

What's with All This Peer-Review Stuff Anyway?*

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Introduction

The *Journal of Physical Security* was ostensibly started to deal with a perceived lack of peer-reviewed journals related to the field of physical security. In fact, concerns have been expressed that the field of physical security is scarcely a field at all.¹

A typical, well-developed field might include the following:¹ multiple peer-reviewed journals devoted to the subject, rigor and critical thinking, metrics, fundamental principles, models and theories, effective standards and guidelines, R&D conferences, professional societies, certifications, its own academic department (or at least numerous academic experts), widespread granting of degrees in the field from 4-year research universities, mechanisms for easily spotting “snake oil” products & services, and the practice of professionals organizing to police themselves, provide quality control, and determine best practices. Physical Security seems to come up short in a number of these areas.

Many of these attributes are difficult to quantify. This paper seeks to focus on one area that is quantifiable: the number of peer-reviewed journals dedicated to the field of *Physical Security*. In addition, I want to examine the number of overall periodicals (peer-reviewed and non-peer-reviewed) dedicated to physical security, as well as the number of papers published each year about physical security. These are potentially useful analyses because one can often infer how healthy or active a given field is by its publishing activity. For example, there are 2,754 periodicals dedicated to the (very healthy and active) field of physics.²

Type of Journals

This paper concentrates on trade journal versus peer-reviewed journals. Trade journals typically focus on practice-related topics. A paper appropriate for a trade journal is usually based more on practical experience than rigorous studies or research. Models, theories, or rigorous experimental research results will usually not be included. A trade journal typically targets a specific market in

* Editor's note: This paper was not peer-reviewed.

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an industry or trade. Such journals are often considered to be news magazines and may contain industry specific advertisements and/or job ads.

A peer-reviewed journal, a.k.a “referred journal”, in contrast, contains peer-reviewed papers. A peer-reviewed paper is one that has been vetted by the peer review process. In this process, the paper is typically sent to independent experts for review and consideration. A peer-reviewed paper might cover experimental results, and/or a rigorous study, analyses, research efforts, theory, models, or one of many other scholarly endeavors.

Why Peer Review?

Any field advances when there is a collaborative effort of sharing research, ideas, or other scholarly work in an open forum. This forum fosters discussion and helps shape the future of the field. In the world of academics, the most common and accessible forum available is the peer-reviewed journal. The “peer-review” process is essentially a pre-publication vetting process.

The reviewer is one of the key players in this vetting process. The reviewer is considered to be a subject matter expert by the editorial staff of the journal. A reviewer looks at the paper with a fresh eye, looking for mistakes or omissions and also determines if the paper is novel and substantial enough to warrant publication. The peer-review process is considered essential to the quality of an academic paper. From the peer review process, the community gains a high quality paper and the author gets a peer-reviewed publication. In some fields, the metric for being considered an expert is based upon the number (and/or importance) of peer-reviewed papers one has published. “Publish or perish” is a familiar mantra in many academic circles.

In academia (especially in science and engineering), researchers frequently present their work in the form of a peer-reviewed paper. Discussion usually follows. Bugs, problems, flaws, and weaknesses are hashed out and the field benefits from the discussion/disagreements and from an improved paper. It is the power of the peer review process that helps facilitate this process. Without open lines of communication, every person in a given field would be “reinventing the wheel” on an individual basis. In such a situation, the field would not progress very effectively, if at all. Trade journals alone are not enough to foster the type of information sharing and careful review that is necessary to enable a field to progress in a positive, rigorous, and healthy manner.

The Peer-Review Process

The peer review process begins when the editorial staff of a journal receives a paper or manuscript. The editor sends a copy of the work to a small number of external experts for review (typically two to three reviewers per paper). The reviewers usually work independently and typically do not know who the other reviewers are. The reviewers' main job is to evaluate the paper on its own merits and remain emotionally unattached during the review.

The reviewers' identities are typically kept secret from the authors of the paper. This makes it easier for the reviewers to offer objective criticism. Some peer-reviewed journals even try to keep the author's identity anonymous to the reviewers, though this is uncommon. The editor is usually the only person who knows the names of all the involved players. The editor is the chief decision maker in the process, whereas the reviewers act in an advisory capacity.

