STORY MAPPING PRAXIS TO PRINCIPLES: LEARNING FROM THE ATLASCINE PROJECT

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ABSTRACT

This paper introduces and discusses story mapping principles inspired by the development of the latest version of Atlascine, an open-source, online platform for tagging, mapping and animating interviews and story collections. This tool has been shaped by critical cartographic theories and oral history research practices and ethics. It combines the analytical, visual and navigational strengths of maps with the immersive, evocative and emotional dimensions of stories. Through the process of designing this platform and the praxis of mapping more than 150 stories, we identified six core principles enacted by Atlascine that could resonate with a range of story mapping projects: (1) the map never replaces the story and the mapmaker never replaces the storyteller; (2) the integrity and totality of each mapped story are preserved; (3) the mapping process is made transparent; (4) the map offers a spatial synthesis of the stories while conveying their geographic complexity; (5) the map acts as a portal for listening to stories as well as for (6) a creative interpretation of story collections that provides an essential pluralistic reading of places. Through these principles, we reimagine the relationships between maps and stories by envisioning mapping as a way to take care of stories and to approach them for what they are instead of what we can extract from them.

Keywords: story mapping; critical cartography; oral history; web mapping; Atlascine

INTRODUCTION

"*Imagine a digital narrative crisscrossing place and time, starting with the date and location of your birth. The narrative grows, fragments, and connects many places and times together, as your life unfolds and as you tell your story. Any event in your life can be geo- and time-located, and each event connects with innumerable other events in your life and the lives of others. Everyone's life story intersects with countless others at every moment, creating ever denser webs that document the complexity of the human experience. Every story matters, every voice can be heard, every event—no matter how big or how small —can be captured.*" (Presner, Shepard and Kawano 2014, 12-13)

Atlascine is an online platform for mapping stories and visualizing their geographies, connections, and spatio-temporal structures, as well as for listening to and navigating within and between them. Building on maps' deconstruction by critical cartographers towards the end of the 20th century, the Atlascine project was originally envisioned to produce self-reflexive maps that inherently acknowledge their constructed and persuasive dimensions instead of trying to hide them. Since then, it has evolved into a software designed to respond to the

conceptual and ethical challenges faced when mapping stories[1], particularly life stories and interviews. Inspired by a renewal of cartographic theory since the beginning of the 21st century, as well as by oral history principles and practices, Atlascine occupies a unique position at the intersection of "cartographic storytelling" platforms like ArcGIS StoryMaps, MapBox's Interactive Storytelling and StoryMap JS on the one hand, and text annotation tools such as Oral History Metadata Synchronizer (Boyd 2013) and Recogito (Simon et al. 2017; Barker et al. 2019) on the other. It combines the geovisualization functionality of the former with the indexation and annotation capabilities of the latter to produce maps that put side by side audiovisual documents with their synthesized cartographic interpretations. By giving access to each story mapped in its entirety, it serves as a sounding board for these stories and for their storytellers. It also resists the atomisation of data often required in story mapping projects to convert unstructured texts into mappable bits and pieces. By allowing story map collections to be overlaid, Atlascine 'atlases' expand the possibilities of connecting and interpreting collections of stories, thereby revealing the inherent nuance and complexity of places. In this paper, we present the latest developments of Atlascine and how they respond to critical debates in story mapping.

This paper is organized into three main sections. Part one briefly presents the milestones of the Atlascine project since the release of version 1 in 2008. It then reviews the main ideas and concepts that have shaped its more recent development which stem from post-representational cartography, feminist data visualization, oral history and the spatial humanities. The following section provides a more technical overview of how the tool works, and describes how the discussed concepts have been translated into praxis and features. We then reflect on what it means to map stories and interviews with Atlascine by presenting a set of six principles that are useful to projects interested in the relationships between stories, maps and places.

CONTEXTUALIZING THE ATLASCINE PROJECT

Project roots

Atlascine belongs to a lineage of mapping praxis characterized by an ongoing dialogue with critical disciplines within the humanities and social sciences (see Kwan 2002; Knowles, Westerveld, and Strom 2015; Kelly 2019; Bergmann and Lally 2021; Aït-Touati et al. 2022; Bodenhamer, Corrigan, and Harris 2021). From its very beginning in 2006, the goal of the Atlascine project was to practically address issues raised by critical cartographers under the growing influence of digital technologies (see Dodge and Kitchin 2001; Crampton 2003; Pickles 2004; Crampton and Krygier 2006). The first version of the platform proposed

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[1] Following the distinction already made in cartography (see for instance Pearce 2008; Roth 2021) and in ethnography (see Roberts 2024), we use the terms "story" to characterize an original telling (e.g. an interview, a novel), and the term "narrative" to characterize the curated and disciplined organization of one or more of these stories – or parts of them – often through a remediated form (e.g. a map of a life story). In other words, we consider "stories" as original tellings and "narratives" as reinterpretations of these tellings. In this way, we distinguish "story mapping" – or "mapping stories" – from "spatial narratives" or "cartographic storytelling." The former corresponds to the process of transforming stories into symbols to produce a cartographic representation of the original stories (e.g. what Atlascine does), while the latter characterizes the production of a new narrative by combining curated and often rearranged parts of stories with maps and other media (e.g. what ArcGIS StoryMaps does).

