

Kansas Library Association College and University Libraries Section Proceedings

Volume 10
Number 1 *Sharing the Impact of Academic
Libraries*

Article 4

2020

Promoting University Inventors: Patent Collection in Shocker Open Access Repository

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Recommended Citation

Matveyeva, Susan J. Dr. and Henning, Samantha (2020) "Promoting University Inventors: Patent Collection in Shocker Open Access Repository," *Kansas Library Association College and University Libraries Section Proceedings*: Vol. 10: No. 1. <https://doi.org/10.4148/2160-942X.1080>

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Abstract

Wichita State University is known for its advances in STEM research for many decades, but there were few inventions patented by WSU. In recent years, commercialization of the results of applied research, especially bioengineering, became a university focus; the number of WSU owned patents increased significantly. WSU initiated several initiatives to support university inventors. These included the development of the Innovation Campus and WSU Venture. The Wichita State University Libraries decided to join these efforts by not only providing information to inventors as a Patent and Trademark Resource Center but to archive and increase awareness of their patents. To increase the visibility of the work of WSU inventors, Wichita State University librarians created a collection of Wichita State Patents in the university's institutional repository SOAR: Shocker Open Access Repository (Wichita State University Patents, 2016). Patent records within SOAR are unique compared to those previously established. This paper details our preparation for this project, such as learning best practices, patent databases, vocabulary and classification, development of guidelines, steps in creation and maintenance of the collection, and its usage.

Keywords

Wichita State patents, institutional repository; patent metadata, collection purpose

**Promoting University Inventors:
Patent Collection in Shocker Open Access Repository**

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Abstract

Wichita State University is known for its advances in STEM research for many decades, but there were few inventions patented by WSU. In recent years, commercialization of the results of applied research, especially bioengineering, became a university focus; the number of WSU owned patents increased significantly. WSU initiated several initiatives to support university inventors. These included the development of the Innovation Campus and WSU Venture. The Wichita State University Libraries decided to join these efforts by not only providing information to inventors as a Patent and Trademark Resource Center but to archive and increase awareness of their patents. To increase the visibility of the work of WSU inventors, Wichita State University librarians created a collection of Wichita State Patents in the university's institutional repository SOAR: Shocker Open Access Repository (Wichita State University Patents, 2016). Patent records within SOAR are unique compared to those previously established. This paper details our preparation for this project, such as learning best practices, patent databases, vocabulary and classification, development of guidelines, steps in creation and maintenance of the collection, and its usage.

Background

Wichita State University (WSU) is a high research activity university, with strong doctoral programs, especially in the STEM fields. Founded at the end of the 19th century, the university has come a long way since its early identity as a liberal arts college to an entrepreneurial research university in an urban setting. The university faculty and researchers have been productive in conducting and publishing research for decades. They have published in prestigious journals, presented their discoveries at national and international conferences, applied for and were awarded numerous grants, and produced perspective inventions. The university provided researchers with equipment and other resources, but until recently was not actively involved in patenting. In the 1990s to early 2000s, there were only four WSU owned patents, all of which were filed with the same inventor, a professor in chemistry.

The situation changed in the last several years when WSU embraced the idea of an entrepreneurial university and added commercialization of WSU affiliated inventions to its priorities. Historically, WSU's National Institute of Aviation Research, and many other of its 30+ research centers, has established cooperative relations with local, regional, and national businesses. The university-industry partnership became even closer after the development of the Innovation Campus at WSU and the creation of a new WSU Venture unit dedicated to the commercialization of the university's intellectual property (WSU Ventures, 2015). This team of dedicated professionals assisted inventors with technology transfer, startup development, patenting, and licensing their products. The Wichita State Intellectual Property Policy defines the rights of inventors and the university and the procedures related to technology transfer (WSU Policies and Procedures, 2015). The WSU's inventor's share is the highest with comparison to any other Kansas Regents university (Inventor Resources, n.d.).

University Library's Role

WSU Libraries is the only Patent and Trademark Resource Center (PTRC) in Kansas. For many years, a dedicated Patent and Trademark Librarian has been providing research services to WSU inventors, assisted them with patent searches, and educating on issues related to patents and trademarks. Services included individual consultations, information on and access to relevant literature and documentation, and Entrepreneurship Research Series workshops.

WSU Libraries has been developing and operating an institutional repository SOAR: Shocker Open Access Repository since 2007. The purpose of SOAR is to increase visibility of the university's digital scholarship to a global audience and to "serve as a reliable digital storage" (SOAR: Shocker Open Access Repository, 2020). In December 2015, the Institutional Repository (IR) Librarian wanted to create collections in SOAR that demonstrate the university's focus on innovation, entrepreneurship, and private-public partnership and found the article by Clemson's University librarians (Wesolek, Comfort, & Bodenheimer, 2015). This article showcased the university's patents in the institutional repository and the library catalog. Inspired by this example, the IR Librarian decided to create a collection of WSU patents in SOAR.

