Mapping Chicagoland: A Collaborative Model for Digitizing Chicago's Historical Maps

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Mapping Chicagoland is a National Endowment for the Humanities (NEH)-funded project to make openly available over 5,000 georeferenced historical maps of Chicago from three institutions: The Chicago History Museum, the Newberry Library, and the University of Chicago Library. *Mapping Chicagoland* strategically deployed collaboration at phases that benefitted most – such as map selection, staffing, metadata creation, and user engagement – while leveraging centralized coordination for digital workflows.

This paper presents the processes and decision points shaped by partnership, explores where collaboration enabled broader coverage and continuity, and discusses lessons learned in choosing when to collaborate and when to streamline. This model of collaboration resulted in a more diverse digital collection, deeper institutional memory, and an increased public impact. The resulting open-access, georeferenced map images enable scholars worldwide to pursue broad research goals and incorporate maps and spatial data into their teaching.

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Introduction

Despite the richness of Chicago's cartographic record, the physical and digital distribution of maps across institutions has limited access and scholarly use. The *Mapping Chicagoland* project leverages digital technology to combine historical cartographic collections of three prominent Chicago cultural heritage institutions. Working together, these partners developed shared solutions for challenges in access, preservation, and discovery. Digitizing and georeferencing these resources required not just technical capacity, but strategic coordination, especially where collections, expertise, and audiences intersect. *Mapping Chicagoland* is one of many collaborative digital collections initiatives that are transforming public access to rich cartographic resources. By exploiting the locational data contained in maps for discovery, search, and visualization, digital access to large map collections is enabling research in new ways.

Mia Vladović described collaborative digital projects as "no longer a novelty, but a necessity and a pre-requisite for quality work [that] also brings financial benefits" (Vladović 2017). Digital collections resulting from collaboration between libraries and external entities have saved on labor as well as financial costs, and the process of working together has raised the visibility and reach of services (Latham 2022). Librarians and curators of cartographic materials are increasingly demonstrating engagement with this collaborative spirit by working together in two significant ways: 1. Overcoming hurdles for the user in accessing print maps and atlases on related topics that are held in different locations and 2. Enriching digital map copies and applications with data derived from the original materials to increase their utility and expand their research impact.

Partnerships enhance collections and promote better quality work by assembling more comprehensive access to the population of existing cartographic materials, easier navigation of large collections, more efficient extraction of information for research, and leveraging expertise distributed across institutions. Extensive institutional map collections often can be a lower priority for digitization efforts due to their unique requirements. In addition, smaller institutions often lack both the specialized equipment and economies of scale that large formats and large projects require. These gaps can be bridged by leveraging the strengths and capacities of each partner for broader, public-facing results. However, academic libraries have found that partnering with peers can lead to more comprehensive collections and better topical coverage, while also promoting the development of best practices (Woods et al. 2016). Collaborative initiatives have become increasingly important to the development of digital cartographic collections, with academic consortia and cross-institutional partnerships broadening access and enhancing metadata quality.

As Trimble et al. (2015) demonstrate in their case study of the Ontario Consortium of University Libraries' Map Group, sustained collaboration among academic institutions can overcome resource limitations and improve the management of digital map collections through pooled resources. The Big Ten Academic Alliance (BTAA) Geoportal provides a model for resource-sharing and coordinated metadata creation across member institutions (Tickner et al 2024). Multi-institutional partnerships such as the American Revolutionary Geographies Online (ARGO) and Europeana's Maps and Geography collection demonstrate effective collaboration for public access to historical maps and geographic information (American Revolutionary Geographies Online 2025; Common European Data Space for Cultural Heritage 2025). *Mapping*

Chicagoland aims to extend this tradition, situating active collaboration as both method and outcome.

Project Overview

Mapping Chicagoland is a collaborative project by the University of Chicago Library, the Chicago History Museum, and the Newberry Library to produce over 5,000 digitized and georeferenced cartographic works from their map collections. The project is focused on making the cartographic representations of Chicago up to 1940 openly available. From initial concept to project execution, the institutions worked in concert to maximize coverage, expertise, and efficiency by collectively deciding scope, selection, and technical standards. Each institution's collection brings unique strengths to the project that complement one another in scale, time period, and subject. These collections range from the earliest cartographic representations of Chicago prior to its incorporation to its rapid expansion in the early 20th century. These maps are rich sources of information for scholarly and community study that illuminate the history and contribute to our understanding of contemporary Chicago.