cartographic techniques inspired by cinema, such as framing and jump cuts, intended to disrupt the "continuity system" or the impression that a natural continuity exists between the territory and the map (Caquard and Wright 2009). These features were implemented in the "Cybercartographic Atlas of Canadian Cinematographic Territories" released in 2008, a prototype developed with the open-source software Nunaliit (Hayes, Pulsifer and Fiset 2014; Hayes and Taylor 2019) in close collaboration with the Geomatics and Cartographic Research Center (GCRC) at Carleton University. A second version of Atlascine was then released in 2011, inspired by the work in literary cartography (see Moretti 2005; Piatti et al. 2009) and by the growing interest within geography for studying the relationships between stories and places (see Massey 2005; Rossetto 2014). It served to visualize geographies of films using tree rings symbols connected by lines that grew in sync with the film's unfolding action sequences (Caquard and Fiset 2014), a visual grammar which has since remained a core feature of the application. A third version released in 2013 consisted of improvements to make the platform more user-friendly by introducing Google spreadsheets as a backend. Atlascine then became used in a broader range of projects interested in studying the relationships between cinema, place and time from various angles (see Moore 2016; Ercole, Treveri Gennari, and O'Rawe 2017; Yang and Caquard 2019).

In 2013, a collaboration began with the Montreal Life Stories project, a large research initiative led by the Centre for Oral History and Digital Storytelling (COHDS) at Concordia University. More than 500 oral history interviews of Montrealers displaced from their country of origin by war and violence were recorded in this project (High 2014; High 2021). To explore Atlascine's potential for mapping these life stories, ten such audiovisual interviews from members of the Haitian and Rwandan diaspora were selected for their rich geographical content (Caquard et al. 2019). This shift from mapping fictional movies to mapping (often traumatic) life stories raised new conceptual, ethical, methodological and technical questions that prompted profound revisions and development of the platform. The latest revisions began in 2018 and followed with the release of a fourth version in December 2020. One project was defining in its inaugural role: the Atlas of Rwandan Life Stories[2]. This atlas was completed alongside the development of this latest version of Atlascine and was instrumental in our increasing awareness of the challenges faced when mapping sensitive stories that deal with complex issues such as forced displacement, political violence and genocide. As such, while our earlier work was key to structuring our mapping approach, our multiple encounters, discussions and feedback from a broad range of storytellers, community members, students, researchers, and software developers helped mould the final atlas platform and map creation methodologies.

From theories to praxis

Conceptual and practical issues raised within critical cartography and the digital humanities relate to positionality, the mapmaking process and the downstream lifecycles and impacts of the map, as well as its capacities for conveying nuance. These have inspired our transdisciplinary approach to story mapping, which draws particularly from post-representational cartography, oral history and feminist data visualization.

In a nutshell, what has been termed the "post-representational turn in critical cartography" (Duggan 2024, 211) aimed to revisit the foundations of cartography by shifting the focus from the map as an outcome to mapping as a process (Del Casino and Hanna 2006;

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[2] https://www.youtube.com/watch?v=UxKPaJN05Yc

Kitchin and Dodge 2007; Rossetto 2016). This shift implies "taking seriously the conscious and unconscious decisions" cartographers make (Kitchin and Dodge 2007, 345), along with their potential consequences (Pickles 2004). It emphasizes the responsibility of the mapmaker, no longer considered the invisible technical hand behind the map but an integral part of how we should be reading it. A part of acknowledging this responsibility requires a reflection on the position from which the mapmaker acts and its cartographic implications. Knowledges and world views are situated (Haraway 1988) and positioned vis-à-vis a cartographic focus. This has been central to feminist cartographers, who have encouraged mapmakers to clearly acknowledge *who* is speaking through the map, to situate themselves vis-à-vis their cartographic intentions and to reflect on how their positionalities have an impact on all decisions made throughout the mapping process (D'Ignazio and Klein 2016; Kelly and Bosse 2022). Such a consideration is especially important when mapping stories, because the voices of the mapmakers and of the storytellers are often made indistinguishable, with a few notable exceptions (see Pearce and Hermann 2010; Kelly 2019).

