

***Department of Biological Science***

## The Florida State University

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February 15, 2019

Robert O. Lawton Distinguished Professorship Committee

Florida State University

Dear Colleagues:

It is with the greatest pleasure that we nominate Professor Thomas Miller for the Robert O. Lawton Distinguished Professorship. Tom is a member of the Department of Biological Science in the College of Arts and Sciences. We know Tom very well as a valued colleague and as a mentor, but have not collaborated with him in research. Here we provide an overview that describes the scholarly disciplines in which Tom has worked and summarizes the evidence of Tom’s excellence that you will read in his credentials and in the letters supporting this nomination. We then discuss the highlights of Tom’s career and his current work in scholarship, instruction, and service. The letters and evidence supporting this nomination come from diverse perspectives: prominent faculty scholars in the fields of Biology, Oceanography/Microbiology, History and Education from the US and abroad. We note that with this year's change in the materials we may submit in a Lawton nomination, we are unable to include many of the letters of support that accompanied his nomination last year. To represent the views of all those who volunteered their time to write passionate letters in support of Tom, and particularly his former students, we include quotes from those letters in this nomination and in the highlights of Tom’s teaching and service accomplishments. We, along with all those who wrote letters for Tom, consider Tom to be exactly what an outstanding faculty member ought to be. He well deserves the honor of this award.

*Overview*

Tom Miller is an Ecologist and Evolutionary Biologist, with a particular focus on the field of Community Ecology. Tom is not just a leader in *his* field, but as the letters in his binder attest, he is known for changing perceptions of dominant paradigms in *multiple* fields by using powerful combinations of ideas from disparate traditions. There are two reasons for this formidable reputation. First, he has promoted ideas that most of those in the field had overlooked and shown them to be vitally important. The best example of this is his leading role in integrating evolutionary biology into community ecology. Second, he has used elegant, innovative experimentation to assess the empirical importance of theoretical concepts that others deemed too challenging to study. The best examples of this are his work on indirect effects in ecology and his studies of what ecologists call “metacommunities.” His letters from outside experts testify to these strengths. Professor McPeek points out that Tom “was one of the few people at the time (early 1990’s) who was thinking explicitly how evolutionary processes might shape the interactions among species and conversely how those interactions drive the structure of communities.” Professor Amaresekare writes that Tom “belongs to a rare group of individuals whose work spans an impressive range of conceptual breadth… making him a ‘Jack of all trades and master of many”. We elaborate on these themes in the section on Scholarship below.

Tom also has an absolutely extraordinary record as a mentor; his thoughtful and active guidance have not only successfully launched the careers of his own students but have also been major drivers of the success of the FSU Ecology and Evolution graduate group as a whole. Tom has exercised a pivotal influence on our group. He leads by example to foster the open and collaborative atmosphere that has attracted top-notch faculty and graduate students to our program. He has also influenced graduate students in other programs at FSU, for example through his leadership of a National Science Foundation-funded interdisciplinary training grant in the History and Philosophy of Ecology and Evolution.

Tom has an extensive service record. He has engaged in important internal service here at FSU in many leadership roles within his department, College and the University such as leading a major cross-departmental hiring initiative and service on internal grant panels. Tom has also provided far-reaching external service to his discipline through service on the editorial boards of many of the top journals in his field and on federal grant review panels where, as noted by Tom's former student, Dr. Jamie Kneitel (Professor, California State University Sacramento), Tom was “the person to whom everybody else turned for advice.”

*Scholarship*

Tom works in community ecology, which is one of the most difficult branches of ecology because it focuses on the complex network of interactions among all of the species found in a particular habitat. Community ecologists seek to understand how the variety of species in an area assemble, how stable those assemblages are, how they respond to external disturbances, and how the diversity and composition of species provide the essential services that humans rely on such as clean water and agricultural pest control.

