



Stop, Collaborate, and List ‘Em: Creating Local Metadata to Promote User Discovery of Minoritized Identities in a STEM Collection

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Abstract

Historical and modern scientific thought is dominated by the English language, colonized science, patriarchal norms, and Westernized “ways of knowing.” By making materials that lie outside that narrative discoverable (e.g., non-Western science, Indigenous/Aboriginal knowledge, women in science, etc.) we can assert that science is a global endeavor by representing diverse scientists on physical library shelves or ebook “shelves.” The Cataloging and Metadata Librarian and Science and Outreach Librarian at Furman University, a small liberal arts college, collaborated on a project to address discriminatory practices in the catalog records of a subset of the libraries’ STEM collection. Spurred by another project to update deprecated Cutters in Library of Congress call numbers, we assessed collection content with an eye to improve future collection development and created a local method for collocating DEI materials within an Alma consortium catalog. The intended goals of the project were to update the collection, improve metadata to increase discoverability, and develop an auditing process to use for other collections.

Keywords: Resource discovery, Collection management, STEM librarianship, Critical cataloging, Consortium catalog

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Introduction

Cataloging utilizes systems, structures, and standards that allow resource discoverability and interoperability of metadata, which are subject to the same problems of structural bias as all other human-designed systems. Critical cataloging is an offshoot of critical librarianship that focuses on making changes to description and organization that promote equity and remediate harms created by library metadata. This article reports on a project to begin addressing discriminatory practices in the catalog records of a subset of the Furman University Libraries' STEM collection by assessing the collection's content of diverse voices and creating a local method for collocating DEI resources.

Institutional Context

Furman University is a private liberal arts institution of about 2,600 students and 300 faculty located in Greenville, South Carolina ([Furman University, n.d.-a](#)). It was founded in 1826 by the South Carolina Baptist Convention (SCBC), named for Baptist clergyman Richard Furman; it remained affiliated with the Southern Baptist Church until SCBC officially severed the relationship in 1992 after years of conflict with university faculty over academic freedom and values ([Furman University, n.d.-b](#)). Institutional interest in social justice and support for diversity, equity, inclusion, and belonging (DEIB) initiatives at Furman increased markedly since 2017, when the Task Force on Slavery and Justice was established to research and report on the university's ties to slavery ([Furman University, n.d.-c](#)).

The Furman Indigenous land acknowledgement states, "We acknowledge that Furman University occupies traditional land of the Cherokee People, a land where the Catawba and other indigenous people might also have found food. [...] It is with gratitude that we [...] honor the land and the people who have stewarded it through many generations. We also must acknowledge that we benefit from the Cherokees' loss of land and commit to remembering the human cost of colonialism" (as cited in [Colmenares, 2022](#)). The authors also wish to acknowledge the history and legacies of slavery on this land.

As the authors of this article and the executors of its methods, we must also acknowledge our personal identities and privileges as cisgender white women who may only occupy none or only a few of the marginalized identities represented in the records that we searched, identified, and collocated within our collections.

Literature Review

Critical Cataloging

In North America, and particularly in academic libraries of the United States, the systems of description that are engrained in cataloging practice – and thus library collection development – include Library of Congress Subject Headings (LCSH), Library of Congress Name Authority Files (LCNAF), and Library of Congress Classification (LCC). Notably, these are all controlled by a central body which is the Library of Congress and therefore ultimately Congress itself. This accountability to Congress, a bureaucratic, governmental body, means that although librarians have the ability to propose and advocate for changes to harmful descriptors, enacting the desired changes is often incredibly slow and sometimes politicized and/or controversial.

One issue with which many librarians and members of the general public may be familiar is the years-long movement to change the LCSH “Illegal aliens,” also known as the Change the Subject project. The effort to change “Illegal aliens” acknowledged that the heading othered and dehumanized the people whom it described and could imply that their very existence was illegal ([Lo, 2019](#)). Dissatisfaction with offensive and/or inaccurate LCSH is a long-standing issue, with librarian-activists like Sanford Berman advocating since the 1970s for changes and implementing local solutions to circumvent the problems ([Berman, 1971](#); [Eichenlaub, 2003](#)).

In addition to proposing changes to LCSH, catalogers may propose new headings for which accurate LCSH are not available. This attempt to work within the system can be stymied not only by the bureaucratic aspect of the process, but by a lack of subject comprehension; the proposal to add “Asexuality” and “Asexual people,” for example, was initially returned with comments from the LC Policy and Standards Division, which is responsible for reviewing subject and classification proposals, indicating their confusion about the concepts involved ([Watson, 2020](#)). Another approach to remediating problems presented by LCSH, such as offensive, inaccurate, and overly vague terms, includes the use or creation of alternative controlled vocabularies such as Homosaurus or Ngā Upoku Tukutuku (Māori Subject Headings) ([Homosaurus, n.d.](#); [National Library of New Zealand, n.d.](#)). The Library of Congress updates not only its subject headings but also its classification schedules (i.e., LC Classification). The division(s) in LC call numbers after the class number are alphanumeric strings called Cutters or Cutter numbers; when a Cutter is assigned by the cataloger, it usually represents the author name or item title, but some parts of the LCC have a Cutter number assigned as well as part of the schedule. In these cases, the Cutter represents a further topical division of the class, often demographic groups, nationalities, or locations. For example, the LCC for books on Libraries – Library science. Information science – Personnel – Special groups, A-Z – Science and technology librarians (i.e., science librarians) is Z682.4.S35, with the Cutter .S35 representing “Science and technology librarians.” In June 2021, the LCC was officially updated to change all instances of Cutters beginning with the letter N representing the word Negroes, to begin with the letter B for Black people. This change came after many years of discussion and advocacy, with some libraries previously implementing local policy

changes to work around the offensive Cutter ([Beckman et al., 2022](#); [Engelson et al., 2021](#)).

Discussions of cataloging tend to be hyper-focused on descriptive and encoding standards—following the rules. The reality, however, is that cataloging exists to facilitate access to materials and information and to meet user needs. Critical cataloging sometimes works within the established standards and systems of description, as with advocating for changes to LCSH and LCC, but sometimes works outside those standards and systems or utilizes them in unconventional ways. Caudle and Schmitz ([2008](#)), for example, describe utilizing MARC fields in local catalog records to create and index metadata that facilitates enhanced catalog functionality and solves local problems for library staff and users.

Collection Development and Collection Policies

Challenges to user needs in discoverability are not limited to the metadata. Another challenge is through the collection and acquisitions of materials. As librarians, we understand that collection development involves choice and can be driven by intrinsic factors as well as extrinsic situational factors such as budget, institutional mission, collection development best practices, a collection development statement, and/or patron base. Therefore, when a librarian does collection development, the choice to say “yes” to an item may result in saying “no” to many other items. These choices are not neutral, because the choices are dependent on the aforementioned situational factors and the points of view, biases, and social identities of the collecting librarian ([Bales & Engle, 2012](#)). Removing the human element from the collection development process does not make the process more neutral. Automated collection development processes such as firm orders and demand-driven-acquisition (DDA) are also subject to the points of view, biases, and social identities of their programmers or users ([Noble, 2018](#)). To combat automated and non-automated biases in collection development, librarians need to frequently ask “What belongs on our shelves?” and, “Do the shelves indicate who belongs in the library?”