After the reviewers are finished, they each supply the editor with their critique, noting suggestions for improvement, weaknesses, or any other issues. Often, the reviewers have a list of specific issues or problems they would like to have addressed. The reviewer also supplies 1 of 4 general responses: 1) publish as is, 2) accept the paper for publication if the author improves the paper, 3) reject the paper but encourage resubmission after a rewrite, or 4) outright rejection.

After receiving all the reviewers' feedback, the editor might accept or outright reject the paper as it is. If the reviewers disagree about publishing, the editor might solicit another reviewer to act as a tiebreaker. More often, however, the editor compiles a list of concerns or questions brought up during the feedback process and ask that the author address the criticisms.

After receiving the critique, the author might address a given issue by modifying the paper, drafting a rebuttal, or some combination thereof. If the author were so inclined, he or she may pull the paper from further publication consideration at any point in the process.

When the editor receives a response from the author, the editor might then decide to publish the paper (or not) depending on the persuasiveness of the response. Alternatively, the editor may share the author's response with (and solicit a response from) each reviewer who raised a specific concern. Once the editor is satisfied the quality of the paper meets an accepted standard for the discipline, the paper is on it's way to publication.

After a paper has completed these steps, it is considered "peer-reviewed." The paper, having been accepted for publication, is now viewed as having merit and academic standing.

Anecdotal evidence about the lack of peer-reviewed physical security journals was the impetus for the *Journal of Physical Security*. This paper attempts to

provide an analysis of peer-reviewed papers and journals covering the field of Physical Security.

Peer Reviewed Physical Security Papers

The first point we will address is: are papers covering physical security being published in significant numbers? If not, then the argument could be made that there is no need for additional physical security journals.

Google Scholar

Google Scholar³ includes a search of every book, article, journal, etc. in the Google database. Google Scholar has many of the inherent disadvantages of other types of Google searches, e.g., the Google database is huge. Searching {1989 Toyota pickup gas mileage}, for example, returns 559,000 hits. This is overwhelming. When looking for something specific, one can click through the results until an exact match is found.

Quantitative searches are a much more difficult problem. A search for {physical security articles} would be a good example. This search in Google Scholar returned 2,190,000 hits. There are some advanced search options, but in the context of this paper, these options seemed limited.

A refinement of the original search to {physical security articles – computer – cyber} returned 1,870,000 hits. (These searches seem to result in a lot of round numbers!) By eliminating matches that contained “computer” and “cyber” we can narrow the scope of the search.

Searching for {physical security articles – computer – cyber + “peer reviewed”} returned 14,900 hits for the years 1990-2009. This works out to 784 papers per year. Putting quotes around “peer reviewed” tells the search engine to look for only these words in that specific order.

The most telling refinement comes from the search {“physical security” – computer – cyber + “peer reviewed”}, which returns 170 hits over the 1990-2009 time period. This works out to about 9 papers a year. The same search without the “peer reviewed” portion returns 17,100 hits, or 900/year. I then tried filtering out social science articles: the search was run again with “-social” included in the search string. This reduced the result to 4,910 papers, or about about 258/year.

These results indicate that peer-reviewed physical security papers are indeed being published in significant, though not large numbers.

Argonne National Laboratory Library Article Search

To further investigate physical security publications, I turned to the ISI Web of Knowledge.⁴ The Argonne National Laboratory library services department was very helpful in this endeavor.

The Web of Science/Knowledge is a science and social citation index consisting of several databases with information collected from thousands of scholarly journals, books, book series, reports, conferences, and more. The databases contain the: Science Citation Index Expanded; Social Sciences Citation Index; Arts & Humanities Citation Index; Conference Proceedings Citation Index - Science; Conference Proceedings Citation Index - Social Sciences & Humanities; Index Chemicus; and the Current Chemical Reactions. In short, this resource represents a broad range of papers published in the technical and social sciences.