The city's geographical location is within the traditional homelands of many Indigenous nations and was claimed by the French and English before coming under control of the United States. Early Chicago started as a transit connection — a portage between the Great Lakes and the Mississippi River. The establishment of railways further confirmed the city as the major hub of the Midwest. Chicago was home to triumphs in civic engagement, tragedies of racial conflict, and events that impacted national and international history (Miller 1996). Early maps and atlases of Chicago are among the most popular collections within the three institutions. However, only a small

fraction of these maps was available digitally prior to the project and there were no georeferenced collections available. Their importance to the historical understanding of Chicago's development is foundational (Holland 2005). They give geographical and visual context for humanities inquiry over many themes. Providing open access to digitized and georeferenced map images allows scholars worldwide to pursue broad research goals and incorporate primary and secondary cartographic sources in their teaching of Chicago's pivotal transition into the 20th century.

An important application of these maps for the humanities will be the study of Chicago's historical development. The city's history is linked to the cartographic materials that both foreshadowed its development through plat maps and described its growth. Michael Conzen and Diane Dillon's *Mapping Manifest Destiny* exhibit and its published book at the Newberry Library showcased how the study of Chicago maps can illuminate regional mapmakers' impact on the economic development of the city and region (Conzen, Dillon, and Newberry Library 2007; Conzen and Dillon 2008). The Chicago History Museum's maps appear in numerous books, such as *Miller's City of the Century* and Cronon's *Nature's Metropolis*. Maps from the University of Chicago also appear in published histories of Chicago and cartography, for example in *The History of Cartography* series. However, scholars and students usually needed to request scans after viewing the physical maps in the collections because so few are digitized. When researchers and educators have access to digitized maps, they can produce compelling online projects such as *Hidden Truths: The Maps in the Introduction* by Pamela Bannos, a professor in Northwestern University's Department of Art, Theory, and Practice, who uses maps to explore visual representation of the past, and *Mapping Urban Form and Society* by Dr. Laura Vaughn, a professor in the University of College London's Bartlett School of Architecture.

Maps are important in the study of Chicago's performing arts and literature, both in understanding the context of the creators and the audiences engaging with the work. The Blues, Jazz, and Gospel musical styles have rich Chicago histories with representation in the cartographic record. Maps such as the University of Chicago's *East 63rd Street* (1930-1939) also depict demolished sites such as the Tower Theatre, which hosted vaudeville, stage shows, and early motion pictures (Figure 1). Historical performance venues have been illustrated using modern maps, such as in the *Jazz Age Chicago* project, but by making historical map overlays available, researchers are able to visualize not only the general location of venues, but their contemporary contexts as well. The same is true for the literary works based in the city. Influential works such as *Cliff Dwellers* (1893), *The Pit: A Story of Chicago* (1903), *The Jungle* (1906), and many more are among notable pieces whose stories and themes draw directly from everyday life in the quickly industrializing Windy City. Historical maps sit beside text and images in the Newberry Library's *The Jungle and the Community: Workers and Reformers in Turn-of-the-Century Chicago* digital exhibit, allowing readers to explore physical and ethnic neighborhood compositions and to compare neighborhoods surrounding the Stockyards to those downtown at the time of Upton Sinclair's authorship (Hawkins, Layson and Barrett 2025; Figure 2). By situating narrative details within actual locations and depicting the spatial realities of human conditions, maps make abstract and unfamiliar historical stories tangible and relatable to contemporary audiences.

[Figure 1 here]

[Figure 2 here]

The themes of race and identity are important contemporary themes explored by scholars. Maps from the collection are often used to explore these themes in dissertations, such as in *Urban Renewal and the Role of the University in the*

Neighborhoods of Hyde Park and Kenwood (Belden, 2017); *She Shot Him Dead: The Criminalization of Women and the Struggle over Social Order in Chicago*, 1871-1919 (Boyle 2017); *Sound Tracts, Songlines, and Soft Repertoires: Irish Music Performance and the City Of Chicago* (Dillane 2009); and *Cultural boundaries: Constructing urban space and civic culture on Chicago's South Side, 1890-1919* (Bachin, 1996).

The University of Chicago Library loaned a sample of the Social Scientists Maps collection to the Smart Museum of Art for an event hosted by artist Amanda Williams to inspire discussion on art and racial history. This collection contains mid-twentieth century maps created by sociologists and urban researchers at the university to document demographic change, housing patterns, and migration trends (University of Chicago Library 2025). These researchers are often referred to as being a part of the "Chicago School," a movement that centered on the interplay of urban environments and social behaviors. The Chicago Architecture Biennial used the same maps in an exhibit at the Chicago Cultural Center exploring the construction of public space and social change called *...And other such stories* (Chicago Architectural Biennial, Chicago, September 19, 2019 - January 5, 2020). These are only a few examples of the ways in which maps are integral to our understanding of the past and our present. While consortial projects in digital cartography are increasingly common, *Mapping Chicagoland* advances the model by showing where collaborative structures add the most value and where direct leadership empowers efficiency. Below we describe these decisions and their impacts across the phases of the project.

Description of institutions and audiences

To understand the collaborative potential, it is helpful to understand each institution's unique collection and audience.