Project Implementation

By that time, SOAR was well-established as a repository that housed the electronic theses and dissertation (ETD) program, graduate and undergraduate student conferences, individual and departmental collections of faculty research works, books and journals, university catalogs, and special projects. Patents were not previously represented in either the library catalog or the institutional repository. To begin, the IR Librarian learned the basics of patents. For example, what terms are used and their meanings, where to find patents, what version of the patent database to use, how to search for patents, and how to read the patents. To get information on what patents should be in SOAR, the IR librarian searched the United States Patent and Trademark Office's Full-Text Patents (USPTO PatFT) for "Wichita State University" as assignee (including a variation of the university name.) The original search query [AN/"Wichita State University" (AN = Assignee Name)] retrieved 15 patents.

The next step was to select the USPTO document to use as a primary source of data. The IR Librarian chose the full-text patent document to upload in the repository and to use it as a primary source for the metadata record. SOAR, powered by DSpace, uses qualified Dublin Core as the default metadata schema. This librarian then created a metadata template using the Dublin Core fields, such as title, author (for inventors), contributor (for assignee), date issued, abstract, citation, description, language, format extend, identifier, publisher, rights, subject, classification, and type (see Appendix A). The Machine Readable Cataloging (MARC) patent records created by Clemson University librarians and the document "Patent Metadata Best Practices" by the Digital Standards Team of the University of Notre Dame (Papson et al., 2013) acted as guides. The WSU collection is searchable and can be browsed by author, title, subject, date, and type. Having the "browse by type" function proved to be very useful to find the patents in the repository. Also helpful are enhanced metadata records that include abstracts, citations, and identifiers.

Four years passed from the time the IR Librarian started the WSU patent collection. Today many universities, especially those of science and technology and with vigorous STEM programs, have patents in their repositories. While the university library cannot obtain comprehensive statistics of patents collected by other universities' repositories, the numbers could be significant. For example, an advance search of all Bepress/Elsevier Digital Commons repositories for the document type "patent" brings 5,474 results. The largest patent collections in Digital Commons' repositories have the University of South

Florida (974 titles), University of Central Florida (807), Iowa State University (713), California State University Monterey Bay (476 historical U.S. land patents), and Clemson University (466).

If one was to look at the patent collections in institutional repositories, they may notice that there are not established standards in collection development, metadata, and presentation of the file when looking at patent collections. Some include patents only, but some also include patent applications. Most upload the full text of a patent, but there are also examples of the front page image, searchable images, and metadata-only items. Some include the links to USPTO or Google Patents, and others do not. Metadata records are varied as well. There are short and full records that include a wide variety of fields. Some include subjects and classification; the names of the originating department, and version of the patent, while some others do not. Many records do not include the rights field, those that have sometimes provide questionable statements. For example, some records for active U.S. patents posted their full-text copies under Creative Commons License, while others used the "Copyright ... All Rights Reserved" statement in the rights field. We believe that it would be beneficial to develop the community issued best practices for patent metadata.

Enhancing the Purpose of the Collection

The variety of approaches to patent collections, and the differences between universities, could explain the differences in collection purposes. Reinman and Ahrberg (2020) state that, "Including a university's patents in an institutional repository is valuable in that they are housed together locally and can be indexed in a library's systems, making them more accessible and visible" (p.2). Clemson University's librarians mentioned the patents' suitability for the institutional repositories as a type of research work (Wesolek, Comfort, & Bodenheimer, 2015). When the IR librarian started the patent collection, her intention was to provide evidence of the university innovators' and inventors' creativity. She saw the patents as an important result of the university's and inventors' collaboration. According to the WSU policy, "When revenues are to be shared, the creator(s) shall obtain his/her share only after the University has recouped any direct costs borne by the University for equipment and materials and costs paid to third parties." Just as the ETDs are the products of the university, the university's patents are the university's products (WSU Policies and Procedures Manual, 2015). However, while theses and dissertations are common types of works collected by every institutional repository of graduate degree granting university, collection of patents are less prevalent. At that time, the IR Librarian believed that the WSU patent collection would have a historical value mostly, especially since intellectual property protection for older patents has already expired.

In recent years, commercialization of the WSU inventions became a university focus. The archival purpose of the collection continued, but it became more valuable for the current users: WSU faculty and students. As patent search is difficult, locally indexed WSU patents increased their discoverability. The convenience of users became the primary goal. As the repository departmental research collections include research articles, conference papers, and other research works of WSU inventors, the co-authors decided to map their patents to these collections. Mapping patents to the departmental collections brought all types of work of the author together that provided the opportunity to users to read the works related to a patent.

The changing focus from historical value to current users allowed us to recognize the necessity of enhancement of patent PDFs. We plan to use optical character recognition (OCR) for the full text of patents to make the PDF files searchable. Also, the plan is to use the patent number as the label for the .pdf link. Users will click on the link to read the patent: it is easy, convenient, and highly visible on the screen.