A topic search of {security} resulted in 34,484 articles for 2005-2009. Almost 51% of these security papers were related to computer security. Narrowing the search to the words {physical} and {security} resulted in 2,923 articles, or 730 papers/year on average.

Approximately 8.5% of the security papers published contain the words “physical” and “security” within the text. The exact phrase {“physical security”} further refined the search down to 718 papers over the same four-year period. This works out to 179 papers a year, or 2% of all the security papers published in these journals. A quick scan of the underlying journals indicates that many of these papers were indeed peer-reviewed.

The ISI Web of Science/Knowledge results reinforce what we found earlier in the Google Scholar search. Papers about physical security are being written and published, though not in overwhelming numbers.

Peer Reviewed Physical Security Journals

The next question I tried to answer was whether physical security papers have a small number of periodicals dedicated to them, or are they scattered over the spectrum of periodicals that cover the field of security in general?

Bacon's Magazine Directory-2009

The first resource that I examined to address this question was the 2009 Bacon's Magazine Directory.⁵ Bacon's lists 18,500 trade, professional, and

consumer periodicals in the United States and Canada. Below are some selected fields and the number of periodicals related to those fields:

Banking and Finance (557)
Arts and Entertainment (368)
Beverages (128)
Gifts, Antiques, and Collectables (73)
Fruits, Nuts, and Vegetables' (39)
Waste Management (38)
Rock and Cement Products (33)
Philanthropy (31)
Religious Administration (30)
Security (27)
Field Crops (25)
Plastics and Rubber (22)
Mortuaries and Cemeteries (17)
Tobacco (14)
Cleaning and Laundry (13)
Farm Chemicals and Fertilizers (9)

The periodicals listed in Bacon's are primarily trade journals that report on new products, plus offer staff-written articles, trade literature, by-lined articles, letters, etc. Although these journals may host physical security related articles, they really aren't peer-reviewed scholarly journals. In the area of security, there are 27 journals reported by Bacon's. Not one of these is dedicated to physical security. The Bacon's results seem to identify few (or no) physical security journals.

Genamics⁶

The Genamics⁷ JournalSeek website (<http://journalseek.net>) is the largest free journal information database available on the Internet, containing 95,320 titles. It lists 144 periodicals with "security" in the title. They break down as follows:

Computer, network, IT, or information security: 42 (29.2%)
Counter-terrorism/homeland security: 5 (3.5%)
Geopolitics, peace and conflict studies, intelligence, national defense: 39 (27.1%)
Security Management: 4 (2.8%)
Social Security: 13 (9.0%)
Security Products Trade Journals: 7 (4.9%)
Nuclear Security, Safeguards, & Nonproliferation: 2 (1.4%)
Human Rights: 1 (0.7%)
Criminology & Police: 3 (2.1%)
Other, including Transportation, Library, Bank, Health Care, Hotel Security; and Security Law: 18 (12.5%)

Of these 144 periodicals, not one is devoted solely or primarily to physical security (except arguably 2 of the trade journals devoted to security sales and marketing), though 16 of the 144 periodicals contain articles or papers about physical security fairly often. (7 of these 16 periodicals are peer reviewed, with 2 of the 7 primarily about nuclear safeguards and nonproliferation, not physical security *per se*).

As with the Bacon's results, we can again conclude that there is a dearth of physical security periodicals (including peer-reviewed journals), and that any papers about physical security are scattered over the spectrum of existing security periodicals.

Ulrich's Periodical Directory

This resource is the 500lb gorilla of periodical databases. The Ulrich's worldwide serials directory² covers "300,000 serials from 90,000 publishers spanning 950 subject areas and 200 languages." The University of Chicago provided the Ulrich's periodical directory service used during this research.

Ulrich's reports that worldwide there are 16,835 periodicals relating to Law; 10,076 covering Sports; 8,924 involving Transportation; 8,880 on Engineering; 2,754 on Physics; and 437 journals on Security.