The oral history concept of "shared authority" (Frisch 1990) is critical in attending to these issues. As synthesized by Kabiljo (2023, 15-16), shared authority "urged researchers to challenge the conventional power asymmetry between the interviewer and the interviewee." The concept emerged from the recognition by feminist oral historians in the 1970s of the importance of human interaction in oral history interviews (Armitage 1983; Sheftel and Zembrzycki 2016). Shared authority summarizes the idea that in oral history, knowledge is co-created by the interviewees who share their experiences, and by the interviewers who create the context for these experiences to be shared. The interviewer is also responsible for sharing these stories in ways that do them and their narrators' justice (Sheftel and Zembrzycki 2016). When interviews are mapped, it is therefore the responsibility of the mapmaker to respect this shared authority and to treat these interviews with care and caution to do justice to the story, to the interviewer and to the interviewee. A common practice which breaches this is the fragmentation of stories into retold narratives. While there are many instances when it might make sense to select and extract clips and citations, and to reorganize them to produce a compelling cartographic narrative, such a decontextualizing practice – known as the "juicy quote syndrome" in oral history (Savage 2008; Geiger, Moore and Savage 2010) – has been criticized for its erasure of the intellectual, ethical, historical and logistical context of the interview's production (High 2014). To attend to these ethical issues, Atlascine seeks to make visible the source material by providing it as an essential part of the map's reading, maintaining the mapmaker and storyteller in constant conversation.

Another key challenge faced when mapping stories, is the articulation of place and time, of geography and history (Presner, Shepard and Kawano 2014; Bodenhamer, Corrigan, and Harris 2015; 2021). Ayers (2010, 4) summarizes this by asking "how (…) might we combine the obvious strengths of geographic understanding with the focus on the ineffable, the irreducible, the singular, that is at the heart of history?" Indeed, combining the geographic with the historic – the cerebral "understanding" with the intimate "ineffable" – has as much to do with reconciling the tangible with the intangible or the precise with the approximate as it does with reconciling the known with the remembered and the performative with the deeply personal. This problem resonates with the challenge of combining maps with stories, in response to which Presner, Shepard, and Kawano (2014, 19) have proposed the concept of "thick mapping", conjoining stories with maps and vice-versa to "give rise to forms of counter-mapping, alternative maps, multiple voices and ongoing contestations." Mapmakers have also developed creative solutions for merging stories with maps to better express intimate, emotional and sometimes traumatic relationships to places such as "sensibility mapping" (Olmedo 2015), "inductive visualization" (Knowles, Westerveld and Strom 2015), and

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"Indigenized map translation" (Pearce 2021, 320). Atlascine, instead of merging stories with maps, offers a distinct approach that transparently acknowledges and embraces their respective strengths and limitations by keeping them in constant dialogue with each other.

ATLASCINE IN PRACTICE

Atlascine has evolved into a robust open source platform that builds on Nunaliit framework (Hayes, Pulsifer and Fiset 2014; Hayes and Taylor 2019), enabling users to geographically annotate audiovisual and textual documents, engage with these documents and draw connections between them through maps. An Atlascine project starts with the deployment of an online Atlascine instance or *atlas*[3]. Each atlas is made up of *cinemaps*, which describe the combination of a media document (i.e. audio or video), its transcript, and an interactive, temporally animated map. Cinemap creation, metadata modification and related data uploads are done in the **Data Management Module**. Once a cinemap has been created, its transcript can then be annotated in the **Stories Module** using tags defined by the mapmaker. Once annotated, interactive ring symbols are automatically generated on the map. When more than one cinemap has been annotated in an atlas, they appear overlaid based on common places and themes in the **Themes Module** (see figure 1). In the rest of this section, we take a closer look at these three modules.
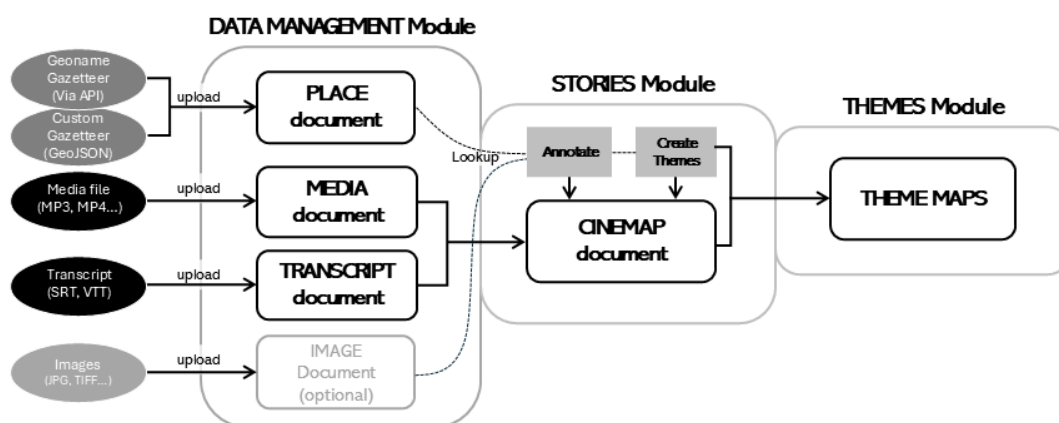

Figure 1: Summary of Atlascine's structure, modules and workflow.