Both questions are important and address Diversity, Equity, Inclusion, and Belonging (DEIB). The latter question seeks to rectify the non-neutral implications of identity representation in collection development. There has been an increase in the number of institutions working on collection development policies that include the input of marginalized groups. These collection development policies serve as methods for collecting; weeding; repatriating; and auditing physical, digital, and archival library collections to include the voices of the people who may or may not be favorably represented; such an example is the Protocols for Native American Archival Materials by First Archivist Circle ([2019](#)).

Other academic libraries are revising collection development policies or strategic plan(s) of library services by stating that DEIB initiatives will be the driving factors of the library mission. University libraries are also auditing their library policies and reporting out about: how the policies privilege already privileged groups, how the policies contribute to systemic forms of oppression, and how to reform policies to mitigate or reverse harm ([Baildon et al., 2017](#); [Redd et al., 2020](#)). In 2021, the Furman University

Libraries (FUL) conducted a similar revision of the FUL strategic plan that centered DEIB in its library services, its people, and its collections. We acknowledge that the work of revising library policies and including DEIB statements in collection development policies can be an effective start to dismantle systemic oppression, but those written statements are not enough. Dedicated time and effort in auditing collections, revising metadata, and updating collection practices is needed if we wish to amplify the voices of marginalized individuals in our collections and physical spaces.

STEM Librarianship

In the Library and Information Sciences (LIS) field generally, and its sub-field of STEM librarianship, marginalized identities experience a lack of representation on the stacks shelves, which results in harm ([Adler, 2017](#); [Barr-Walker & Sharifi, 2019](#); [Bussmann et al., 2020](#)). We ask that you take a few seconds to:

1. Think of a scientist.
2. Write down or say their name aloud.
3. Reflect.

Did you name Albert Einstein, Sir Isaac Newton, Galileo Galilei, Charles Darwin, or another “household name” scientist?

If we asked a patron to do the same exercise, or if they scanned the shelves of a STEM library collection, these “household name” scientists and their discoveries would be on the shelf – sometimes even spanning multiple genres outside of scientific discovery. Lack of representation in media (i.e., books, films, and other library materials) may create patron de-identification with a topic. People who do not identify with a STEM topic, or cannot envision themselves conducting science, may even refer to themselves as “not a math [chemistry... science...] person.” More specifically, in STEM collections, identities of race and gender are often stereotyped, and those stereotypes are reinforced through history of science and biographical works, as many of these works center white, male scientists. These collections reflect how people have come to perceive science and/or scientists ([Bowers et al., 2017](#); [Carli et al., 2016](#)). This perception not only affects patrons, but how librarians collect and what librarians collect.

This bias toward representing white men in science then affects the “who, what, when, where, and why” questions that people ask about science and the scientists who conduct it. The “who” questions are historically biased in referencing the dominant identity: white male scientists in STEM ([Bowers et al., 2017](#)). When there is a lack of diverse materials in the STEM collection and on the physical shelves, the “who” questions can only be researched about the dominant identity. Identity work and questions of identity are crucial to DEIB work in STEM and STEM libraries ([Chen et al., 2021](#); [Dou & Cian, 2022](#); [Lester & Ruth, 2022](#)). In addition to library-wide policy audits, some libraries have conducted DEIB audits of their collections to try and capture the “who’s” who are missing. A few of these identities that librarians have focused on in diversifying library collections include Indigenous Peoples, people of color, women in science, LGBTQIA+ individuals, neurodivergent individuals, and other social identities ([Barr-Walker & Sharifi, 2019](#); [Bowers et al., 2017](#); [Maina, 2012](#)).

It is not for lack of prestige or scientific work conducted by people who identify with these groups either; these minoritized identities have been just as successful in science and have collaborated with some of the most esteemed, recognized, or prolific scientists in their discoveries, but are overshadowed by white, male scientists. One of the most famous examples is James Watson, Francis Crick, and Maurice Wilkins, who were awarded the 1962 Nobel Prize in Physiology and Medicine. It was Rosalind Franklin's X-ray crystallography methodology that aided them in the discovery of the double helix structure of DNA, yet she was neither named nor later awarded the Nobel Prize, because Nobel Prizes are not awarded retroactively or posthumously.

Franklin's story is far from the only example, and this famous example still centers whiteness. There is a shift, however, in popular Western media to recognize minoritized persons in science. Scientific greats like Kathryn Johnson, Chien-shiung Wu, and Jocelyn Bell Burnell are now being celebrated for their contributions to science. As these stories about the invisible college of women and minoritized populations emerge, it is the responsibility of the STEM librarian to collect materials that further illuminate the experiences and contributions of these previously invisible people; however, it is prudent that librarians do not just collect materials of (now) well-known or culturally popularized, minoritized scientists either. Collection development is an ongoing process that can – and should – amplify the voices of those who may not be as well known in the STEM disciplines by name.

The erasure of persons and identities is not the only challenge STEM librarianship has had in terms of DEIB collection development. STEM librarians must also consider the centralization of Western Science and its history of colonialist practices that erase the knowledge of Indigenous Peoples, Traditional and/or Aboriginal knowledge, and the first peoples of any colonized nation in many canonical scientific works ([Gill, 2018](#); [Maina, 2012](#)). Collecting original authored works by minoritized peoples may be harder than collecting works about them that are authored by white, Western, and/or colonialist ethnobotanists, biographers, or anthropologists. STEM Librarians have a responsibility to change out these colonist texts and/or juxtapose and/or contextualize such texts through collection development.

Ironically, through colonization and modernity, science is thought to be a global enterprise, but is not treated as such. English is the dominant language in scientific publishing followed by other global, colonist languages ([Gordin, 2015](#)). There is plenty of science written in Chinese, Japanese, Spanish, Portuguese, and Hindi that advanced science in local communities/regions/countries and can be applied to a global context, yet this literature is largely ignored in academic STEM publishing if left untranslated ([Márquez & Porras, 2020](#); [Ramírez-Castañeda, 2020](#)). Translation is not the all-cure to this issue, though. Even when science is translated from a non-English language to English and then indexed in a database that has worldwide reach like ScienceDirect (SD), Web of Science (WoS), or Scopus, there are often translation errors that can inhibit discovery and attribution ([Ainsworth & Russell, 2018](#)).

Collaborative Project Background

Language about, descriptors for, and the absence of diverse materials spanning race, ethnicity, region/location, gender, and other identities impedes advancements in scientific research. Changes to LCC are much less frequent than changes to LCSH, due in part to the logistical difficulties of making retrospective updates to physical materials. One option for making classification and Cutter changes is to leave existing materials as-is, but aside from the social justice implications, this results in items being partitioned on the shelves, disrupting browsability and thus discoverability. We therefore designed and conducted a project to update all instances of the changed N Cutters in our collections. The identification of all N Cutters revealed very few items in STEM subject areas; this prompted questions about other ways that cataloging practice might perpetuate harm to marginalized groups by leaving silences in the metadata of STEM collection records and how these items could be identified. We conducted an assessment, described below, of Furman's STEM collection holdings to identify items representing DEIB concepts. From this project, lists of physical and electronic materials were generated. We then added local metadata to the bibliographic records for those materials to create linked, collocable collections within the catalog.