The Chicago History Museum

The Chicago History Museum was founded in 1856 as the Chicago Historical Society, and early acquisitions focused on American history as well as Chicago history materials. The Chicago History Museum Research Center serves the research collections of the Chicago History Museum, meaning archives and manuscripts, prints and photographs, architectural drawings, and published material, which includes maps.

The depth and breadth of The Chicago History Museum collections make it a natural partner for the *Mapping Chicagoland* project. It includes published materials, archives and manuscripts, ephemera, prints and photographs, and a large collection of architectural drawings and architectural manuscripts.

The *Mapping Chicagoland* project ultimately included nearly 3,000 maps from the Chicago History Museum. The Chicago History Museum's map collection includes maps of Chicago as early as 1812 and maps from Rufus Blanchard, one of the city's first map publishers (Figure 3). Maps are categorized by topic, such as annexations and accretions, communities, parks, wards, industries, transportation, topography, cemeteries, world's fairs, and population and sociology.

[Figure 3 here]
Figure 3. Chicago in 1812.

Newberry Library

Mapping Chicagoland appealed to the Newberry Library because of its connections to the Newberry Library's important collections in maps and genealogy, especially local history in Chicago. Since the Newberry Library's opening in 1887, maps have always been an important part of the library's collection. The Newberry Library's almost complete run of printed Ptolemaic atlases, for instance, was donated by Edward Ayer,

one of the library's most important early trustees and donors, who purchased them from the son of the bookseller Henry Stevens. The Newberry Library's commitment to maps grew substantially with the creation of the Kenneth Nebenzahl, Jr., Lectures in the History of Cartography in 1966, the hiring of its first map curator in 1969, and the founding of the Hermon Dunlap Smith Center for the History of Cartography in 1972. Smith, then the president of the Board of Trustees, also donated his own collection of maps of the Great Lakes region, which further bolstered the cartographic collections related to the Midwest. Other donations, small and large, as well as steady acquisitions in maps of Chicago of the Midwest mean that the Newberry Library has a wide ranging and deep collection documenting Chicago's spatial history. These collections range from the Everett D. Graff Collection of the western U.S., which includes many maps and documents related to early Chicago, to real estate and fire insurance atlases that show the block-by-block growth of the city.

Given the collection strengths in genealogy and maps, it made sense for the Newberry Library to offer *Mapping Chicagoland* its extensive collection of large-scale real estate, fire insurance, and land valuation atlases of parts of Chicago published from 1872 to 1924. Among the thirteen atlases included in this project are two atlases detailing the grounds of the World's Columbian Exposition of 1893 and the Chicago Union Stockyards. Totaling 1,167 individual maps, these atlases show footprints of individual structures and lots, providing large scale details for studying Chicago's cultural geography.

University of Chicago Library

The University of Chicago's faculty began collecting maps for research in 1927. In 1929 the collection was taken into the library's care. A cornerstone of the collection was

a purchase of French geographer's Emile Lavasseur map collection which contains maps from the 19th century and earlier. Around of quarter of the over 475,000 maps are cartographic maps collected in the first decade after collection moved to the library. Featuring over 10,000 aerial photos and 2,000 books, the collection is strong in 19th-early 20th century maps. Of particular note are 19th century maps of the United States, Europe, Latin America, and Africa, and Asia. Of the maps from Asia, the library boasts the most complete set of the Survey of India Maps in North America dating to the 18th and 19th centuries. Maps by Heinrich Kiepert make up a notable portion of Germany maps featuring political boundaries, towns, and topography.

Urban maps in the collection range from the 18th-19th century, with the most commonly requested being Chicago maps. Of particular interest are the Social Scientists Maps of Chicago. Social scientists at the University of Chicago in the 1920s and 1930s developed "The Chicago School," conducting ethnographic work in the city to study how the social and physical environment shaped human behavior. Maps of neighborhood studies cover a range of topics, such as demographics and crime. Chicago maps also include many produced by the municipal government in the 1920s-40s that illustrated city infrastructure and planning projects.

Collaborative Approach

The *Mapping Chicagoland* collaboration brings together the rich resources of three institutions to make a digital collection with a depth and breadth that could not be accomplished individually. It leverages expertise and resources at the University of Chicago to create an efficient process that benefits from coordinating workflows in one location while drawing on material from three different institutions. The Newberry Library and Chicago History Museum benefit from the work performed at the

University of Chicago Library, because neither had the capacity to undertake the scale and complexity of this digitization and metadata creation or the expertise to georeference maps at scale. However, their selection and contribution of maps greatly expanded the date range and depth of the resulting collection.

