

# **Scholarship Standards for Tenure and Promotion for the Department of Engineering and Computer Science (ECS) 2014**

## **1. Scholarship in the Department of Engineering and Computer Science (ECS)**

Our call as faculty in ECS is to promote our educational mission to equip students with theoretical knowledge and applied skills to create and utilize appropriate solutions in Engineering and Computing disciplines. We aim to create a supportive Christian community in which to prepare our students to become responsible and effective servant-leaders. To achieve this, we envision the ECS Programs at Seattle Pacific University as a national leader in undergraduate engineering and computer science education through innovative academic programs that integrate Christian faith and calls to service to our local and international communities through hands-on learning. As part of our overall plan for engineering and computer science, we embrace our role as educator-scholars. Furthermore, we believe that to effectively educate our students, we must be actively engaged in scholarship. These standards for scholarship are provided to delineate our expectations with regards to scholarship for promotion and tenure.

There are two driving factors for our scholarship standards and expectations in the Department of ECS at Seattle Pacific University. The first is that the computing sciences, and to a lesser extent, engineering fields, are in constant, rapid change and keeping up with these changes is an absolute necessity. The second driver is the broad nature of scholarly expression within the computing sciences and engineering. Not only are traditional academic publications and conferences used to communicate scholarly findings, but also patents, standards and open-source implementations.

A faculty member in the Department of ECS must stay current in the discipline. To that end, each faculty member should be engaged in professional activities of a scholarly nature that go beyond the usual classroom preparation.

Each faculty member must have a special interest in some area that is related to engineering or the computing sciences. This could be i) a specialty within an area of the disciplines, ii) a special interest in engineering or computing sciences education, or iii) a special interest in questions regarding the relationship between the Christian faith and engineering/computing sciences.

Regardless of the faculty member's chosen area of investigation, it is the responsibility of the faculty member to keep abreast of the new developments in that area through study and participation in the profession at large. In addition, each faculty member should be involved in their own scholarly investigation or research. This work should lead to the sharing of results through talks, presentations, publications, or design or software projects. What characterizes scholarship in engineering and the computing sciences is that it results in a product that is evaluated and accepted by other engineers and/or computer scientists.

The three overarching scholarship goals are:

1. to increase the knowledge of the faculty member in a field of engineering or the computing sciences,
2. to provide for professional development of the faculty member,

3. to establish professional relationships outside of Seattle Pacific University.

The Department of ECS recognizes that an ongoing commitment to scholarly work and an increasing commitment to the profession at large is required of the faculty member. This will require thoughtful planning and prioritization of scholarly effort (often documented in the Professional Development Plan), specific attention to suitable activities to involve and carry out the intended research, and success in demonstrating the ability and desire to bring scholarly efforts to completion that result in valued scholarly products. In establishing and fulfilling this scholarly trajectory, a faculty member will clearly demonstrate an active and ongoing participation and engagement in their scholarship.

## **2. Types of Scholarship**

We believe that scholarship enables effective teaching, and thus scholarship is an important part of a full-time tenure track or tenured faculty's vocation. The Scholarship of Discovery, Teaching, Application, and Synthesis as described in the *Faculty Employment Handbook* are valued by the ECS faculty and provide the basis for our expectations in scholarship. We encourage faculty to engage in scholarship to support the mission of SPU and the vision of our ECS programs. This includes, but is not limited to a focus on innovative engineering and/or computer science education methodologies, and the integration of engineering and/or computer science with calls to service in our local and international communities. The types of scholarship in each of the four areas (discovery, teaching, application, and synthesis) are provided below.

Scholarship of Discovery: The scholarship of discovery involves the creation, discovery, or advancement of new knowledge by means of the tools and disciplined practices of one's academic field.

The primary venues for the scholarship of discovery in engineering and computer science include patents, peer reviewed publications in recognized engineering and computer science journals, peer reviewed full length papers in published engineering or computer science conference proceedings, and successful external grant applications in support of this work. It is expected that, in particular, the publications (journal and/or conference) and grant applications will often have multiple authors, including those at other institutions. Given the nature of SPU and its mission, we recognize that the research involved in supporting new discoveries in the scientific sense may be difficult to undertake. Therefore, contributions in the scholarship of discovery are welcome, but not expected, and it is anticipated, and in fact encouraged, that faculty members collaborate with colleagues at other research oriented institutions or within SPU in this work.

Further, since these are applied disciplines, opportunities for new discoveries in the scientific sense are not generally a major focus of engineering or computer science research activities. However, we recognize in engineering and computer science that the concept of discovery also applies to the creation of patentable products, which by definition exhibit such novelty that they are granted a patent by a governmental body. That governmental body may be the United States, a foreign country, or an agency of the United Nations. A patent is granted for work that has never before been done. It is a very highly reviewed process that results in the

recognition of a novel development. For acceptance as evidence of scholarship by ECS, the object of the patent must be related to the fields of engineering or the computing sciences.