Methods

The last weeding project for the Sanders Science Library collection was conducted by the previous Science and Outreach librarian in 2017. For that weeding, the STEM library reference, oversized, and general collections were evaluated against the existing collection development policy, which remained the same at the time of writing this article. In 2019, a shelf inventory project was initiated by the current Science and Outreach Librarian (Dhyne) but was put on hold for two years due to library operations disruptions during the height of the COVID-19 pandemic. In finishing the shelf inventory project in 2021, Dhyne went through and replaced missing, lost, or stolen items, which returned the collection to its 2017 state, because purchasing was also put on hold until 2021 due to the pandemic.

We audited the collection by using two common information seeking modes common for both patrons and librarians: searching the library catalog and shelf browsing ([Huvila, 2013](#); [Jiang, 2013](#)).

Searching the Catalog

In order to capture as many titles as possible in our catalog searches, we created a three-part search strategy (SS) using keywords (KW) and LCSHs.

For search strategy 1 (SS1; see [Appendix A](#), Figure A1) we conducted simple KW phrase searches for bibliographic records in Primo, our discovery layer, for "contains my keywords" or "exact match" anywhere in the record (e.g., Women in Science, Black Scientist, etc.). The results list was then sorted by relevance and reviewed in descending order. Items that returned the keyword phrase as "exact match" (i.e., KW1 KW2) and "contains my keywords," which may have transposed keywords or play between keywords (i.e., KW2 KW1; or KW1 ... KW2), were assessed based on our

inclusion and exclusion criteria for bibliographic records. The inclusion criteria required that the KW phrase was a main idea (KWaMI) in the bibliographic record. A main idea was defined as having more than one instance of the KW phrase and/or synonymously related concepts throughout the record as the KWs relate to science. If the bibliographic record met the inclusion criteria, we recorded the title and the call number and then marked the item to be added to its respective collocated collection by Nance. Examples of when items did not meet the inclusion criteria were when the KW phrase was mentioned only in a single chapter/ glossary/ appendix or if the “contains my keyword” search separated the KW phrase so much that the item did not apply to the KW search idea or scientific themes.

We repeated this process of reviewing bibliographic records until ≤ 50 consecutive bibliographic records in the results list from our KW searches did not meet the KWaMI inclusion criteria. If the inclusion criteria for SS1 were met at any point in reviewing the ≤ 50 consecutive bibliographic records, the count to ≤ 50 consecutive bibliographic results that did not meet the inclusion criteria restarted. For example, if result 1-10 met the inclusion criteria, but bibliographic record 11 did not meet the inclusion criteria, we would then review result 12. If result 12 met the inclusion criteria, the count to ≤ 50 consecutive non-inclusive bibliographic records restarted. Some results lists were fewer than 50 bibliographic records, and in that case, all bibliographic records were reviewed.

The title list compiled from SS1 was used in SS2 (see [Appendix A](#), Figure A2). For SS2, each title from the SS1 title list was searched as “exact match” in Primo. We used the collected metadata (title and call number) to confirm the bibliographic records returned matched the previously documented title on the title list. After this was confirmed, we then documented all of the LCSHs in the bibliographic record on a separate LCSH list (see [Appendix B](#)).

In order to systematically search the collection and capture related bibliographic records outside of KW searching, we used the SS2 LCSH list to find related bibliographic records that may have not appeared because the records were empty, missing metadata, not robust, and/or our KW phrase was too general or specific. In SS3 (see [Appendix A](#), Figure A3) the LCSHs were searched as “exact match” in Primo (e.g., Traditional Environmental Knowledge; African-American Scientist – Biography – United States). We reviewed all bibliographic records in the result list for KWaMI inclusion criteria. When the KWaMI inclusion criteria was met, we documented the title for inclusion in the respective collocated collection. In addition, the LCSHs of each item were reviewed, and the inclusion criteria for LCSHs required that the LCSH mentioned or were related to:

- Non-white race identifiers, e.g., African American, Black; American Indian or Alaska Native; Native Hawaiian or Pacific Islander; Asian.
- Non-white ethnicities, e.g., Black, Chinese, Ghanaian, Hispanic, Japanese, Jewish, Latino, etc.,
- Gender or sex, e.g., woman, man, male, female, intersex, non-binary, transgender
- Gender role or gender in... , e.g., wife, partner, spouse, caretaker, women in mathematics
- Sociodemographic, socioeconomic, and social movements

- Science or science adjacent terminology, areas of study (-ologies), or careers

If the LCSH from the bibliographic record met the inclusion criteria, regardless of meeting the KwaMI inclusion criteria, we documented the LCSHs (see again [Appendix B](#)). SS3 was repeated until all LCSH that met the inclusion criteria were searched and the results exhausted.

Shelf Browsing

In order to fill gaps that were not captured in the catalog searches and to recreate a patron experience of shelf browsing, we took our collocated collection title list and sorted them based on item type. Once the list was narrowed to physical items, we then took a 1/3 random sample of physical items and used their call numbers to browse the surrounding items. Surrounding items were defined as the items that were one entire shelf above the item, the entire shelf the item was on, and one entire shelf below the item. As librarians, we would be able to know what items were lost, missing, or checked out, so our interpretation of what diverse items we had in the collection was skewed. In order to objectively look at the items like a patron and to preserve what was physically available to browse at the time of the review if we needed to reference the browsing experience, we took pictures of the surrounding shelves. Call numbers and titles were recorded from these pictures and then searched by title as “exact match” in the catalog. Items that met the KwaMI inclusion criteria were identified for the local collection.

Adding Metadata

Furman University is a member of the PASCAL (Partnership Among South Carolina Academic Libraries) consortium; we share our catalog records and thus need to be especially careful to ensure that our methods of applying changes to bibliographic records impacts only local data. The MARC fields that can be used with local bibliographic metadata in Alma are 77X/78X (linking fields for related resources), 09X (local call numbers), 59X (local notes), 69X (local subjects), and 9XX fields (other local data, not defined by MARC21). Because Alma allows for only a limited number of local MARC fields, PASCAL created a document recommending best practices for utilizing 9XX fields within the consortium; we chose to use the one there designated as a corollary to a local 710 (Added Entry – Corporate Name).

In the Alma Metadata Editor, we created an Institution Zone (i.e., local) Drool normalization rule to add a local MARC field 965 containing a collection name to the bibliographic records selected (see [Appendix C](#), Figure C1). We then created a normalization process in the Metadata Configuration to allow the rule to be applied to a set of records.

When the lists of materials had been compiled, we added each list as an itemized set in Alma by uploading it as a list of MMS IDs (Metadata Management System ID, the unique Alma record identifier) in an Excel file. We ran the normalization process as a job on each set; the same rule and process were utilized every time, but the name of the collection was changed in the normalization rule in the Metadata Editor.