Because of the complexity of these systems, community ecology requires using both painstaking field experimentation and sophisticated mathematical modeling tools. Tom is one of the few researchers who really masters both of these approaches; this was expressed particularly well in the letter from Professor Amaresekare as she describes Tom’s “…truly synthetic and integrative approach…” and his “…simultaneous achievement of breadth and depth - an achievement as difficult as it is rare.”

Tom excels in addressing critical ideas in ecological theory with innovative experiments. Professor Ellison wryly expresses this in his letter, pointing out that “Tom has meticulously tested key theories of evolutionary ecology, found many of them *in need of revision* [italics ours, a polite way of saying “wrong”], and used field data from several systems…to expand and improve these theories.” Professor Ellison points to several papers illustrating Tom’s accomplishments. Time and again the outside letter writers refer to Tom’s exceptional skill at bringing data to bear on theory, or, in the words of Professor Estes (Distinguished Professor and National Academy member, University of Santa Cruz), Tom’s “evidentiary excellence." Critically, Tom has mastered experimental work in two extremely different types of organisms (plants and microbes). The letter from Professor Mason details the remarkable collaboration between herself (a microbiologist) and Dr. Miller. As the letter from Professor Travis attests, Tom's versatility and influence across disparate disciplines put him in the company of a handful of illustrious and internationally recognized ecologists.

Tom has brought his exceptional skills to bear to influence the discipline in three areas. First, he was a leader in convincing ecologists that so-called indirect effects were critically important in communities. Professor Travis’s letter is focused on this part of Tom’s work and we refer you to its detailed discussion. Second, Tom’s work made a theoretical construct, the metacommunity, empirically approachable. The idea here is that a single community does not exist in isolation from others and that communities can be connected by the movement of individuals or nutrients across what is often a considerable spatial area. Tom has been a leader in discovering the actual dynamics of real metacommunities; the letters from Professors Amaresekare and McPeek describe Tom’s important work in this area in detail. Third, Tom recognized long before most of his colleagues the importance of evolutionary processes in community ecology. The letters from Professors McPeek and Schmitz describe this facet of Tom’s work. As Professor Schmitz writes, Tom “has been at the forefront of advancing this new kind of system thinking.”

The most synthetic discussion of Tom’s work is in the letter from Professor Gravel, who covers all of these areas in detail, pointing to key papers for each of his points. Professor Gravel highlights, in particular, Tom’s investigation of community turnover in the microbial communities of pitcher plants from Florida to the Yukon as “the most extensive empirical study of large scale variation in food web structure” (Buckley et al. 2010), and his critical assessment of unquestioned theory in the discipline (e.g. Miller et al. 2005) as a prime example of how to make use of theory in science.

The *curriculum vitae* offers ample evidence of Tom’s intellectual leadership. Professor Schmitz’s letter reviews his publication record and describes the impact of Tom’s extensive publication list. A further measure of Tom’s continuing influence is his recent funding success. Tom not only sought funding for his own research, securing nine independent NSF grants, among other awards, to support his research. He also applied for and received support for a novel program for graduate students (a History and Philosophy of Science training grant,), and awards that specifically supported undergraduate (REU) and graduate (DDIG) research.  He was co-PI on a project to investigate pitcher plant biodiversity funded through the Dimensions of Biodiversity program, an extremely competitive interdisciplinary program at NSF.  Tom has been able to acquire external support not only for his own research, but for larger programs and efforts that have benefitted and trained many students.