The **Data Management Module** is the administrative backend of Atlascine and is the entry point for uploading, creating and modifying media, transcripts, places and cinemaps, all of which are considered documents (stored in JSON format within a CouchDB database on a Linux server). Media documents are created by uploading video or audio files in a range of formats. Timestamped transcripts can be then uploaded in subtitle format (VTT or SRT) as subtitle documents, which can then be attached to their associated audio or video file. Multiple subtitle files can be associated to the same media, allowing cinemap transcripts to be viewed and annotated in multiple languages. Cinemap documents are then created by combining a media document and a transcript. This constelled, document-driven setup allows for a diversity of uses from the same media source without needing to copy files and burden server

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[3] For demonstration purposes, a production-grade instance of Atlascine is hosted at https://rs-atlascine.concordia.ca. As an open-source tool, however, the software is downloadable from and fully documented in an online repository and wiki at https://github.com/geomedialab/atlascine, which makes it possible for anyone with a linux machine to set up additional Atlascine instances.

storage space, a logic which extends itself to geographic annotations which depend on place documents. Each atlas requires its own gazetteer that can be created either by adding places manually, extracting proper-noun place names and their coordinates from the open-source Geonames gazetteer, or uploaded in bulk through a GeoJSON document. The fact that places can be created from this range of sources and methods allows for a great deal of flexibility: for example, place names can be relative, personal and very specific such as "My bedroom in my grandmother's home" or generic proper nouns such as "Kigali". Finally, the module also offers the ability to upload images such as photos and drawings that can be associated to any parts of a story; This association is done in the Stories Module.

The **Stories Module** is considered Atlascine's primary interface as it serves two main purposes: it allows the mapmaker to annotate cinemaps (i.e. stories), while also serving to visualize and listen to these mapped stories for the user. The stories module is structured around individual stories in that it allows only one to be viewed at a time. Tagging is carried out through annotation windows, where annotators define tags (e.g. "childhood", "trauma", "silence"), group them by themes (e.g. combining the tags "mother", "Aunt Pati" and "grandparents" into the "Family" theme), and choose a particular color for each theme. Annotators can then select a segment of the transcript in the text window and associate them with themes and places. The selected text segment will then appear highlighted with the theme's color and, if it matches a place contained in the atlas's gazetteer, will be associated to a ring symbol on the map. These segments also appear on the graph timeline, an interactive component that visualizes the tags' temporal distribution throughout the storyline (see Figure 2). The hierarchical tagging structure enables a high level of granularity since keywords can be reorganized into themes at will depending on evolving project goals. The annotation window also allows mapmakers to leave comments, for instance, if they wish to explain their choice or the doubts they may have while tagging a particular segment. Finally, in addition to themes and places, mapmakers can also associate images and captions to these text segments, which then appear as part of the cinemap's progression to users.

In Atlascine, the map acts as a piece of time-based media synced with the audio or video media it is associated to. As the media plays and crosses a tagged place, the map pans to where a new corresponding ring will appear. Over time and across multiple spatial annotations, an accumulation of rings form across the map which function as **proportional ring symbols** indicating the relative temporal importance of specific places in a story. The size of each ring is defined by the length of time associated with the tagged text segment. Note that multiple place and theme tags can be associated to a text segment, in which case multiple rings will appear simultaneously on the map. Along with rings, Atlascine can also generate lines between places. **Solid lines** act as links connecting sequential place tags in Euclidean space that follow each other chronologically throughout the story timeline. For example, if the first tagged place in a story is Butare (Rwanda) and the second is Bujumbura (Burundi), a line will automatically connect these two places. If the third place tag is Butare again, another line will connect Bujumbura to Butare, thickening the previous one. Line thickness therefore corresponds to how many times two locations are connected throughout the story. In other words, they represent the geographic structure of the story, how the story – based on its annotations – moves from one location to another. **Dotted lines** are also generated automatically to connect two or more places associated to the same segment. This enables users to visually differentiate the succession of places in each story (i.e. solid lines), from the places that are intertwined within a segment (i.e. dotted lines). These networks, created by a narrative back and forth between places in sequence or in simultaneity, enact what Moretti (2005) refers to in literary cartography as the 'geometries' of stories.
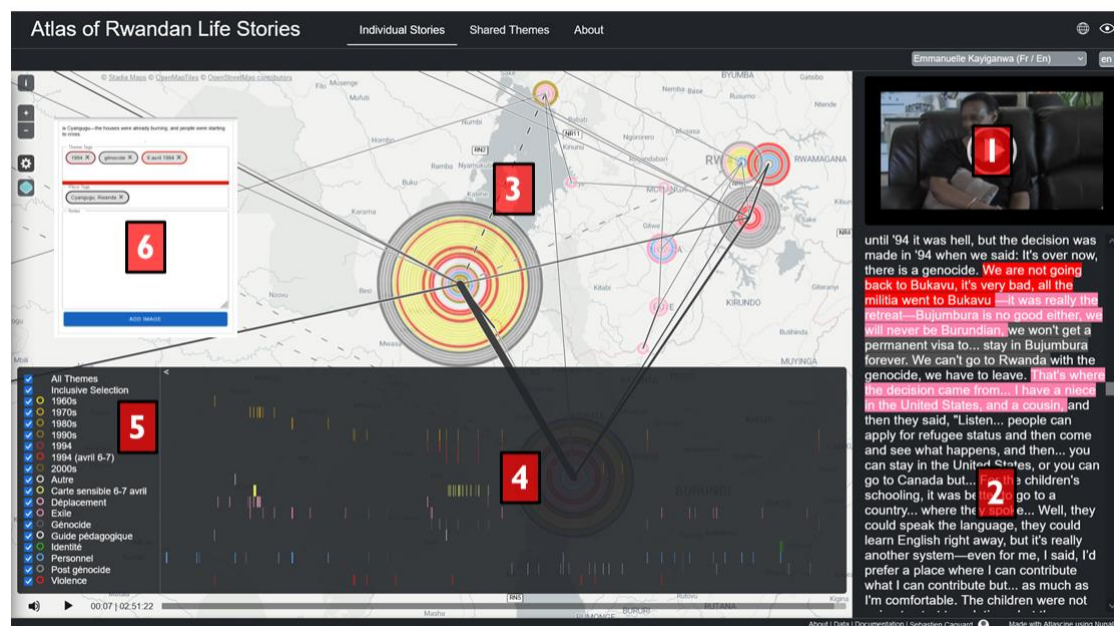
Figure 2 – Interconnected windows of Atlascine's "Stories module": (1) the audiovisual window; (2) the transcript window; (3) the map; (4) the interactive graph timeline; (5) the interactive legend and (6) the annotation window.