Results and Discussion

Through our methods, we discovered that our institution was greatly lacking in physical items that represent women and minoritized groups in STEM as individuals as well as works that highlight the achievements of historically minoritized scientists. Many of the items we have that represent minoritized identities are reference items; items that summarize issues and challenges in science careers; and/or items which give a general overview of several scientists who hold the same social identity. We had more items related to Indigenous science than expected; however, many of the items were science conducted about Indigenous Peoples and their lands rather than science conducted by Indigenous Peoples. We also discovered that the items in our STEM collection are outdated and scattered across the institution between the main library and science library branch, which was a known issue prior to the project due to spacing limitations, but this issue illuminated how tedious and jarring our browsing experience can be. Patrons who may not be very familiar with the university library structure at Furman University may find it difficult to assess the extent of a topic as represented in the STEM collection.

There are many benefits to belonging to a state-wide library consortium. Our membership helps our consortia libraries have collective bargaining power and save personnel and monetary resources by utilizing consortial lending; however, it appears that our reliance on collecting around materials owned by other institutions may have strongly shaped our collection development techniques. Lending physical materials between libraries is a great boon, but the presence of a physical item within a network at one library does not help with discovery of DEIB materials or DEIB efforts tied to physical representation on our libraries' shelves. Much of our evolving STEM collection is collected as ebooks, electronic DDA titles, or pay-per view articles, and these materials are "invisible" to patrons in our physical spaces; in addition, these items rely on vendor-supplied bibliographic records for discovery. Another aspect of the consortium impacting discovery is a platform migration that occurred only a few years ago in which all members moved to a consortial catalog; members did not control which institution's record was chosen to become the primary, shared record for any given item. Metadata may have been lost for some records, impacting the discoverability of items via keyword and LCSH searching.

Additionally, as a sub-field of LIS, STEM librarianship must acknowledge that science, through its heuristic methods and basis in empiricism, is only one "way of knowing." Empiricism paired with colonialism can potentially erase the identities of scientists and incorrectly attribute knowledge to certain groups through what Western science deems "original scientific discovery." Our STEM collection centers Western science, and until 2019, Western science was evidently the collecting priority. While scientific frameworks, theories, and experimentation will continue to be the collecting priority, our next steps include collecting non-Western scientific works and developing a collaborative plan with our librarian colleagues to ensure that other "ways of knowing" are represented in the appropriate collections across the Furman University Libraries. Overall, collecting diverse, scientific physical and electronic materials will be a collection priority and consortial holdings data will be weighted less in the collection development process.

By the time we discussed the possibility of connecting items in the catalog to create a local collection, we had already received a similar request from the Associate Director for Special Collections and University Archivist. In the case of special collections materials, the desires were to make donor information more visible in the Primo VE (OPAC) interface and to allow items given by any specific donor to be quickly and easily collocated. The local historical practice was to utilize an item-level public notes field that is searchable in Alma, or the “back end” interface, but not searchable by the public, or sometimes to record the donor metadata in a local bibliographic notes field (MARC 59X), which is searchable in Primo but not Alma. Neither option allows for faceting nor linking. As a result, we were already pursuing other options within the ILS for collocating records or utilizing collocable metadata.

We evaluated two primary options for collocating items within the catalog. Alma includes out-of-box functionality that allows selected bibliographic records to be displayed, searched, and faceted as a “collection” (not to be confused with Alma electronic collections). Creating and organizing collections in this way is simple and quick, but this option did not meet our needs. The collection function mimics the hierarchy of archival organization and appears to be designed for use with local digital collections; the options for sub-collections and thumbnail-based navigation were confusing to use with catalog records for book materials. This solution was also less than ideal because the longevity and interoperability of the metadata was unknown – because it relies on a feature of the platform, we could risk losing the collocating metadata in a future ILS migration. For this reason, we chose to utilize local metadata in the MARC bibliographic records.

We added a total of 575 bibliographic records for physical and electronic materials to three collections (see [Appendix C](#), Figure C2), broken down as follows:

- Indigenous Science: 85 items
- Women in Science: 410 items
- Black and African Americans in Science: 80 items

The use of local collection headings allows for functional flexibility as well. The field is indexed as a search term, added to the public record display, and linked as a search query similar to the way subject headings are linked. We have also made the field a facet that displays as “Local Collection,” which can be used to filter completed searches. Cumulatively, the functional result is that the additional metadata tie the items together and offers multiple paths for users to discover both the collections and their associated items.

Limitations and Challenges

The size, values, and type of our library and institution were not limiting factors in these projects. Our work aligns with Furman University’s values, so we were not limited in terms of institutional support. The smaller size and private status of our institution tends to reduce bureaucratic roadblocks, but we do recognize that our small size means that time is a major limitation due to staffing.

The Cutter project has made so much headway because a student worker can help, but we are still limited by the cataloger's ability to make time for it – we have only one spine label printer, which can only be used from the cataloger's computer. Some libraries may find it even more difficult to complete retrospective updates, particularly those with very large collections and those with very few resources who find it difficult to even manage everyday cataloging work. We also acknowledge that lack of control over some ILS functions poses additional challenges.

Some other challenges that we will need to consider regarding our physical and digital collections are our collection methods. Firm orders, DDAs, and other semi-automated purchases are hard to account for unless data is pulled on a rolling basis. Our library also allots materials funds to academic departments, and academic departments are allowed to purchase items without approval from their librarian liaison(s). Since liaison librarians do not approve purchase of these items, it will be necessary to establish a procedure for reviewing newly acquired materials via this collection method to identify which materials should be added to one or more of the local collections.

Conclusion and Next Steps

Social justice work does not require completely dismantling a system; incremental change can be impactful, and the work may simply be in chipping away at updating deprecated Cutters or using MARC metadata to collocate items in a new way in your library management system. Creative and flexible problem-solving and openness to change may offer more opportunities for social justice work than any one specific approach. Our next steps include identifying other minoritized identities, which includes parsing out intersectionality between social identities. Intersectional identities may mean that some records could belong to more than one collection, and a method for systematically identifying this overlap should be developed. It will be our responsibility to continue to user test and seek feedback on our collocated catalog collections in order to make adjustments when necessary. As part of this process, we have committed to revising the titles of the collocated collections after consulting with members of the identified groups.

The gap in the literature at the time of writing left us to create a highly individualized methodology that fit our needs for this audit; we recognize that the methods could be improved, and our methodology may not scale to other institutions. Nonetheless, we encourage catalogers and STEM librarians to collaborate in critical librarianship and cataloging practices.