*Instruction and Mentoring*

Tom has made pivotal contributions to teaching, not just in his own lab, classroom and department, but also through outreach and collaboration with faculty in Science Education. One line of evidence for Tom’s excellence in instruction is the teaching awards he has won at FSU, both graduate and undergraduate. It is notable that both letters from former undergraduate and graduate students (now quoted in the Teaching Highlights list) and faculty letters (see e.g. the letter from Dr. Gravel, faculty at Université de Sherbrooke) mention Tom’s excellence in the classroom. Dr. Gravel observed Tom teaching ecology during a visit to FSU and to this day uses a technique he learned from Tom in his own classes. Another line of evidence for Tom’s key contributions to the success of FSU undergraduates is the extraordinary number of undergraduate researchers he has hosted in his lab. Dr. Sarah Gray, BS in Biology from FSU, highlighted how effectively Tom works with these students, encouraging them in independent work and career development. We know from talking to our undergraduates the high esteem they have for Tom. Finally, Tom has also served our undergraduates and the larger community through sustained involvement in FSU programs such as FSU-Teach and outreach to local schools; these contributions are detailed in the letters from Dr. Southerland of the FSU College of Education and Dr. Granger of the FSU Office of Science Teaching Activities and AAAS Fellow.

The most important line of evidence of Tom’s exceptional contributions as a mentor is the success and testimony of his former students. In letters they wrote for a previous Lawton nomination (now quoted in the Teaching Highlights list), all of them pointed out the enormous amount of personal attention that Tom lavishes on his students and the lasting influence he has not just on their careers but on how they think. For example, Associate Professor Jean Burns (Case Western Reserve University) describes Tom as “one of the most dedicated mentors I have witnessed in the last 20 years.” She continues to write “Tom is my academic hero. As a recently tenured professor, I have modeled my approach to scholarship, teaching, mentoring, and service on what I learned from Tom during my graduate career. The numerous students I have trained have Tom to thank for setting the bar high for us all, both improving our science and our sense of scientific community and responsibility.” Dr. Sarah Gray, who began as an undergraduate student here in Tom’s lab, credits Tom as the inspiration for her entire career and writes that “In many situations professionally, I subconsciously ask myself, “What would Tom do?” It is particularly striking that Tom’s influence on his field through mentorship is noted not just in letters from his former students, but by the external letter writers as well (for example Dr. McPeek). It is also obvious that Tom is extremely successful at training new professional scientists. His graduate students and postdocs have virtually all gone on to faculty positions and are building very successful careers for themselves.

Tom has also contributed to teaching at the graduate level at FSU through two important outside training grants. One was a National Science Foundation grant to train graduate scientists in working with K-12 teachers, improving both the scientist’s abilities to teach and convey science to the public, and helping K-12 teachers and students elevate the level of science discussed in their classrooms. More unusually, Tom was the PI for a collaborative training grant between the Department of Biological Science and the FSU History and Philosophy of Science program. This innovative program paired graduate students from Biology and HPS to work on joint research projects, giving the biologists a much broader context for their work, and the HPS students hands-on training in science. In his letter of support for Dr. Miller's nomination last year, Co-PI Professor Fritz Davis (now R. Mark Lubbers Chair in the History of Science, Purdue University) states that "Tom was an excellent Primary Investigator for this project in that he kept the faculty, postdocs, and graduate focused on key goals: interdisciplinary research with a goal towards publication.... Tom regularly challenged the students (and faculty) to articulate the contribution of the work.... The work was demanding and at times quite challenging, but along with the graduate students, I feel as if the experience made me a better scholar and teacher." This program resulted in many presentations at conferences as well as several publications co-authored between Biology and HPS students – an extraordinary meeting of “the two cultures”. It is a testament to Tom’s intellectual curiosity and dedication to creating opportunities for students that he took on these projects.

Tom also has a pivotal influence on faculty in the Ecology and Evolution group. He is the voice of reason who speaks up to resolve differences in opinion at E&E faculty meetings. He sets an example by volunteering for extra administrative work in the group to be sure the burden doesn’t fall on pre-tenure faculty, for example taking part in some of the thankless and time-consuming organizational tasks associated with graduate admissions decisions. He creates the opportunities for interaction outside of our workday responsibilities that bring us together as a faculty, from coordinating a daily coffee break to routinely hosting receptions at his home to inviting all - faculty and graduate students alike - to participate in a yearly weekend survey of plant communities at St. George Island. These things sound inconsequential. They are not. Tom’s contributions to the collegial atmosphere of our department were directly influential in attracting both of us – years apart - to the university as faculty recruits, and have shaped our own approaches to mentoring and the practice of academia. Indeed, our most recent QER pointed out our remarkable record of faculty retention and we know that this record is, to a significant extent, generated by the atmosphere that Tom has helped create.