Visitors to the Stories module can consult any cinemap made public by selecting from the drop-down menu. A story, represented in Figure 2 as a video (1), can be navigated in multiple ways: by using the media play bar at the bottom of the interface; by clicking on a text segment within the transcript (2), by clicking on a ring symbol on the map (3), or by clicking on a particular bar in the graph timeline (4). The sequences presented in the graph timeline from left to right correspond to highlights (i.e. tags) made in the transcript and their colors correspond to themes listed in the interactive legend (5). The interactive legend works as a filter, allowing the user to select themes they want to display. Finally, a popup window (6) has been implemented to show images associated with any text segment. This popup window was originally added to include hand drawn sensibility maps that aim to reveal more intimate and subtle aspects of stories that are difficult to grasp with the ring symbols available in Atlascine (Olmedo and Caquard 2022). This structure allows the user to actively engages with each story in multiple ways.

Finally, the **Themes Module** enables connections between the different stories in an atlas, based on the themes and places they have in common (see Figure 3). Unlike the Stories module where annotations can be made, the Themes module only serves to display and navigate story collections: maps in this module are automatically generated based on all geotagged annotations in the atlas. In this module, the dropdown menu shows the different themes while the legend shows the names of each cinemap. Users start by selecting a theme from the dropdown menu (1). The map then shows the geographic distribution of all the ring symbols associated to this theme across all stories (2). Here the color of the ring corresponds to the story it is associated with, the latter of which can be filtered by employing the interactive legend (3). Clicking a first time on any given ring loads the associated story and clicking a second time launches the story segment associated to that particular ring (4)**,** enabling users to listen to how different stories engage with a place or theme they have in common. This module was designed to facilitate navigation across stories, enabling detailed comparisons between

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them and new interpretations of how stories and places intersect. By allowing story collections to be overlaid and connected based on the places they share, it envisions each story as part of a community of stories, as a fragment of a larger collective knowledge base.
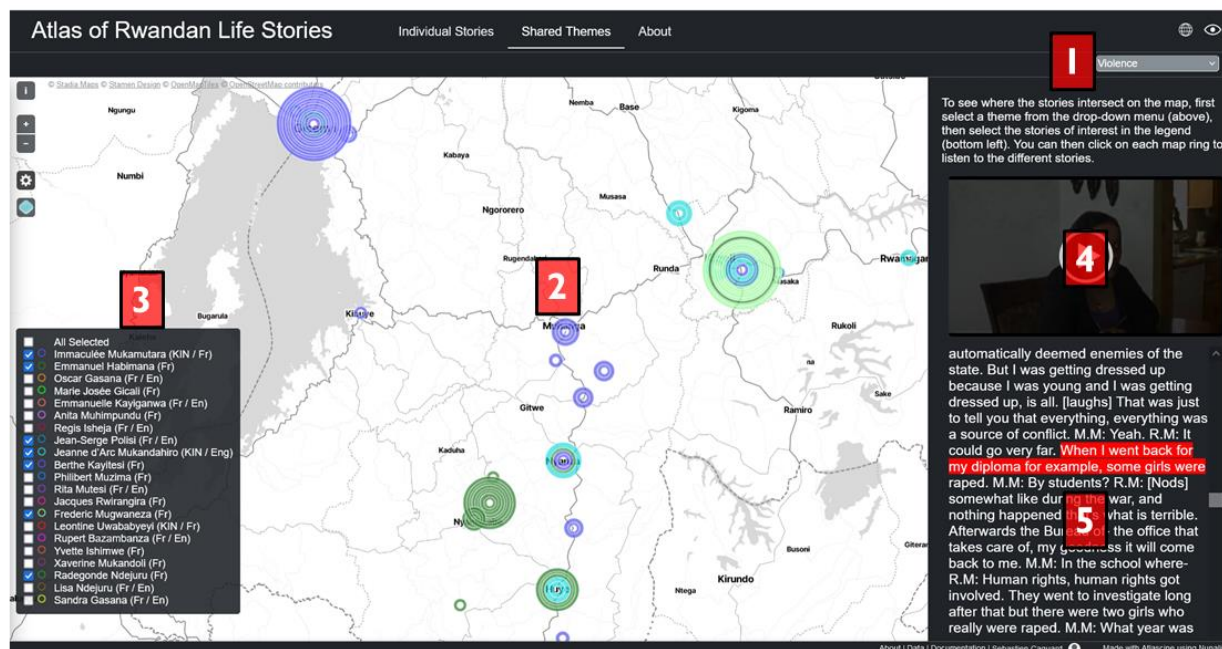