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Appendix A

Figure A1. SS1 to Search and Build a Title List

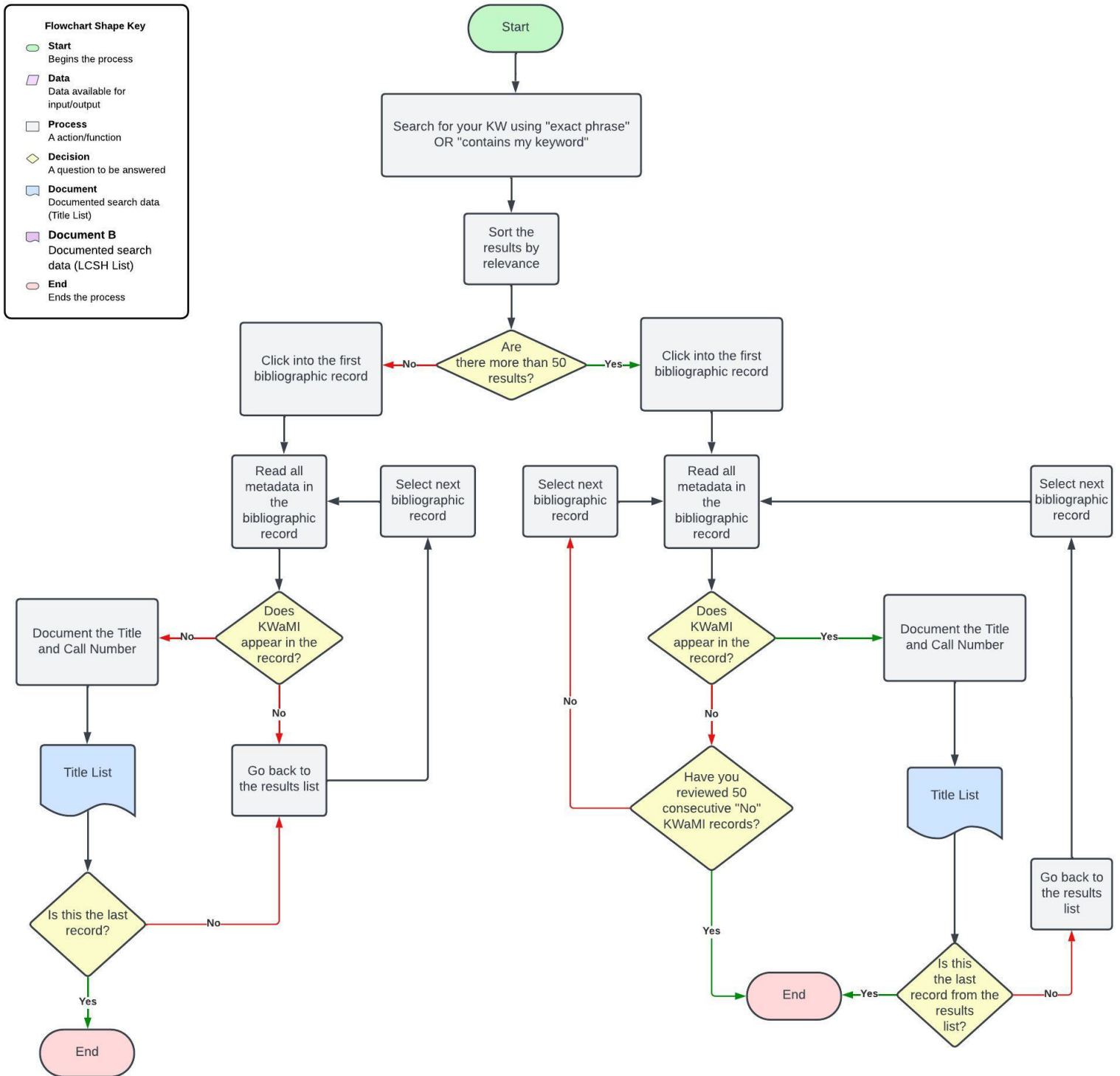


Figure A2. SS2 to Search and Build an LCSH List from Title List

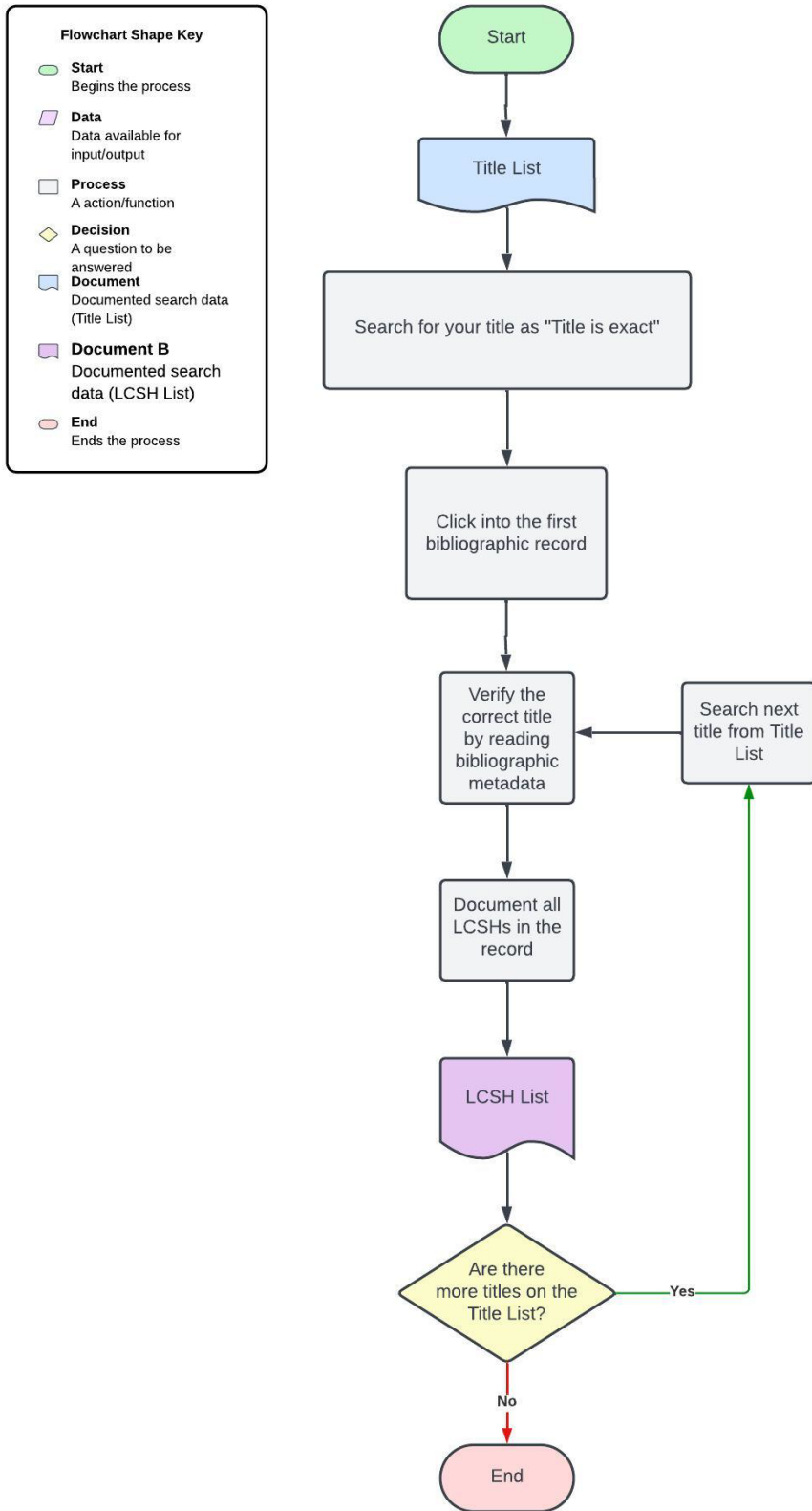
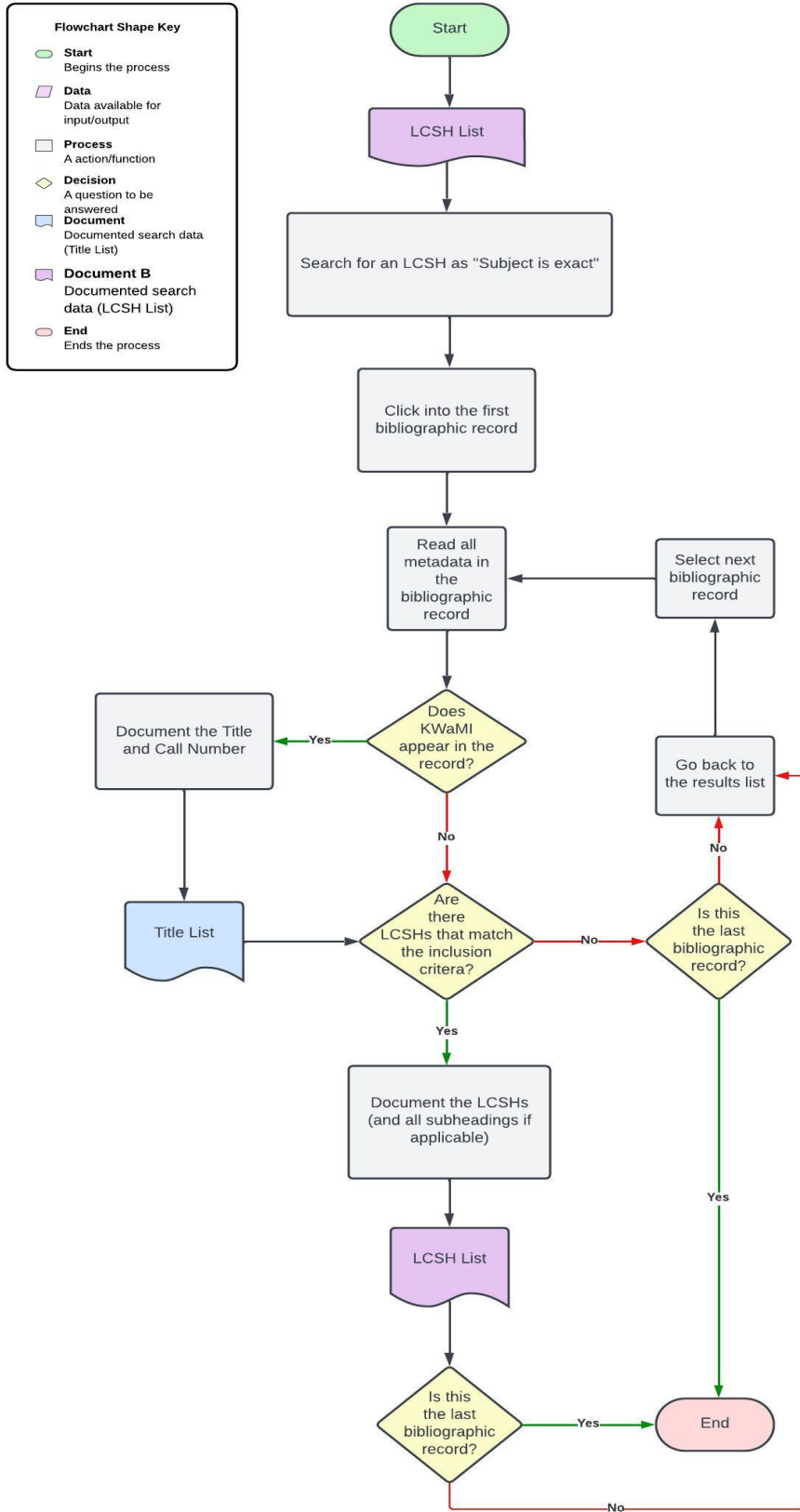