On a more personal note, we want to convey how extremely important Tom’s mentorship has been to our separate developmental trajectories as scientists and faculty members, and for the rest of the faculty that have come into our Ecology and Evolution graduate group since Tom arrived at FSU. Tom is the first person we go to for advice of all kinds (mentoring of students, writing of grant proposals and papers, making career decisions, etc.). He is always ready to listen and provide thoughtful guidance. His insistence on fostering the careers of junior faculty has created an extraordinarily collegial, collaborative and productive atmosphere in our graduate group and greatly improved the lives of his colleagues. This kind of influence on the field and the university is hard to quantify, but we assure you that it is enormous and critically important. The FSU E&E group is nationally known for its excellent atmosphere of collaboration and for the success of its junior faculty, and Tom is largely to thank for that.

*Service*

Tom’s service accomplishments speak to his tireless dedication to faculty development and graduate and undergraduate education at FSU, but also to the international scope of his research influence. Within FSU, he has served on the ad hoc committees of eight junior faculty in the Ecology and Evolution division of Biological Science, and chaired five of those committees. This means he played a major role in providing advice on advancement to tenure for these faculty members, and, when chair of those committees, in presenting details of that advancement to colleagues. Our division includes a total of 20 tenured or tenure-track faculty, and Tom’s key role in the careers of so many of our colleagues is a mark of both his influence and the high esteem in which we hold his advice. He was a member of the university-level Coastal Marine Research Steering Committee, and chaired the searches under this initiative that led to the successful recruitment of three new faculty to our department in recent years.

Nationally, Tom has influenced the direction of his field through service on ~20 NSF grant review panels for five different programs, which represent distinct funding initiatives within the foundation. He also served on the panel to design the National Ecology Observatory Network, through the American Institute of Biological Science, a visionary program that gathers and synthesizes biodiversity data on the impacts of climate change, land use, and invasive species, and makes this data freely available to ecologists to tackle questions they could not address on their own. Internationally, Tom has influenced research directions through five years of service on the Board of Reviewers for Canada Research Chairs, and through service on the editorial boards of five of the major academic journals in his field.

*Final Comments*

As you will see from the letters enthusiastically provided by members of his research field and by colleagues in other fields, Tom Miller has an extraordinary influence on his field not only through his exceptional research but also through the powerful influence he has on the quality of work of those around him. He certainly has the level of research excellence that the Lawton Award seeks to recognize; his consistent focus on pivotal and difficult research questions that cross disciplinary boundaries has resulted in a long history of acquiring very competitive federal funding and publishing in the best journals, publications that have shaped the direction of his field. All of his letters emphasize his extraordinary knack for boundary-crossing research that changes the way people think, describing his work with terms such as "novelty and ingenuity" and "synthetic and integrative" (Amresekare), "integrating ideas from outside the usual bounds" (McPeek), "deeply thoughtful, philosophical" (Schmitz) and "the importance of these papers cannot be overestimated" (Ellison). And, as the letters from Dr. Travis and Dr. Mason so nicely point out, Tom has managed to continue work in one major biological system (plants), while successfully mastering a second and completely different study system (microbial ecology). But Tom’s importance to his field and to FSU is far more than just his research contributions. His outstanding mentorship of students at all stages and of his faculty colleagues has strongly shaped the careers and thinking of people at FSU and beyond, making FSU and the field of Ecology stronger. As Dr. Schmitz put it in his letter “being an excellent researcher that enhances and promotes others ahead of themselves is the hallmark of someone who deserves recognition of distinction at a major research university.” We could not agree more, and we hope you will too.

Sincerely,

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| Nora Underwood  Professor, Biological Science | Emily H. DuVal  Associate Professor, Biological Science |