The breakdown by number of periodicals per topical area is interesting:

Folklore (661)
History of Asia (649)
Alternative Medicine (469)
Glass and Pottery (441)
Security (437)
Physics of Heat (140)
Birth Control (175)
Leather and Fur (194)
Urology and Nephrology (392)
Postal Affairs (156)

Of the 437 security periodicals, 33 (7.5%) are peer-reviewed. Over half (58%) of the 33 peer-reviewed journals are categorized as Computer Security (19). A total of 10 (~30%) are classified as Criminology and Law Enforcement. Two of the periodicals (6%) cover Cryptography (another 3 Cryptography journals share classification with Computer Security), one journal is devoted to Transportation Security (from France), and one covers Library and Archival Security (United States).

Demographically, the United Kingdom is responsible for 48% of the 33 peer-reviewed security journals, with the United States coming in second (33%), followed by the Netherlands (6%). Switzerland, Germany, Japan, and France are tied with one peer-reviewed security journal apiece.

Of the original 437 security-related periodicals reported by Ulrich's service, none are solely dedicated to physical security. To put this into perspective, there are 204 journals devoted to *Astrology*, and 7 (3%) of these are peer-reviewed! There are also 9 journals about *Cold Fusion*, and 3 (33%) of these are peer-reviewed.

Ulrich's Periodical Directory probably does not include every periodical available. For instance, they omitted the *Journal of Physical Security*. Certainly though, the results can be taken to be representative of the overall pool of existing periodicals. This data confirms the previous two conclusions: There are few, if any, peer-reviewed journals dedicated to physical security and the existing physical security papers tend to be spread out over many different periodicals.

Discussion

There seems to be a general consensus that physical security is an important field. It's broad in scope, covering the protection of important assets such as people, airplanes, buildings, money, weapons, pharmaceuticals, chemicals, documents, equipment, food and drink products, merchandise, etc. This includes protection from theft, tampering, espionage, terrorism, sabotage, destruction, vandalism or unauthorized access. This diversity of scope makes physical security an extremely complex and rich field to work in.

One would expect extensive pockets of physical security research being conducted in academia, as well as in government and at private companies. The depth and scope of physical security research, it would seem, ought to be vast, involving a highly multi-disciplinary collaboration by security practitioners, security managers, engineers, social scientists, computer scientists, psychologists, chemists, physicists, mathematicians, etc. In order to share information, recognize failures and successes, and exchange ideas across the entire field, some form of effective communication is required. One of the most important communication channels available to other fields is the peer-reviewed journal.

Although, this is a very rudimentary study, the results clearly indicate that there are few peer-reviewed journals dedicated to the field of physical security. Papers about physical security are scattered throughout the (not very large) universe of existing periodicals, but perhaps not in the numbers we might expect for a field of this importance.

One troubling aspect of this conclusion is that perhaps this is a symptom of a much larger problem. Perhaps, as suggested above, the field of physical security isn't much of a field at all.

What can be done? More physical security papers need to be written and submitted to peer-reviewed journals. Although the peer-review process is time consuming, it helps to ensure the quality of the work being presented. One can think of the peer review process as a vulnerability assessment of the authors' paper. The paper will be much stronger after the process.

Acknowledgements

I'm grateful to Gary N. Davidoff and Todd J. Morris of the Argonne National Laboratory research library for their assistance during the course of this work, and Roger Johnston for providing the Genamics results and offering suggestions about the paper.

References

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² Ulrich's Periodical Directory, "Ulrich's Web.com" 2009. <http://www.ulrichsweb.com/ulrichsweb/> (accessed December 10, 2009)

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⁴ Thomas Reuters, "ISI Web of Knowledge." 2009. <http://isiknowledge.com/> (accessed December 10, 2009)

⁵ Cision, "Newspaper/Magazine Directory" 2009. <http://us.cision.com/product.asp?key={ABFD28FA-2794-4611-BF03-1B01CEBC3C80}> (accessed December 10, 2009).

⁶ The following is a private communication from Roger Johnston, Vulnerability Assessment Team, Argonne National Laboratory.

⁷ Genamics, "JournalSeek" 2009. <http://journalseek.net/> (accessed December 10, 2009).