Figure A3. SS3 to Search LCSHs & Discover LCSHs and "Hidden" Titles to Add to the Title List



Appendix B

Women in STEM LCSH List from Keyword Search “Women Scientist”

- (KW) Women Scientist
 - LCSHs associated:
 - Acevedo, Sylvia
 - —Juvenile literature
 - Aerospace engineering
 - Aerospace Technology and Astronautics
 - African American college teachers
 - —Selection and appointment
 - African American women
 - —Biography
 - African American women in the professions
 - African American women scientists
 - Agriculture
 - Analgesics—Therapeutic use
 - Application software
 - Applied mathematics
 - Art and society
 - Association for Women Geoscientists
 - Astronautics
 - Astronomers
 - —Massachusetts—Biography
 - Astronomy—History
 - Astronomy—Observations
 - Astronomy, Observations, and Techniques
 - Atomic bomb—United States—History
 - Atomic bomb victims—Japan-Hiroshima-shi—Biography
 - Barres, Ben, 1954-2017
 - Bassi, Laura, 1711-1778
 - Beauty, personal
 - Black people—Race identity
 - Biodiversity
 - Biographies
 - Biology
 - —General
 - —History
 - —Philosophy
 - —Research
 - Biochemists—United States—Biography
 - Biomedical engineers
 - —Canada—Biography
 - Biotechnology
 - Birth control—Environmental aspects
 - Body image
 - Body image in women
 - Breast—Cancer
 - —Etiology
 - —Patients—United States—Biography
 - —Research—Moral and ethical aspects
 - Businesswomen
 - Cancer—Patients—Biography
 - Cardiology
 - Carson, Rachel, 1907-1964
 - —Juvenile literature
 - Ceramic engineering—biography
 - Chemistry—History
 - Chemical engineers—Biography
 - Chemists

- Childbirth—United States
- China
 - —History—Cultural Revolution, 1966-1976—Personal narratives
- Chinese American women
 - —Biography
 - —Juvenile literature
- Circuits and Systems
- Climate change [/Climate Change Impacts]
- Climatic changes—Social aspects
- College dropouts
 - —United States—Prevention
 - —Prevention
- College teachers—United States—Attitudes
- Communications engineering, networks
- Communication in science
- Communication of technical information
- Computers
- Computers and women
- Computer industry—United States—History—20th century
- Computer science
 - —Juvenile literature
 - —United States—Biography
 - —Vocational guidance—Juvenile literature
- Computer security
 - —Congresses
- Comstock, Anna Botsford, 1854-1930—Juvenile literature
- Cori, Gerty T (Gerty Theresa), 1896-1957
- Cosmology—History
- Curie, Marie, 1867-1934
 - —Juvenile literature
- Cyberspace—Security measures—Congresses
- Dark matter (Astronomy)
- Diabetes
- Discoveries in science
 - —Drama
- Discrimination in employment—United States
- Discrimination in higher education
- Diversity in the workplace—United States
- DNA
 - —History
 - —Drama
 - —Research
 - —Drama
- Du Chatelet, Gabrielle Emilie Le Tonnelier de Breteuil, marquise, 1706-1749
- Earth Science Women's Network
- Ecocriticism
- Ecofeminism in literature
- Ecologists
 - —Australia—Biography
- Educational innovations
- Electrical engineering
- Electronic circuits
- Endocrinology
- Engineers
 - —Supply and demand
 - —United States—Biography—Juvenile literature
- Engineering
 - —Study and teaching—sex differences
 - —Study and teaching (Higher)—United States
 - —Vocational guidance
 - —United States
- Engineering mathematics
- ENIAC (Computer)—History
- Entomologists