The following sections describe major decision points and processes deliberated on as project partners. Categorized as map selection; staffing; material preparation; handling, and transportation; digitization; cataloging; georeferencing; and user interface design, these areas of work required significant communication and often iterative approaches. Rather than suggest templates for digital collections projects, these sections emphasize the complex and dynamic contexts of the partnering institutions and the cascading influence of early decisions into later stages of the project. We identify both the strengths of partnership and areas where centralization served the project best. The following sections track how collaborative decisions shaped project outcomes and where streamlined leadership proved necessary.

Map Selection

Mapping Chicagoland began as an idea to grow the digital map collection at the University of Chicago Library, inspired by the popularity and fragility of the historical maps of Chicago in the Map Collection. A small group of staff from the Map Collection, Digitization Unit, and IT Services & Digital Scholarship met to discuss the need and potential impact of growing the digital collection in this way and began to scope what was meant by "historical maps of Chicago." Several factors were discussed: the desire for a systematic approach to digitizing the collection, the desire to include the popular and University of Chicago produced *Social Scientists Map Chicago* collection, and to respect intellectual property rights of maps in the collection. A significant

contribution to these discussions is that the maps held by the University of Chicago Library are catalogued, allowing for an estimation of the number of maps of Chicago or subsections of the city. The number of maps that would later be digitized and georeferenced was estimated by multiplying the number of maps in the catalog by two, which provided a useful approximation for the total number of maps that would have geographies on their verso and recto sides, or, for georeferenced images, more than one map on either side.

From these initial conversations, the University of Chicago Library team established initial leanings for the scope of the project, including:

- Focusing on maps of the city of Chicago would have the greatest impact for our research and learning communities at the university.
- Including the earliest maps within this subset would allow us to control moving through the collection systematically.
- Restricting the selection to maps published in 1940 or earlier allows inclusion of our earliest maps and the Social Scientists Map Chicago Collection (published through the 1930s), while ensuring most materials are securely within the public domain. This facilitates and expedites rights research for the remaining maps.
- At this time, atlases were identified as out of scope for the project.

The group also discussed expanding the project to invite one to two Chicago cultural heritage institutions with historical map collections. Three significant benefits of during so were discussed. First, and most practically speaking, funding agencies emphasize the powerful impact that collaborative projects can have with their partners and communities and encourage such applications. Second, the University of Chicago Library recognizes its academic community is only one audience for its Map Collection.

For example, Google Analytics show that a majority of its digital map collection users are distributed globally and are not affiliated with the university. Collaborating across institutions would both strengthen the digital collection with more maps but also invite in expertise in positioning the maps to a diversity of audiences locally and around the world. And finally, the University of Chicago Library team was interested in connecting our expertise and experiences with our colleagues at other institutions. So, while originally envisioned as a University of Chicago Library project, the plan evolved into a multi-institutional partnership, with each collaborator shaping the criteria and selection approach.

The University of Chicago Library first reached out to the Newberry Library and the Chicago History Museum to explore joining the project because they knew each to have a strong map collection and staff members had previously collaborated on projects with both institutions. That prior collaborative experience provided some shared reference points when discussing the project with the individual institutions. Through a series of working meetings and on-site visits, criteria for inclusion were finalized jointly, respecting both local audience needs and broader research objectives. While the Newberry Library and the Chicago History Museum were enthusiastic to join the project, the Newberry Library determined it did not have the capacity to contribute its paper maps that met the project criteria. Instead, they opted to contribute a selection of atlases from the time period that include large scale maps, providing detailed depictions of Chicago that contrast with the mostly smaller scale maps shared by the Chicago History Museum and University of Chicago Library. This was the most significant change in scope throughout the project, and one that proved to enrich the overall depth of the final product.

However, the scope of this project did not expand to include multiple copies of the same items. We chose to prioritize unique items rather than multiple copies, even though maps in these real estate and insurance atlases are rarely the same in any two copies; different owners updated (or did not update) their copies to their own needs as the city around them changed. The Newberry Library, for instance, did not send the dozens of volumes of the Sanborn Fire Insurance atlases of Chicago previously owned by Peoples Gas Light and Coke Company. These copies were first published in the 1910s, 1920s, and 1930s and the company kept them updated with Sanborn's pastedown additions until the early 1990s. Similarly, the Newberry Library did not send their copy of *Emil Rudolph's Atlas of North Shore Property* published in 1896. The differences between the one held at the Newberry Library (corrected to 1912) and at the University of Chicago (corrected to 1915) were numerous but relatively minor. These differences can be crucial to the research needs of local historians and genealogists; but their exclusion was a sacrifice we needed to make given the realities of the limited capacity of different departments at the Newberry Library and the University of Chicago.

The process of selection, then, prioritized the original hope for a deep representation of how people mapped Chicago from the early nineteenth century until around 1940 while also recognizing what was manageable for each institution's current staff. These decisions allowed each institution to select materials while considering factors such as which materials received significant attention from their users, which could not be digitized with the institution's current workflow and equipment, and what could maximize the uniqueness of each institution's collection.