Figure 3 – Atlascine Themes Module: (1) in the dropdown menu the user selects the theme they want to see mapped (among all the ones previously generated in the Stories Module); (2) on the map each color represents one particular story; (3) each story can be activated-deactivated in the interactive legend; and when the user clicks twice on a particular ring on the map, the associated segment starts in both (4) the audio visual and (5) the text windows.

The functions and features described above have been used in a range of projects. At the time of writing this paper, more than 150 stories had been mapped across several atlases: the first of which was the Atlas of Rwandan Life Stories[4]. This atlas contains 22 oral history interviews from members of the Rwandan community living in Montreal, including many from survivors of the 1994 genocide against the Tutsi of Rwanda. Mapping these life stories raised challenging ethical, methodological and technological questions that shaped the early stages of the platform's redesign. One of the challenges was to make sure the atlas could contribute to memory transmission across generations and between cultural groups, an existential issue for this community. The design of this atlas benefited from ongoing discussion with community members and the support of Page Rwanda, a Montreal-based organization led by relatives of the victims (see Lavorel 2020). Page Rwanda played an active role in the public launch of the atlas in December 2020 as well as in the organization of two exhibitions on Mapping Memories in Montreal (2023) and Kigali (2024) (see Hamer 2024). This atlas was followed by others including the *La Ville Extraordinaire*[5] atlas (Hammond and Sicotte 2023), the *Intangible heritage of Parc-Extension*[6] atlas (Shahamati 2024), the *Stories of Saint-Colomban Cemetery*[7]

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[4] https://rs-atlascine.concordia.ca/rwanda

[5] https://rs-atlascine.concordia.ca/la-ville-extraordinaire

[6] https://rs-atlascine.concordia.ca/parcextension

[7] https://rs-atlascine.concordia.ca/saint-colomban

atlas (O'Rourke 2024), and the *Raconte-moi Riopelle*[8] atlas. These different projects continued to shape the development of Atlascine through liaison between atlas developers and storytellers. Although not a requirement, the connection between storytellers and atlas developers has been essential for all the atlases developed so far. These atlases were shared privately and publicly with the storytellers and the different communities involved, opening spaces for feedback and critique. This emphasizes the importance of building and nurturing long term relationships between interviewees and storytellers on the one hand, and those who map them on the other. These atlases have also been used to teach university courses on geomedia and the geoweb, oral history, film studies, art education and most recently in literary studies with the mapping of fictional novels, which demonstrates their pedagogical potential and capacity to bridge between storytellers and audiences.

STORY MAPPING PRAXIS TO PRINCIPLES

Throughout our experience of designing the platform, supporting its users and interacting with storytellers, map makers and software developers, we identified six principles enacted by Atlascine that address contemporary challenges faced by those exploring the relationships between places, stories and maps. The first three principles refer to the story mapping process, while the last three refer to the map outputs themselves and what they are capable of.

1. *The map never replaces the story*

We emphasize that maps cannot replace stories, and instead complement, connect and support stories by spatializing, illustrating, and synthesizing them. In practice, Atlascine does this by keeping the story and the map perpetually juxtaposed like a diptych. Doing so preserves the strengths of both the map (i.e. its capacity to visually synthesize data) and the story (i.e. its nuances, emotions and details conveyed through intonations, laughs, and hesitations recorded during an interview). This juxtaposition enacts what Ethington and Toyosawa (2015, 97) call the complementarity between "textual and pictorial mapping", in this case between original media documents, their textual transcripts and their cartographic representations, all in a fully interactive way. Atlascine connects and puts into dialogue the oral, the visual and the written with the aim of providing pluralistic "nuanced and humanistic conceptions of space and time" (Lo Presti 2022, 70). Making the map and story work simultaneously on the screen may also increase their respective capacities to reach audiences, trigger interest and stimulate curiosity. Having the story and map in direct conversation with each other also frees the map from speaking on behalf of the story. As such, the mapmaker's voice does not replace that of the storytellers, but instead supports them as they speak for themselves. In this way, Atlascine aims to respond to issues of erasure raised by feminist cartographers by clearly dissociating the voice of the mapmakers from the voice of the storytellers (Kelly 2019).