- —Germany—Biography—Juvenile literature
- Entomology
 - —Germany—History—17th century—Juvenile literature
- Environmentalism
 - —United States
- Environmental engineering
- Environmental engineering/Biotechnology
- Exercise for women—Physiological aspects
- FAMILY & RELATIONSHIPS / Parenting / Motherhood
- Feminism
 - —Public opinion
 - —United States—Biography
- Feminism and higher education—Canada
- Feminism and literature
- Feminism and science
 - —Congresses
 - —United States—History—19th century
- Feminists—United States—Biography
- Feminist criticism
- Feminist theory
- Fertility, Human
 - —Social aspects
 - —Economic aspects
- Food—Biotechnology
- Food Science
- Forensic sciences—Juvenile literature
- Forest canopy ecology
- Franklin, Rosalind, 1920-1958
 - —Drama
- Frize, Monique, 1942-
- Galaxies
- Gender expression
- Gender studies
- Geneticists
- General Practice / Family Medicine
- General practice (Medicine)
- Geomagic (Firm)
- Girls—Education (Early childhood)—United States
- Glass ceiling (Employment discrimination)—United States—History—20th century
- Glass manufacture—biography
- Globalization—Social aspects
- Goodall, Jane, 1934—Juvenile literature
- Gynecology
- Hamerstrom, Frances, 1907-1964—Juvenile literature
- Health & Biological Sciences
- Hispanic American scientists
 - —Biography—Juvenile literature
- Hispanic American women
 - —Biography—Juvenile literature
- History and Philosophical Foundations of Physics
- History of Biology
- History of Chemistry
- History of Computing
- History of Mathematical Sciences
- History of Science
- Human biology
 - —sex differences—political aspects
 - —Social aspects
- Human reproductive technology
 - —Economic aspects
 - —political aspects
- Image processing
- India
- Industrial safety

- Infertility—Treatment—Economic aspects
- Information Systems Applications (incl. Internet)
- Innovation/Technology Management
- Insects
 - —Metamorphosis
 - —Juvenile literature
- Intellectual life
- Internal M[m]edicine
- Internet
 - —History
- Jet Propulsion Laboratory (U.S.)
 - —Biography
 - —History
- Job Careers in Science and Engineering
- JUVENILE NONFICTION
 - —Biography & Autobiography
 - —Women
 - —Science & Technology
 - —People & Places—United States—Hispanic & Latino
- Life Sciences
- Life Sciences, general
- Lowman, Margaret
- Manhattan Project (U.S.)—Juvenile literature
- Manufacturing, Machines, Tools, Processes
- Marriage
- Maternal health services—United States
- Mathematical and Computational Engineering
- Mathematics
 - —Study and teaching—sex differences
 - —Study and teaching (early childhood)—United States
 - —Vocational Guidance
- McClintock, Barbara, 1902-1992
- Medicine
 - —History
 - —Research
 - —Missouri—Saint Louis
- MEDICAL / Gynecology & Obstetrics
- Medical tourism
- Merian, Maria Sibylla, 1647-1717
 - —Juvenile literature
- Microbiology
- Midwifery—United States
- Minorities in engineering
 - —United States
- Minorities in science
 - —United States
- Minorities in technology
 - —United States
- Minority college students
 - —Florida—Case studies
- Mistresses
 - —France—Biography
- Mitchell, Maria, 1818-1889
- Molecular biology
- Molecular Medicine
- Mothers
- Motherhood
 - —Psychological aspects
 - —United States
- Nanochemistry
- Nanjing hang kong hang tian da xue—Biography
- Nanoscale science
- Nanoscale Science and Technology
- Nanoscience

- Nanostructures
- Nanotechnology
- Nanotechnology and Microengineering
- Naturalists
 - —Biography
 - —Juvenile literature
 - —United States
 - —Biography
- Natural history
 - —Biography—United States
 - —United States
- Natural history literature
 - —women authors
- Neurobehavioral disorders—Patients
 - —Biography
 - —Rehabilitation
- Neurobiologists—United States—Biography
- Neurobiology
- Nobel Prize winners
 - —Drama
- Nuclear warfare—Moral and ethical aspects
- Nuclear weapons—Nevada—Testing
- Nuclear weapons information—United States
- Observational, Astronomical
- Obstetrics
 - —United States
- Obstetrics/Perinatology/Midwifery
- Occupational diseases
 - —Sex factors
- Oncology
- Operations Research/Decision Theory
- Oral contraceptives
 - —Research
 - —History
 - —Social aspects
- Ovum
- Pain—Treatment
- Parsons, Elsie Worthington Clews, 1874-1941
- Parenthood
- Plant breeding
- Plant Breeding/Biotechnology
- Philosophy of Biology
- Philosophy of nature in literature
- Physical sciences—juvenile literature
- Physical sciences & Mathematics
- Physics
- Popular Science in Astronomy
- Population—Environmental aspects
- Practice and Hospital Management
- Practice of medicine
- Pregnancy—Psychological aspects
- Primatologists—England—Biography—Juvenile literature
- Professions—Women
- Psychologists
 - —Canada—Directories
 - —United States—Directories
- Q (Chien-shiung), 1912-1997—Juvenile literature
- R & D/Technology Policy
- Radioactivity—History—Juvenile literature
- Rain forest ecology
- Relations with women
- Research, Industrial—History
- Rocketry
- Rothschild, Miriam

- —Juvenile literature
- Science
 - —Awards
 - —Experiments
 - —Juvenile fiction
 - —History
 - —20th century
 - —Italy—History
 - —Philosophy
 - —Social aspects
 - —Study and teaching—sex differences
 - —Study and teaching (Early childhood)—United States
 - —Study and teaching (Higher)
 - —United States
 - —Study and teaching (Secondary)
 - —Vocational guidance
 - —United States
- Sciences - General
- Science e[Education]
- Science fairs
- Scientific illustration
 - —Germany—History—17th century—Juvenile literature
- Scientific illustrators
 - —Biography—Juvenile literature
- Scientific surveys
- Scientists
 - —Biography
 - —Juvenile literature
 - —Drama
 - —Great Britain—Biography
 - —Family relationships
 - —France—Biography
 - —Interviews
 - —Juvenile fiction
 - —Professional ethics
 - —Supply and demand
- Self-care, Health—Audio-visual aids
- Self-experimentation in medicine
 - —Juvenile literature
- Sex customs
- Sex differences
 - —Research
- Sex differences in education
- Sex discrimination against women
 - —History
 - —United States
 - —History—20th century
- Sex discrimination in employment—United States
- Sex discrimination in higher education—Canada
- Sex discrimination in science
 - —History
 - —United States
- Sex (Psychology)
- Sex role
 - —Research
 - —United States—History
- Sexism in medicine
- Sexism in science
- Sexism in sociobiology
- Signal, Image and Speech Processing
- Signal processing
- Skin—Bleaching—Psychological aspects
- Space sciences
- Space sciences (including Extraterrestrial Physics, Space Exploration and Astronautics)