Staffing

Recognizing the complexities of staffing a large multi-institutional project, the partners worked together to create team structure that would facilitate continuity and collective expertise. At the beginning, the partners established who would lead the work at each institution to help move the work forward and to share information. Factors influencing staffing were shared frequently to take into account changing contexts and the needs of each institution.

In any project, changes in staffing due to turnover or the need for additional members is likely. One benefit of the multi-institutional approach is a safeguard against losing too much institutional memory. The project began with the GIS & Map Librarian at the University of Chicago Library as PI, and the Newberry Library Map Curator and Director of the Chicago History Museum Research Center as co-PIs. Senior personnel included members of digitization, cataloging, and development teams from the University of Chicago Library, where that work would be taking place. Many existing additional team members from the University of Chicago Library, and curation and metadata staff from the Newberry Library and the Chicago History Museum also supported various aspects of the work.

The grant funded the hiring of several term positions. First, a digitization specialist was hired to scan each of the maps. The specialist also made contributions to a project social media campaign. A project cataloguer was hired to catalog the atlas pages and maps from the Chicago History Museum and Newberry Library (the University of Chicago Library maps having already been cataloged). Finally, graduate student employees were brought on as a georeferencing team.

Between the time that the grant was submitted and the grant began, a number of staffing changes happened For instance, both staff members named in the grant from the Newberry Library had left and been succeeded by new staff members. This meant the

curator shepherding the materials had no role in their selection and the conservator had had no role in the initial conservation review or budgeting for treatment. If the Newberry Library had tried to do a grant like this alone and faced the same staff turnover, it would have been much harder to successfully complete the grant. With staff from other institutions in place, these staff members could bring the new folks from the Newberry Library up to speed without too much trouble.

Another significant change was the promotion of the GIS & Map Librarian at the University of Chicago Library. After a two-year vacancy, the GIS & Map Librarian role was converted into a GIS Librarian and a Map Curator position. While the Map Curator position remained vacant for some time longer, a new GIS Librarian was hired, expanding the capacity for attention to be paid to the georeferencing portion of the project.

Team members relied on a shared project folder, hosted by the university, to document the project which encouraged a collaborative and transparent approach to decisions. This collaboration helped with cross-institutional onboarding, allowing new staff members (especially those hired mid-project) to quickly get up to speed through shared documentation from experienced colleagues at partner institutions. This distributed staffing model facilitated continuity, minimizing disruption from turnover and preserving institutional memory.

Intellectual Property

All the maps were published in the United States, so their copyright status is understood according to United States copyright code. Most of the materials were published before 1928 and we consider them to be within the public domain by the end of the project. Maps produced by the federal government were also considered as not being under

copyright. The small portion of maps with a copyright notice or produced by Illinois or municipal governments still move through the project workflow but are not ingested into the public portal until review determines they can be shared. This includes a small number of works that will be released manually each year as they enter public domain. This area is an example in which the university took leadership with the input of partners, rather than an intensively collaborative process.

Material Preparation, Handling, and Transportation

To leverage the digitization capacity at the University of Chicago Library, partner materials needed to be pulled, approved and prepared for transfer, and driven to the university. Site visits, discussions about best practices, and practical negotiation about available resources shaped the approach to safe movement and interim storage. The Newberry Library pulled atlases, and The Chicago History Museum pulled maps for transportation to the University of Chicago Library. How the materials were handled was established through conversation between conservators at all three institutions. Site visits from the university staff, including the conservationist and preservation librarian, enabled clear communication around the material.

When conservation issues or item substitutions arose, the partners reviewed possible replacements collectively, leveraging complementary holdings. Staff reviewed the conditions of the materials at their own institutions prior to travel, in some cases conducting some conservation or selecting alternative titles to replace items that were not fit for travel. With fuller conservation review, some items had to be removed from the grant or replaced with similar—but sometimes not identical—copies from one of the other institutions. These adjustments benefited from the project's collaborative structure, enabling flexible decision-making and problem-solving across institutions. The

transportation of very large atlases also required the purchase of a special case and the creation of custom foam inserts funded by a grant subaward. The University of Chicago Library provided large crates used by digitization vendors to carefully pack the Chicago History Museum's maps, including their folders, for transport. Map packing material and transportation for both collections were also covered by subawards. The maps and atlases were driven in batches to the university for digitization. At the university, maps and atlases were securely held in the Digitization Lab until their return to their collections.

Digitization

Digitization took place at the University of Chicago Library Digitization unit. Here, the project leaned into more streamlined decision making by making use of the university's deep expertise and capacity for digitization project work. While the university led this technical phase, the partners (with expertise themselves) remained engaged through frequent consultations and updates. All institutions contributed to discussions about standards, workflows, and problem-solving as needed. Digitization activities for the grant adhered to the Federal Agencies Digital Guidelines Initiative (FADGI): Technical Guidelines for Digitizing Cultural Heritage Materials (Rieger et al 2023). The workflow included a robust quality assurance program, imaging techniques to ensure proper material handling, and a standard set of quality control activities to verify accuracy of the end product. While the university set these practices, they kept partner institutions informed through project meetings, allowing time for questions and concerns to be addressed. Copies of all image originals were shared with partner institutions and backed up on University of Chicago Library systems.