Scholarship of Teaching: Engineering and computer science education provide a venue for the scholarship of teaching. Engineering and computer science education scholarship entails the development of new strategies for teaching in our disciplines. Examples include i) the development of strategies and methodologies that promote learning and that enhance classroom interaction and ii) the authorship of textbook, textbook chapters or compiled works. The necessary characteristic of these works is that they are reviewed and approved by computing scientists or engineers prior to publication. This is in keeping with the spirit and intent of scholarship, specifically that it is a product that is disseminated after being reviewed and accepted by our peers.

Venues for the scholarship of teaching include peer reviewed publications in education related journals in engineering, computer science and/or higher education, full length peer reviewed conference papers in published ECS education related conference proceedings, textbooks demonstrating the application of new teaching strategies, and successful external grant applications in support of ECS education.

Scholarship of Application: Engineering and computer science are applied disciplines, and as such traditional engineering and computer science scholarship can be often be characterized as the scholarship of application. This type of scholarship can involve advancement of the profession through research, academic, and/or professional practice applications. These applications include applied research in a specific engineering or computer science discipline, development of academic programs and materials in new discipline areas, development of new standards in industry, and creation of significant software or engineering systems. A scholarly effort resulting in the development of a significant system is characterized by the fact that it was crafted using some element of novelty. In other words, the product must contain some new algorithm or approach, or be used to solve some new problem. For acceptance as evidence of scholarship by ECS, the product must be reviewed by engineers or computing scientists outside of the organization for which it was developed and must be deemed as exhibiting some element of novelty by the reviewers. If national security laws or intellectual property rights prevent outside review, appropriate statements of novelty and scope by engineers or computer scientists within the organization will be accepted. In the case of multiple developers, the faculty member must show that s/he contributed significantly to the software or engineered system.

Primary venues for scholarship of application include peer-reviewed publications in technical or educational engineering journals; full-length, peer-reviewed conference papers in published engineering conference proceedings; engineering textbooks in new areas or those previously lacking adequate teaching materials; industrially adopted codes and standards; and successful external grant applications in support of this work.

Scholarship of Synthesis: The engineering discipline impacts many aspects of our society, and consequently there are many opportunities for collaborative work with other disciplines. There are numerous applications for the scholarship of synthesis; some of these include collaboration with faculty in other scientific disciplines to advance or apply knowledge in

new areas (this may overlap with the scholarship of discovery and/or application); collaboration with other faculty on the impact or use of technology in society; and the relationship between Christian theology and the ECS disciplines. Specific examples include intra-disciplinary collaboration with ECS, inter-disciplinary collaboration with biologists, collaboration with faculty in sociology, business, and theology to develop programs to prepare engineers or computer scientists to work effectively in developing countries, and the integration of the call for stewardship and the engineering profession for Christian engineers. Venues for the scholarship of synthesis include, but are not limited to, peer-reviewed journal articles and conference proceedings directed to an interdisciplinary and/or Christian audience, successful external grant applications in support of this work, peer-reviewed publications intended for the general public, and textbooks or monographs on interdisciplinary topics. It is expected that these scholarly products will have multiple authors in a variety of disciplines.

### **3. The Particular Kinds of Public Scholarly Products**

According to the *Faculty Employment Handbook*, formal expression in the production of scholarly products is defined as *work that is publicly disseminated and subject to careful peer review*. Following this guideline, examples of the kinds of public scholarly products were provided in Section 2 for each type of scholarly product. The kinds of public scholarly products are coalesced below and sorted into two categories depending largely on the degree of scrutiny the research undergoes and the significance of the work. The two lists below are not exhaustive, but offer examples of acceptable evidence of scholarly work. The faculty member may submit other products for consideration of acceptance as evidence of scholarly work; that evidence must satisfy the criteria that the work is in an area related to the ECS disciplines and that the product was reviewed by other computing scientists or engineers.

The first category includes examples that are highly prized, but likely to be fewer in number than the second category.