- Speech processing systems
- Sports medicine
- Spouses
- Social inequality
- Social policy
- Social sciences
- Social scientists
 - —Biography
 - —Canada
 - —Directories
 - —Biography—Directories
 - —United States
 - —Directories
 - —Biography
 - —Directories
- Social structure, Social Inequality
- Sociology
- South Asia
- Sports for women—Physiological aspects
- Surgical O[ncology]
- Sustainable Development
- Systems and Data Security
- Technological innovations
 - —History
- Technology and civilization
- Transgender people—United States—Biography
- Universities and colleges—Faculty—Employment—Sex differences—Congresses
- United States
 - —Intellectual life—20th century
 - —Race relations
 - —Social conditions
- United States Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development
- Voltaire, 1694-1778
 - —Relations with women
- Wildlife conservation—Juvenile literature
- Wildlife crimes
- Wilson, Barbara A., 1941- —Mental health
- Women
 - —Africa
 - —Social conditions
 - —Economic conditions
 - —Biography
 - —Crimes against
 - —Economic conditions
 - —Education—Law and legislation
 - —United States
 - —Education (Graduate)—United States
 - —Employment
 - —Health aspects
 - —United States
 - —Evolution
 - —Government policy
 - —History
 - —Physiology
 - —political aspects
 - —Psychology
 - —Social conditions
- Women admirals—United States—Biography
- Women and the arts
 - —History
- Women and the environment—United States
- Women and Underrepresented Minorities in Computing A Historical Social Study
- Women anthropologists—United States—Biography

- Women astronauts
 - —Biography
- Women astronomers
 - —Massachusetts—Biography
- Women athletes
 - —Health and hygiene
 - —Physiology
 - —Psychology
- Women biologists—United States—Biography
- Women-owned business enterprises
- Women chemists
 - —biography
 - —France—Biography—Juvenile literature
 - —Poland—Biography—Juvenile literature
 - —United States—Congresses
- Women college graduates
 - —Attitudes
 - —United States—Attitudes—History
- Women college teachers
- Women computer industry employees
- Women computer engineers—United States—Biography
- Women computer programmers
 - —United States—Biography
- Women computer scientists
 - —Biography
 - —Congresses
 - —United States—Biography
- Women earth scientists
 - —United States
 - —Biography
- Women ecologists
 - —Australia—Biography
- Women engineers
 - —Canada—Biography
 - —Legal status, laws, etc.—United States
 - —United States
 - —Biography—Juvenile literature
- Women engineering students
 - —Florida—Case Studies
- Women environmentalists—United States
 - —Biography
- Women forensic scientists—Juvenile literature
- Women geneticists
 - —Biography
 - —United States—Biography
- Women geologists
 - —History
- Women glassworkers—biography
- Women life scientists
- Women inventors—United States—Biography
- Women in astronautics
- Women in chemistry—United States—Congresses
- Women in computer science—juvenile literature
- Women in computer sciences—United States—Biography
- Women in engineering
 - —Government policy—United States
 - —United States
 - —Social aspects—Congresses
- Women in higher education
 - —Canada
- Women in information science
- Women in physics
 - —Congresses
- Women in science

- —Congresses
- —Drama
- —Europe, Western
 - —Biography
 - —History—19th Century
- —Germany
- —Government policy—United States
- —History
- —Italy—History
- —Juvenile literature
- —Social aspects—Congresses
- —South Africa
- —United States
 - —History—20th century
- —Vocational guidance
- Women in technology
- Women in the professions—Australia
- Women mathematicians
 - —Biography
 - —United States
 - —Biography
- Women medical scientists
 - —Taiwan—Biography
 - —United States—Biography
- Women naturalists
 - —Biography—Juvenile literature
 - —Germany—Biography—Juvenile literature
 - —United States
 - —Biography
- Women Nobel Prize winners—Biography
- Women physicians—Texas
- Women physicists
 - —Biography
 - —Congresses
- Women primatologists—England—Biography—Juvenile literature
- Women Scholars
 - —United States
- Women scientist
 - —Vocational guidance
- Women scientists
 - —Biography
 - —Dictionaries
 - —Juvenile literature
 - —Canada
 - —Biography
 - —Congresses
 - —Education (Higher)
 - —South Africa
 - —Germany
 - —Employment—Congresses
 - —Family relationships—United States
 - —History
 - —Interviews
 - —Italy—Biography
 - —Juvenile literature
 - —Legal status, laws, etc.—United States
 - —Social aspects—Congresses
 - —Texas
 - —United States
 - —Congresses
 - —Biography
 - —Vocational guidance—Congresses
- Women social reformers
 - —United States—Biography

- Women social scientists
 - —United States
 - —Attitudes—History
 - —Biography
- Women social scientist
 - —History
- Women zoologists—Canada—Biography
- Women's studies
 - —History—19th Century
- Women's rights
- Work and family
 - —United States
- Working mothers—United States—Biography
- World War, 1939-1945—Science
- Wu, Cheng-wen—Family
- Wu, Felicia Y.-H (Felicia Ying-hsiueh)
- Young women
 - —China—Biography

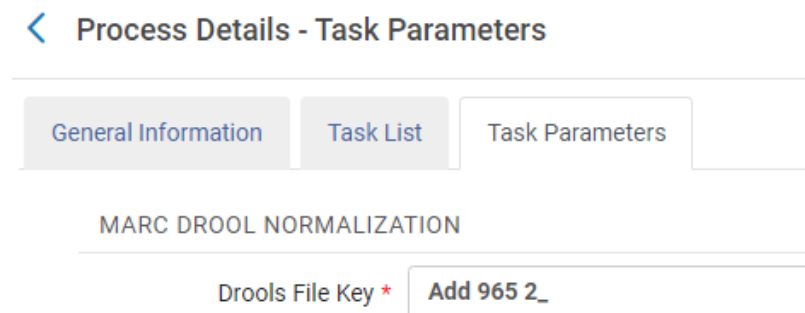
Appendix C

Normalization Rule and Process

The Drool normalization rule was created in the Alma Metadata Editor to add MARC field 965 with first indicator 2:

```
rule "Add 965 2_"
when
  (not exists "965.{2,-}.a.Indigenous Science")
then
  addField "965.{2,-}.a.Indigenous Science"
  addSubField "965.9.local" if (exists "965.{2,-}.a.Indigenous Science")
end
```

The normalization process was created in the MARC21 Bibliographic Metadata Configuration Profile with the Marc Drool Normalization task and the relevant normalization rule (“Add 965 2_”) selected as the Drools File Key.



Primo Display

Publisher	Springer Nature
Publication Date	2021
Edition	1st ed. 2021.
Format	1 online resource (XXXVI, 350 p.)
Local Collection	Indigenous Science >

Figure C1. Public display of local collection heading in Primo VE, linked as a search query.

Refine my results

Sort by Relevance ▾

Availability ▾

Publication Date ▾

Resource Type ▾

Subject ▾

Library ▾

Collection ▾

Local Collection ▲

Indigenous Science (85)

Author/Creator ▾

Language ▾

Figure C2. Display of the local collection heading as a filter facet in Primo VE.