</i> | <i>Units as an Experimental Tool</i> | <i>Conservation of Momentum</i> |
| <i>SI Units</i> | <i>Newton's Laws of Motion</i> | <i>History of Unit Systems</i> |

C. Papers presented at Scientific Meetings (give title, date, occasion, and location):

The Water Economy of *Macrotermes* colonies. University of Groningen. Groningen, The Netherlands. 11 September 2009. About 50 people in attendance.

Termite Mounds as Models of Swarm Cognition. Lessons for Realizing the Living Building. In symposium on *From Insect Nests to Human Architecture*. Venice, Italy. 23 September 2009. About 50 people in attendance.

The Intentional Brain. Department of Neuroscience, Michigan State University. 28 October 2009. About 100 people in attendance.

New Concepts in Termite-Inspired Design. *Social Biomimicry Conference*. Arizona State University. 18-21 February 2010. About 200 people in attendance.

Do Cheaters Prosper? Sordid Society and Public Good in Termite Colonies. SUNY Conversations in the Disciplines. Cornell University. 16 October 2009. About 50 people in attendance.

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

The Termite Cube (exhibition). *Pestival. The Art of Being an Insect*. Royal Festival Hall. Southbank Centre, London, UK. <http://pestival.org/> 5-8 September 2009. Attendance about 100,000.

Numerous informal presentations at *Pestival. The Art of Being an Insect*. Royal Festival Hall. Southbank Centre, London, UK. <http://pestival.org/> 5-8 September 2009. Typically 30 people at any event.

The Air Conditioned Termite Nest Revisited. Presentation at *Pestival. The Art of Being an Insect*. Royal Festival Hall. Southbank Centre, London, UK. <http://pestival.org/> 5 September 2009. App 200 people
Beyond biomimicry: What termites can tell us about realizing the living building. Namibia Institute of Architecture, Windhoek, Namibia. 31 May 2009.

V. PUBLIC SERVICE

23 Funded Service (include consulting activities)

None

23 Government Agencies (Federal, State, Local):

None

2. Industrial and Commercial Groups, etc.

Mostly interviews, consultation, with media groups

John Farrell Media. Interview

American Freedom Alliance. Workshop on Design

BBC Natural History Unit (Consultation with multiple units)

BBC XFM (interview broadcast at Pestival)

Ardman Productions (London)

CNN International

Victoria Bezemer

Natural History magazine

Featured in New Scientist article on biomimetic architecture

Conservation magazine

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

None

VI. PROFESSIONAL DEVELOPMENT

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

None

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

None

2. Professional Society Membership

None

23 Other Professional Activities

23 Editorial activity

Journal (s)

Bio-Complexity

Responsibility

Editorial Board Member

Other (books, symposia, etc.)

Co-editor (with Guy Theraulaz and Michael Weinstock). *From Insect Nests to Human Architecture*. University of Chicago Press.

b. Reviewer

| <i>Journal(s)</i> | <i>No of manuscripts</i> |
|---|--------------------------|
| <i>Oikos</i> | 1 |
| <i>Proceedings of the Royal Society of London. B. Biological Sciences</i> | 1 |
| <i>Climatic Change</i> | 1 |
| <i>Zoological Society of London</i> | 1 |
| <i>Harvard University Press</i> Book proposal | 1 |
| <i>Agency</i> | <i>No of proposals</i> |
| <i>US-Israel Binational Science Foundation</i> | 1 |
| <i>National Science Foundation</i> | 2 |
| <i>National Geographic Society</i> | 1 |

c. Participation (workshops, symposia, etc.)

| <i>Name of workshop, etc</i> | <i>Date</i> | <i>Place</i> |
|---|---------------------|----------------------------|
| <i>Insect-Inspired Architecture. Symposium during Festival. The Art of Being and Insect</i> | 5-8 September 2009 | London, UK |
| <i>Termite biology. Mini-symposium on promotion of Dr Bernd Freyemann</i> | 11 September 2009 | Groningen, The Netherlands |
| <i>From Insect Nests to Human Architecture</i> | 23 September 2009 | Venice, Italy |
| <i>SUNY Conversations in the Disciplines.</i> | 16 October 2009 | Ithaca, New York |
| <i>Social Biomimicry</i> | 18-21 February 2010 | Phoenix, Arizona |