Cataloging

Cataloging standards and practices were established through consensus among project partners: integrating expertise from the Chicago History Museum, the Newberry Library, and the University of Chicago Library. Following digitization, original catalog records or enhancements to copy-catalogued records have been made in OCLC for each of the digital objects according to the Resource Description and Access (RDA) standard for map cataloguing. The University of Chicago Library, with all three institutions' maps onsite for digitization, hired the Project Cataloguer. In the case of atlases, a full item-level record had been created for the complete work, as well as the individual maps contained therein. Creating separate records for the individual maps for an atlas is not the University of Chicago Library's usual practice (although the Newberry Library has done some analytic cataloging of atlases), but individual records for maps within each atlas can make these items more discoverable for users. The Newberry Library and the University of Chicago Library agreed that map titles from atlas pages would be based on the maps' elements, such as township and range numbers or street names. We created a template for each atlas which the Project Cataloguer works from to ensure efficient workflows and consistent metadata. The MARC records have been added to the Library's FOLIO instance and are discoverable through VuFind. The metadata for the maps have been shared with the BTAA Geoportal (https://geo.btaa.org/) and Chicago Collections (https://chicagocollections.org/) to enhance discoverability.

Georeferencing

The International Image Interoperability Framework (IIIF) is an open standard for delivering media files online that enables institutions to share customized digital object representations derived from high-quality electronic images and metadata (International

Image Interoperability Framework 2025). The University of Chicago Library leveraged its IIIF server to georeference images using a browser-based workflow through Allmaps (https://allmaps.org/). The Allmaps platform enables users to pull in a IIIF image then append "georeference annotations." These annotations are an approved extension of the IIIF presentation API that allows images to be warped and aligned with their locations on a digital map. This process is known as *georeferencing,* which associates control points on the image with map coordinates. After bringing in IIIF images, users can then mask the map images and lay ground control points quickly, resulting in three types of URLs: 1. a URL to the resulting map overlay in the Allmaps Viewer; 2. the georeferencing annotations themselves (the ground control point data); and 3. an XYZ map tile set that can be used to view the georeferenced image in a desktop GIS software or interactive map application. The georeferencing annotation information is stored by Allmaps and is based on W3C's Web Annotation standard.

Inspired by Atlascope (https://atlascope.org/), an historical mapping application created by the Normal B. Leventhal Map & Education Center at the Boston Public Library, *Mapping Chicagoland* team decided to pivot to this technology and away from desktop GIS georeferencing workflows for several reasons. First, when moving through a traditional georeferencing process, large files must be stored, processed, and moved locally. With Allmaps, the process only requires access to the IIIF URL of an image or a manifest – there are no large files for GIS specialists to store or move. Furthermore, the georeferencing work is simpler than in a desktop application. A user need not be familiar with the complicated menu suites or multiple docked windows found in desktop GIS software designed with spatial analysis in mind. Steps such as creating masks, selecting ground control points, and editing work are all handled in-browser with the Allmaps point-and-click interface, and therefore can be taught to beginners in a

much shorter time period. Relative to typical student training times for processing and georeferencing images in a desktop GIS, we estimate that the simple Allmaps georeference interface saved about half an hour of training time per person. Given the high resolution of images in the collection, it normally could take up to a few minutes for desktop GIS tools to render and export each GeoTIFF. Allmaps produced additional time savings by rendering images on-the-fly. Altogether, given the size of the collection, we estimate that over 60 hours of labor time was saved by working with Allmaps. Each georeferenced map was subjected to a secondary peer inspection in Allmaps Editor to confirm visually consistent placement, which occasionally involved adding, moving, or deleting points. That quality control work was also completed more quickly and easily by viewing the URLs that result from the Allmaps georeferencing process, rather than loading images and ground control point files into a desktop GIS software and duplicating the output process. Finally, one of the resulting URLs in the editing process is a link to the georeferenced images through which anyone can view the map image overlay atop a modern base map. The *Mapping Chicagoland* team preserved these original georeference annotation states to ensure that original ground control points and intended image transformations remain intact to viewers, even if future editors modify annotations using Allmaps Editor.