2. *The map preserves the story's integrity*

To respect the integrity of each story and of each storyteller, Atlascine was designed to map and give access to each story in its totality. This approach addresses the story's fragmentation, often associated with cartographic storytelling and the "juicy quotes syndrome" in oral history (Savage 2008; Geiger, Moore and Savage 2010). By providing access to the

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[8] https://rs-atlascine.concordia.ca/riopelle

entirety of each story, "non-topographical" passages remain as valued as the ones identified as spatial and mappable, avoiding a reading that fragments and obscures the story (Luchetta 2017, 5). This also addresses two feminist principles of data visualization as defined by D'Ignazio and Klein (2016): First, it preserves important contextual information such as the unmapped passages that nonetheless remain essential to providing a more nuanced understanding of the maps and mapping decisions; second, it retains, legitimizes and values the embodiment and affect expressed by the storytellers. In Atlascine, the audiovisual and textual documents can be envisioned simultaneously as a mappable database as well as a complex form of human expression composed of a stream of unmappable 'bits and pieces' that are important to keep intact and make accessible. By providing access to each interview in its totality, Atlascine resists the extractive and fragmenting process of retaining only mappable quotes that tend to dominate cartographic storytelling projects.

3.   *The mapping process is made transparent*

User-facing metadata show "the provenance of the data and their stakeholders (caregivers) at each step" of the process (D'Ignazio and Klein 2016, 3). This intent to expose cartographic decisions is another way of contributing to the transparency of the mapping process and encouraging accountability for mapmakers' decisions. Atlascine carries this out in several ways. For one, the application systematically highlights the segments of text that have been mapped. Every theme and place tag are made visible to the user on the map with colored rings and in the text with the same-colored highlights. The annotation window also includes a comment box in which the mapmaker can share their thoughts about the segment or explain the decisions that led to choosing such tags (see Figure 4). Decisions underlying the tagging and thematic groupings could therefore be challenged by users and storytellers. As a result, the produced maps can be considered as "reflexive and self-conscious" since they "contain the seeds of their own subversion" (Bodenhamer 2015, 21) and since they contribute by design to "their own deconstruction" (Presner, Shepard and Kawano 2014, 127). They open themselves to critique and controversy by making the cartographic choices transparent and by recognizing the high level of interpretation and subjectivity associated with any tagging and mapping process.
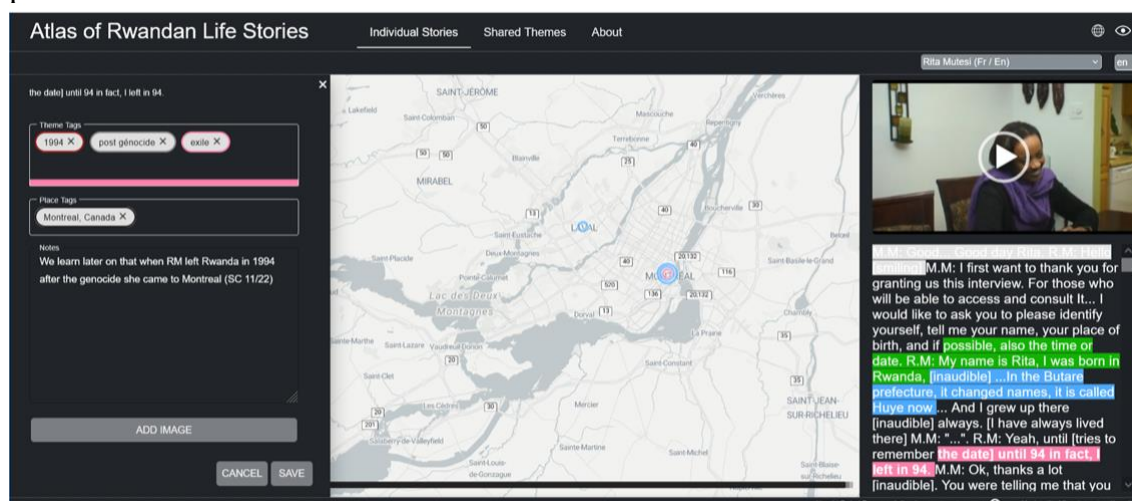

Figure 4. The annotation window (on the left) includes the theme tags, the place tags as well as some notes in which the map maker can explain their decisions. In this case, the note explains why the segment of text was associated to Montreal even if Montreal was not mentioned in this particular segment.