C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.
None

D. Foreign Travel (Where, When, Purpose)

| <i>Where</i> | <i>When</i> | <i>What purpose</i> |
|----------------------------|---------------------------------|---|
| London, England | 3-6 September 2009 | Participation in <i>Pestival. The Art of Being an Insect</i> |
| Nottingham, England | 7-9 September 2009 | Planning meeting with project partners on US Army Research Office grant on swarm cognition |
| Cambridge, England | 10 September 2009 | Planning for sabbatical leave |
| Groningen, The Netherlands | 11-13 September 2009 | To be a reader in the Promotion (PhD defence) for Dr Bernd Freymann To give a seminar at University of Groningen |
| Venice, Italy | 22-27 September 2009 | Participation in symposium <i>From Insect Nests to Human Architecture</i> |
| Cambridge, England | 14 January 2010 to 30 June 2010 | Sabbatical leave at Cambridge University. |
| Namibia | 3 March 2010 to 3 April 2010 | Ongoing work for National Geographic and US Army Research Office projects on <i>Macrotermes</i> biology in northern Namibia |

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

None

B. College-level

SU Senator (Fall 2009)

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 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, which I'll continue to award based on your contributions to the department and college this reporting period.

- 1 I launched EFB 200 Physics of Life. The course had an initial enrollment of 140, which dropped to 129 by the end of the semester. Part of this launch involved delivering electronic course materials through a variety of media. For this, I produced, along with the staff at ITS, 35 short instructional videos, which are available to students on iTunesU and the ESF channel on YouTube. A fuller retrospective is given on a "post-mortem" video production that was distributed to the Chair and relevant administrators in January 2010. I left on sabbatical before I could get the evaluations. However, informal feedback was very positive. Likewise, I am unsure at this point of the hoped-for impact on accessory instruction.
- 2 I was awarded a grant from the John C Templeton Foundation to fund my sabbatical leave at Cambridge University, where I am writing my third book. Since January 2010, I have been in residence in St John's College

at Cambridge. I have completed four chapters of an expected ten. By the time my sabbatical in Cambridge is finished, I expect to have completed five. By the time the Fall 2010 semester commences, I expect to have completed seven.

- 3 My work on termite architecture and biological design continues and continues to attract media attention. Some of these are outlined in the body of the report above.
- 4 I was promoted to Professor effective September 2009.

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 intend to complete the manuscript of my third book by the end of the calendar year.
- 2 I will be overseeing the completion of the edited book *From Insect Nests to Human Architecture*. (co-editors Guy Theraulaz and Michael Weinstock)
- 3 I will continue development of electronic content for EFB 200 Physics of Life.
- 4 I will be continuing my ongoing research in termite colony structure and function in Namibia.
- 5 I will be trying to persuade the College to establish an international campus in Namibia.

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2009

a. Course(s) to be offered
None

b. Proposed research activity
Ongoing work on US Army funded research in termites

c. University, professional society, and public service
Advising the John C Templeton Foundation Board of Advisors on question: What is Life?
See proposal for *From Insect Nests to Human Architecture* volume to acceptance.

2. Fall Semester 2009

a. Course(s) to be offered
EFB 200 Physics of Life
EFB 462/662 Animal Physiology

b. Proposed research activity
Complete manuscript of third book
Complete compilation of papers for *Cimbebasia* special edition
Prepare *From Insect Nests to Human Architecture* for publication.

c. University, Professional society, and public service

3. Spring Semester 2010

- a. Course(s) to be offered
none currently planned
- b. Proposed research activity
Research expedition to Namibia.
- c. University, professional society, and public service