There are some drawbacks to using Allmaps for the project. First, the platform is still relatively new. The resulting Allmaps Viewer, which displays the overlaid georeferenced map, could be improved by adding additional features such as including a wider selection of base maps and accessible controls for transparency. Importantly, there are also some limits to the speed of tile rendering with the Allmaps platform, as it does not actually store and cache all the XYZ tile images that are generated from the georeference annotations. Rather, the annotations are used to render georeferenced

iterations of IIIF images on-the-fly, by request. On the viewer side, this means that sometimes it may take a moment for tiles to appear at various zoom levels as they are being rendered. Those building web applications using larger tiled image services from Allmaps should keep this limitation in mind, as it may potentially introduce more "jank," or friction to user experiences.

Image Hosting & Portal Ingest

The University of Chicago Library's Digital Repository (LDR) stores digital assets and metadata. The LDR is a secure repository and not available to the public. While hosting and ingest solutions were determined primarily by existing University of Chicago infrastructure, partners remained actively involved in discussions about public portal needs, access, and cross-platform discoverability so that outcomes reflected shared priorities. To make the *Mapping Chicagoland* project openly accessible, the team choose to work with a new initiative to bring the university's digital collections from across campus into a shared ecosystem called Node. Node was also NEH-funded and a joint endeavor between the University of Chicago Library and the University of Chicago Humanities Division (University of Chicago Library 2023). Node enables users to search across digital collections and enable new discovery features such as spatial search. The University of Chicago Library uses a platform named OCHRE developed by the Humanities Division's Forum on Digital Culture to ingest cataloged records from the library's integrated library system, FOLIO, and the IIIF URLs. We then leverage an API call provided through Allmaps that dynamically pulls in and displays options for viewing or downloading the georeferenced version of the map and the annotation containing the data used to georeference the map.

Impact of Collaborative Approach

Promoting Access

Pooling expertise and resources across institutions was essential for advancing access, enabling digitization, and enrichment that none could have accomplished alone. The COVID-19 pandemic exposed multiple health and economic vulnerabilities. It also laid bare vulnerabilities in access. The closure of academic institutions in March of 2020 and pivot to remote learning, while disruptive, could be accommodated by 21st century library resources, meaning databases with full text of articles, and electronic books. Special collections materials such as archives and manuscripts were inaccessible. In some instances, staff who were permitted to be on-site in their repositories scanned and sent portions of collections by request, but this is not a substitute for a comprehensive digitization program.

Comprehensive digitization programs require a plan of work that accounts for staffing, funding, and infrastructure. For example, the Chicago History Museum has only been able to accomplish this through partnerships. One such partnership is with ProQuest, with whom the Chicago History Museum has contracted to digitize archival material for the company's History Vault product. The collections are then available to institutions who subscribe to History Vault.

When the University of Chicago approached the Chicago History Museum and the Newberry Library with the proposal to apply for grant funding to digitize and georeference historical maps, one very appealing aspect of the project was that the results would be fully open access, with no subscription required. Another attraction was pooling the resources of the three institutions to accomplish this. The University of Chicago Library has the resources and expertise to digitize and georeference while the

Newberry Library and the Chicago History Museum have the depth and breadth of map collections to complement those at the University of Chicago.

Project visibility

The project's collaborative structure not only enabled broader digitization, but magnified its public visibility, as joint outreach and advocacy opened audiences to learning about the collection from multiple institutions simultaneously. Coordinated messaging and resource sharing amplified initial impact beyond what any one institution could achieve. Discussing the project with our different audiences prior to grant submission and engaging in our individual social media channels to announce that the grant was received, was much greater than the reach of only one of our institutions. Each institution's consortial connections, providing immediate channels to discuss and promote the project to relevant librarians and prospective audiences across the country, further multiplied the impact of press releases and updates about the project (Majewicz 2022). The project was also able to benefit from grant-funded staff who set aside time to create outreach messaging that could be reused and shared by all three groups.

Relationship building and collection awareness

Chicago area special collections (libraries, archives, museums) with Chicago history holdings have made a concerted effort in the last several years to join forces to promote collaboration and discovery of collections. The Black Metropolis Research Consortium (BMRC), founded in 2006, and the Chicago Collections Consortium (CCC), founded in 2012, have created portals that allow researchers to search for topics across members' holdings. The University of Chicago, the Chicago History Museum, and the Newberry Library are members of both consortiums so there is a pre-existing relationship among

the three institutions. Each consortium's portal, however, searches for archival holdings and photograph collections, so there is a definite gap when it comes to map holdings. Interestingly, one of the inspirations to form the Chicago Collections Consortium's was the Chicago Festival of Maps, held in November 2007 (Chicago Collections Consortium 2025). The collaborative nature of that event showed stakeholders that there was a place for a consortium to coordinate future events and promote CCC members' holdings.

Chicago's topography and built environment over the last two centuries provides a wealth of study for humanities and social sciences scholars. The University of Chicago, the Chicago History Museum, and the Newberry Library welcomed the opportunity to join forces to share their respective map collections and reinforce collaborative ties. In addition to each collection's profile being raised through the result online, the grant has allowed the University of Chicago to provide the Chicago History Museum with catalog records for the individual maps supplied. Prior to the grant, for example, the Chicago History Museum's map collection had only been discoverable through a finding aid attached to a summary catalog record.