#### Highly prized – category A

- Peer reviewed publications in journals related to ECS, higher education, and/or a Christian perspective (in print or electronic media)
- Peer reviewed publications in highly respected conference proceedings with low acceptance rates (in print or electronic media)
- Patents
- Successful significant external grant applications (with an abstract available to public) for ECS related scholarship or educational outcomes in which the faculty member was the lead PI
- Textbooks, monographs, and book chapters
- Industrially adopted codes and standards in which the faculty member took a lead role

Other professional activities are also indicative of one's achievement as a scholar and can serve to augment the scholarship listed above. These include:

#### Valued – category B

- Peer reviewed publications in conference proceedings which have a high acceptance rate (in print or electronic media)
- Peer reviewed (extended) abstracts in conference proceedings (in print or electronic media)
- Industrially adopted codes and standards in which the faculty member was an active participant
- Successful external grant applications (with an abstract available to public) for ECS related scholarship or educational outcomes in which the faculty member was a supporting PI
- Successful less significant external grant applications (with an abstract available to public) for ECS related scholarship or educational outcomes in which the faculty member was a PI
- Development of significant ECS product, appropriately peer reviewed
- Presentations at regional/national/international ECS related conferences
- Non-peer reviewed conference papers
- Invited presentations at other institutions of higher education
- Successful internal grant applications

#### **4. Types of Peer Review Most Common and Valued within Engineering and Computer Science**

Two types of peer review within engineering and the computing sciences are common. One is for the individual product and the other is for the total body of work.

The peer review process using external confidential peer-reviewers is most commonly used in engineering and the computing sciences in evaluating individual scholarly works for publication. Typically a peer reviewed article (e.g., journal, conference proceeding, textbook, or monogram) has undergone review by two to three scholars (nationally or internationally selected) in engineering and the computing sciences with an appropriate background to review the particular subject material. External grant applications related to engineering, computer science, and industrially adopted codes & standards are also typically reviewed by a panel of scholars.

The peer review of a scholar's total body of work is aimed at assessing the overall quality and significance of one's contribution to the profession. Awards, national recognition (including being asked to or elected to serve on national committees or as a journal editor), and citations, can be evidence of the value of one's overall contributions to the profession. For tenure and promotion in rank, the peer review of a candidate's body of work typically includes evaluation by colleagues at a higher rank at the candidate's institution.

#### **5. Implementation of a Quality, Coherent Research Plan**

The implementation of a quality, coherent research plan is a very important component in evaluating a candidate for tenure and promotion. Typical indications of such a plan at peer institutions include the items listed in Section 3. Developing and implementing a sustainable, quality research plan will require thoughtful planning and prioritization of scholarly effort (often documented in the Professional Development Plan). Specific attention must be paid to

suitable activities to carry out the intended research. Over time implementation of the plan should reveal the ability and desire to bring scholarly efforts to completion that result in valued scholarly products. In establishing and fulfilling this scholarly trajectory, a faculty member will clearly demonstrate an active and ongoing participation and engagement in their scholarship, as well as an increasing commitment to the profession at large.

## **6. Scholarship Expectations**

In the review process, the quality of the scholarship and the coherence of the work are key issues in the decision making process for both promotion and tenure. We also recognize that each person is individually created by God with their own unique gifts. Therefore, quantifying expectations for the general case is difficult. The following are provided as guidelines for tenure and promotion at various levels, and exceptions to these guidelines may occur on occasion, provided that a solid case is made that the spirit of the expectations has been met.

- Promotion from Assistant Professor to Associate Professor

Scholarship standards for promotion from Assistant to Associate Professor include evidence of a scholarly body of work and the potential for continued development as determined by the SPU departmental review committee.

The body of scholarly work will include at least three (3) acceptable products as described in sections 2) and 3) above, published or accepted for publication while at the rank of Assistant Professor; at least one of these products must be from category A (highly prized publications).

In addition to listing his/her scholarly works, the candidate's narrative should clearly outline his/her contributions to the discipline and his/her scholarship trajectory.

- Promotion from Associate Professor to Full Professor

Scholarship standards for promotion from Associate Professor to full Professor include evidence of a scholarly body of work appropriate for the rank as determined by the SPU departmental review committee and at least one external written review from faculty at a peer institution. The candidate will provide a list of potential reviewers. Qualified reviewers in industry or government positions will also be considered as appropriate.

The body of scholarly work should include a minimum of four (4) acceptable products as described in sections 2) and 3) above, published or submitted while at the rank of Associate Professor; at least one of these products must be from category A (highly prized publications).

- At third year review

At the time of the third year review, there must be clear evidence of one's potential for achieving ECS's scholarly standards for tenure and promotion as outlined in this document. At a minimum, the candidate must have developed a detailed, coherent research plan that is supported by a body of completed work and work in progress. This should include at least one piece of scholarly work published, accepted, and/or submitted since coming to SPU. This (and other) product(s) may also be submitted later for tenure and/or a promotion step; there is no prohibition to "double-counting" them.

- To receive Tenure

The granting of Tenure requires the production of at least two (2) acceptable products as described in sections 2) and 3) above, published or accepted for publication since coming to SPU; at least one of these products must be from category A (highly prized publications). Either or both of these products may also be submitted for a promotion step; there is no prohibition to "double-counting" them.

Pictorially:

