

Faculty Scholarship Standards
Department of Physics
Seattle Pacific University
Approved by Faculty Affairs Committee 4/4/11

1. Appropriate Types of Scholarship

The *Handbook* identifies four possible types of scholarship: the scholarship of discovery; the scholarship of teaching; the scholarship of application; and the scholarship of synthesis. The physics department recognizes three separate areas as acceptable areas of scholarship: traditional physics research; research in the learning and teaching of physics; and research in the professional preparation of teachers of physics. This is a parallel description and the next sections will work to map these three areas onto the four type of scholarship outlined in the faculty handbook. Often a single research project or research grant will cover more than one of these three areas of physics scholarship.

□ **Scholarship of Discovery.** Like other disciplines, physics prizes the creation and dissemination of new knowledge, and several venues exist for the dissemination of this new knowledge (journals, professional meetings, and academic publishers). Often discovery in traditional physics requires an extensive collaboration and a significant investment in infrastructure, which makes this form of scholarship particularly difficult at smaller institutions that have limited laboratory budgets and significant teaching loads. Discovery in the learning and teaching of physics involves basic research on how students learn physics and what specific instructional strategies are helpful in learning specific concepts. Discovery in the professional preparation of teachers of physics involves basic research on what influences teacher practice in the areas of physics and physical science.

□ **Scholarship of Teaching.** Within the field of physics nationally, research in the learning and teaching of physics and the professional preparation of teachers of physics are recognized as sub-disciplines equivalent to other sub-disciplines such as sub-atomic particle physics or condensed matter research. Therefore the scholarship of teaching is not considered an independent line of scholarly work; instead it is incorporated into the scholarship of discovery, application and synthesis in as far as these lines of inquiry shape the training of teachers and the incorporation of theory into curriculum.

□ **Scholarship of Application.** In traditional physics the scholarship of application focuses where the ideas, theories and data of physics are applied to practical use. This is usually at the interface between engineering and physics – not exactly the development of new technology but application of the scientific principles in new ways so that new technology can be developed. This is another type of new knowledge and physics prizes the creation and dissemination of this knowledge as well. In physics education, the scholarship of application focuses on the development of tools or resources for classroom use based on theoretical or empirical research results in the field. This could include, for example, curriculum development or modification, or

development of targeted assessment tools for use by classroom teachers. In the preparation and professional development of teachers of physics, scholarship of application focuses on creation or modification of activities or programs for pre-service and in-service teachers.

□ **Scholarship of Synthesis.** This type of scholarship happens in traditional physics with the integration of two or more separate theories into one new idea or theory. This is an active area of theoretical physics where many groups are trying to combine quantum mechanics and relativity to develop a Grand Unification Theory (GUT) or the Theory of Everything (TOE). Synthesis is also required when conducting research in the learning and teaching of physics; for example, this type of research can bring together knowledge of how the brain works with knowledge of how the physical universe works. Synthesis happens within the professional preparation of teachers of physics when the researcher incorporates the results from the work of scholars in other subject areas such as mathematics or biology into the preparation of teachers of physics or when advances in other disciplines such as cognitive science can yield insights into the preparation of teachers of physics.

2. Appropriate Kinds of Public Scholarly Products

Appropriate public scholarly products include articles in scholarly journals focusing on basic and applied research in physics or science education, invited or refereed conference presentations, and grant applications and reports. A particularly prized product of scholarly work is the winning of grants from nationally recognized science funding agencies such as the National Science Foundation (NSF), the World Health Organization (WHO), or regional trusts such as the Murdock Trust. These are prized because they are highly peer reviewed and the evaluation covers both the work being proposed as well as past work of the researcher and the environment in which the researcher works.

Single author journal articles are not common in any physics research as there is considerable emphasis on collaboration in the field and research programs are usually large and complex. First author publications in the most prestigious national and international journals are most highly prized. However, in light of the dominant representation in our guild of scientists at research universities and industry, we also highly value second authorship of articles in these journals or first or second authorship on a large range of peer reviewed journals. An equivalent recognition to “first author” is being the Principal Investigator (PI) on a research grant. Co-PI is similar to being second author on a journal article.

3. Appropriate Types of Peer-Review

The normative standard for peer-review in physics, whether in the scholarship of discovery, application, or synthesis, is anonymous peer-review by one or more scholars. Articles, books, and book chapters published by recognized academic journals or presses that have undergone peer-review prior to publication are presumed to have met

this standard. Funded grants from national funding organizations which incorporate peer review, such as the NSF, are also presumed to have met this standard.

4. Trajectory of a Productive Scholar

The SPU department of physics expects its tenured and tenure-track faculty to be active in the wider physics community as scholars. At a minimum, this means that a faculty member will be able to demonstrate an area of specialization in which he or she actively engages in program development, project leadership, publication, or grant work on an ongoing basis. Ideally this area (or areas) of specialization will be connected to the areas in which a faculty member teaches, and the faculty member will be able to show how his or her scholarly activities enrich the courses taught by the faculty member.

While project leadership and program development are not areas of scholarship that contribute directly to the increase in knowledge in physics, we consider these types of activities as appropriate and necessary for productive scholarship when they are focused on projects or programs that can serve as the laboratory in which the research is done.

Project leadership could include such activities as being the local representative of a national development effort (such as the PhysTEC project or the National Task Force on Teacher Education in Physics).

Program development could include such activities as the development of a new undergraduate or graduate degree or program specifically targeted at the needs of future science educators. Another example could be the development of a new study abroad/study away program focused on the needs of science students or future science educators. Program development could also include the development of collaborative relationships with outside organizations to establish appropriate technology centers in the developing world. These centers could offer a venue for our students to perform internships during which they would assist with developing solutions to problems proposed by the technology centers. Program development could also include the development of collaborative relationships with outside organizations to establish "Centers of Learning" for the learning and teaching of science which are across regions, schools and disciplines.

For purposes of tenure and/or promotion to Associate Professor, a faculty member in our department is expected to present evidence of a minimum of two of the activities listed above. This could include the publication of a significant public scholarly product in the candidate's field published outside the university, or the winning of one or more grants from a regional or national granting agency. In addition this could include work on one or more project leadership or program development activities as outlined above.

For purposes of advancement to Full Professor, a faculty member in our department is expected to demonstrate progress in two or more of the areas described above and present evidence of a minimum of three significant accomplishments in these areas. This could be the publication of scholarly products outside the university or the winning

of grant or the initiation of a new external collaboration or program. At least two of these accomplishments must have been completed since promotion to Associate Professor.

The faculty member is also expected to present evidence of an ongoing plan for research, scholarship, project leadership or program development. Evidence of this ongoing activity is provided not only by the faculty member's PDP but by a list of completed projects or other scholarly work and a description of projects planned and in process that can be incorporated into the faculty member's vita whenever the faculty member is being evaluated.