The project's collaborative approach directly strengthened inter-institutional relationships, developing a foundation for ongoing cooperation. As a result, the project leads started conversations on joint instructional programs and outreach for the wider community and are now co-authoring new funding proposals to support these expanded

efforts. These actions would have been more challenging without the trust and shared experience developed through *Mapping Chicagoland.*

Improved user discoverability

If someone is looking for a scanned map online, there are many websites, large and small, that they can consult. Some aggregate other sites; others focus on a theme; most show images from a single institution. With *Mapping Chicagoland*, the partners wanted to provide multiple access points for people whose research would benefit from maps, but for whom maps are not their central focus, as well as for people who are primarily interested in Chicago's cartographic history. Therefore, *Mapping Chicagoland* combines its own landing page and searchable database of maps with the distribution of the images and metadata to existing platforms such as the Big Ten Academic Alliance Geoportal and the Chicago Collections Consortium, which enable item discovery through faceted and text-based searches.

Connecting collections and distributing discovery across multiple platforms benefited researchers, educators, and the public. Including maps in across different platforms allows us to meet the different needs of users with different levels of interest in maps and map history. Someone looking for information on the Pilsen neighborhood, for instance, can find maps to contextualize their research on the Explore Chicago Collections portal from the Chicago Collections Consortium, but this site is not designed primarily for filtering or sorting by specific cartographic interests. In contrast, the *Mapping Chicagoland* platform prioritizes the unique aspects of searching for maps and bring together thousands of maps of Chicago from multiple institutions in one place. This platform is an important complementary resource for diverse audiences with a range of interests.

Lessons Learned

Flexible collaboration can benefit project scope and innovation

Collaboration among the Chicago History Museum, the Newberry Library, and the University of Chicago Library created a wide-ranging digital map collection. By jointly developing criteria for map selection, negotiating collection strengths, and coordinating outreach priorities, the partners made sure that the resulting resources addressed diverse needs and audiences, far beyond what any single institution could achieve alone. The shared process led to innovation in cataloging and georeferencing, with cross-institutional input shaping new workflows and enhancing metadata consistency.

Distributed staff resources can improve project continuity

Staffing a multi-institutional project introduced expected complexities, including staff turnover and shifting responsibilities. The partners' decision to adopt shared documentation systems, transparent onboarding, and routine meetings proved essential for continuity. When unexpected personnel changes occurred, the collaborative structure allowed new team members to quickly access project history and benefit from collective expertise, minimizing delays and loss of institutional memory.

Developing shared processes can help solve new challenges

Joint protocols for conservation review, material preparation, and transportation leveraged each institution's expertise. This resulted in improved security for the physical items. Issues such as condition-based item substitution were resolved through collaborative decision-making, often drawing on complementary holdings and practical

input from all partners.

Centralization is sometimes more efficient

Not all project phases benefitted from intensive, shared action. Steps such as digitization workflow and intellectual property review were efficiently and appropriately led by the University of Chicago Library, where equipment, knowledge, and process already existed. In these domains, partners provided guidance and oversight but deferred daily management. This arrangement streamlined execution while maintaining transparency and alignment.

Collaboration has capacity to magnify public impact

Pooling collections, knowledge, and outreach amplified visibility, expanded audiences, and secured greater support from the digital scholarship and cultural heritage community. By distributing discoverability and access across platforms and institutions, Mapping Chicagoland can reach users who would not have encountered these materials otherwise.

Conclusion

The *Mapping Chicagoland* project transformed the access and usability of our Chicago maps for humanities scholars and many others. Pooling our resources to digitize and enrich the maps with coordinate data unlocks curated, but essentially hidden, artifacts of Chicago's past. By foregrounding collaboration through continuous negotiation, shared resource deployment, and strategic partnership, the project delivered results neither possible nor sustainable by any single institution. These maps are available to all through the *Mapping Chicagoland* project page, and discoverable across

search platforms, such as the Big Ten Academic Alliance Geoportal and Explore Chicago Collections. As we promote this collection to public audiences across the region, we hope to bolster scholarship on the built environment, social development, and urban histories of the city of Chicago. Now that we have established foundational workflows, conversations have quickly turned to an envisioned next phase of the project as we seek to expand upon this success. Building on the lessons from the first phase, future efforts will deepen collaborative decision-making where it delivers greatest impact. For example, while all three partners are interested in developing community programming, the leadership decided that because the Newberry Library's central audience is the public and they have existing resources for community engagement, they will take the lead on grant submissions in this area. We plan to invite fellow Chicago institutions with map collections to contribute to the project and to expand on educational and outreach programming for our different audiences including public schools and libraries, researchers, and community members.

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