We also revised metadata to make it more user friendly. The original metadata template included the patent number into three fields: dc.identifier and as part of dc.identifier.citation and dc.description, but these are not user friendly. The

dc.identifier field is not in a public view and the patent number is not prominently displayed in the other fields. We increased visibility of the patent number by creating a separate description field. We also separated the application number/date from the granted patent number/date. Original records included abstracts as a source of the full-text search. Users often use keywords in searches for patents, so we decided to add keywords to the metadata.

Classifications are another important tool for patent searches. Original records included three patent classifications: CPC: Cooperative Patent Classification (2015-present), IPC: International Patent Classification and USPC: U.S. Patent Classification (granted prior to 2015). The most popular classification is CPC. After discussion, we decided to continue providing all three. As we stated above, there is no community best practices for patent metadata. When developing our decision about the dc.right metadata field, we were focused on the users. As stated by the U.S. Department of Labor, "the fact that a patent's description is in the public domain ... does not give others permission to manufacture or use the invention during the life of the patent without permission from the inventor" (Public Domain Copyright Trademark & Patent Information Schedule, 2020). Instead of using generic statement "in public domain", we provide information on status of the patent. The active protection for utility patents is 20 years. In metadata we include the status of the patent and anticipated expiration date for active patents as it done in the Google Patent search. Also in the immediate plans is the addition of patent applications to the collection, which currently includes only granted patents. As a couple of years can pass from the patent application to granted patent, having patent applications in the institutional repository will benefit WSU inventors (see Appendix B).

The changed focus of the collection, has increased the importance of marketing and collaboration within and outside of the library. We introduced the SOAR collection to the engineering librarian assigned to patent, copyright, and trademark subjects. She then used this collection in her work with the university researchers and included the link to this collection in her libguide (Patents LibGuide, 2020). We would like to extend collaboration with the university departments, especially with the WSU Ventures. Recently, this unit initiated a program, "Gateway to IP," intending to educate students on intellectual property and obtaining patents. "Students will perform inventor interviews, engage in technology evaluations, execute patent and other intellectual property searches, and obtain exposure to preparing patent applications." (WSU Strategic Communications, 2019). This program may provide an opportunity to market the WSU Patents collection directly to students.

Conclusion

Creating and having a patent granted is a fulfilling achievement for a researcher and the university. Much time and effort, as well as monetary resources, can go into the process of establishing a patent. Once a patent has been granted, the inventor's peers and colleagues need to be able to access such information. In addition to being available in the USPTO, SOAR makes the WSU patents available locally. The patent collection provides the full text of the patents and related metadata that was created to increase their discoverability. The purpose of the collection has shifted from focusing on the historical value of the WSU patents toward convenience and the discoverability of the patents to current users. With increasing attention of the university to monetization of their inventions, the number of WSU patents increased. This motivated us to update metadata records and presentation of the patents by converting them to a searchable image. We also extended a scope of the collection by including the patent applications. It is our hope that with time this collection will grow into a representative showcase of the university's intellectual capital in applied research.

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Appendix A

Original Metadata Template

dc.contributor	Wichita State University
dc.contributor.author	LastName, FirstName MiddleInitial.
dc.date.issued	yyyy-mm-dd
dc.date.submitted	yyyy-mm-dd
dc.identifier	[U.S. patent no]
dc.identifier.citation	LastName, FirstName MiddleInitial, inventors. Wichita State University, assignee. [Title.] United States patent U.S. [no.], Month Day Year.
dc.identifier.uri	[http://patft.uspto.gov/...]
dc.description	WSU inventors: FirstName MiddleInitial LastName, Dept. of [], College []
dc.description	Application No. [] filed Month day, year. Patent No: [] granted Month day, year
dc.description.abstract	[text]
dc.format.extent	[] claims; [] drawings; [] pages
dc.language	en_US
dc.publisher	United States Patent and Trademark Office
dc.rights	Status: []
dc.subject.classification	U.S. Cl.:
dc.subject.classification	CPC:
dc.subject.classification	Int. Cl.
dc.title	Title
dc.type	Patent

Appendix B
Updated Metadata Template

dc.contributor	Wichita State University
dc.contributor.author	LastName, FirstName MiddleInitial
dc.date.issued	yyyy-mm-dd
dc.date.submitted	yyyy-mm-dd
dc.identifier	[U.S. patent no]
dc.identifier.citation	LastName, FirstName MiddleInitial, inventor. Wichita State University, assignee. [Title]. United States patent [US number.] Granted Month day, year.
dc.identifier.uri	[http://patft.uspto.gov/...]
dc.description	WSU inventors: FirstName LastName, Department, College
dc.description	Patent No. [] granted Month day, year
dc.description	Application No. [] filed Month day, year.
dc.description.abstract	[Text]
dc.format.extent	[] claims; [] drawings; [] pages
dc.language	en_US
dc.publisher	United States Patent and Trademark Office
dc.rights	Status: [] ; Anticipated expiration: yyyy-mm-dd
dc.subject	[keywords]
dc.subject.classification	U.S. Cl.:
dc.subject.classification	CPC:
dc.subject.classification	Int. Cl.
dc.title	Title
dc.type	Patent

All fields except Title are repeatable. The new additions are in bold.