Through this structure, Atlascine touches upon another core principle for feminist data visualization which is "the disavowal of binary distinctions" (D'Ignazio and Klein 2016). Although there is an obvious binary structure in this mapping process (i.e. tagged vs. non-tagged segments of stories), there is also a high level of fluidity within and between these categories since tags can be continuously commented, modified, added, and removed at will by any users with the proper credentials. In this way, Atlascine tends to blur the visual binary between mapped and unmapped segments of stories rather than openly disavowing it. The tags can also be envisioned as "signposts" – to reuse the term proposed by November, Camacho and Latour (2010) - for the users not only to navigate back and forth between the audiovisual documents, their transcripts and the maps, but also throughout the entire mapping process, revealing the multiple tagging decisions that led to the production of the map. Tagging is not just about categorizing, organizing and visualizing; it is also about leaving traces and evidence of the mapping process.

4. *The map conveys the story's spatial complexity*

Atlascine mobilizes two cartographic symbols that together provide a potentially useful abstraction of the story, while also evoking its complexity. Proportional rings synthesize and simplify the geographies of stories and provide a clear overview of the spatial structure of each story or combination of them. Proportional straight lines automatically connect each place tag in the order that they appear throughout the story (see Figure 2). These lines allow users to visualize something understudied and difficult to grasp, but that can be of value to those studying stories, narratology and their spatial structures: in other words, the spatial journey of the story. Each segment of the story's mapped polyline represents the sequencing of tagged places in the story. Most often, these lines represent the spatial trajectory of the story itself, although sometimes they can overlap with physical movements, such as when a story describes a journey in a chronological order (see Alavez 2022). The spatial structure and granularity of the story fluctuates greatly depending on the storytelling style or, in the case of oral history, the ability to recollect events or the willingness to express these recollections. Making sense of the spatial trajectory of the story is therefore complex since the networks produced are not self-explanatory. They show "patterns as well as randomness" and leave "open-ended the story about exactly how those networks function" (Corrigan 2015, 65). These complex networks also counterbalance the message of clarity and precision conveyed by the ring symbols. Indeed, while the ring symbols materialize the cartographic fantasy of revealing clear and well-organized geographies of stories, the network exposes the complexity that exists between these rings, the spatio-temporal messiness of lives and stories, or as Maharawal and McElroy (2018, 384) put it, "the messiness of politics or the complexity of personal histories." The complexity or messiness of stories can also be conveyed by including less conventional forms of spatial expression in the atlases. For instance, sensibility maps expressing highly emotional moments of selected segments of stories have been added to the Atlas of Rwandan Life Stories using the popup window feature. These hand drawn maps complexify the clean technological maps produced with Atlascine by revealing not only "what is said in the lines of these stories" but also "what is hidden between these lines" (Olmedo and Caquard 2022, 127).

5. *The map is an invitation to listen*

By offering entrypoints to each story through the segments annotated and mapped, Atlascine provides what Bodenhamer (2015, 19) calls "portals into narratives rather than illustrations." In this way, the map is proposed as a portal into and across stories. These portals

are envisioned as invitations to engage with and listen to stories, to make sense of them and to appreciate what or how they are told. This cartographic invitation is facilitated by the simplified and familiar figure of the map, making stories appear visually enthralling and spatially grounded. For Margaret Wickens Pearce (2021), maps offer a reassuring and familiar form that can attract users to engage with less comfortable topics, such as stories about genocide. Yet Pearce also warns us about the risk of transforming the ineffable and the traumatic into a cartographic spectacle: "Never approach the story as spectacle or entertainment" (Knowles and Pearce 2021, 00:37:00). As such, the map is not intended to support cartographic spectacle, to provide a quick assessment of highly emotional quotes and traumatic events and places. It is instead an invitation to listen to existing stories, to discover their nuances and to travel within and between them. In this way, Atlascine is as much an analytical tool as it is a contemplative one that combines the visual stimulation of seeing a certain story's geography unfold alongside a necessarily direct and focused engagement with the story. It is envisioned as an attempt to address the now well-known "deep dark secret" of oral history, that "nobody spends much time listening to or watching recorded and collected interview documents" (Frisch 2008, 223).

6. *The map provides a pluralist, interpreted reading of places*

Atlascine proposes an atlas interface that facilitates a story-based and pluralist understanding of places. Story collections are connected through common themes assembled on maps around common places (see Figure 3). As such, stories in Atlascine are not only presented independently, they become part of a larger community of experiences, memories and tellings. On the one hand, connecting story collections through themes and places can help reveal broader spatial trends and nuances such as variations across socio-demographic groups in the memories and places associated to intangible heritage in a given neighborhood (Shahamati 2024). In this way, the platform responds to calls from within oral history to provide cohesive story collections as comprehensive objects of study (High 2017). On the other hand, connecting stories through places also addresses major challenges raised in thick and deep mapping, which are to ensure that places be represented by the multiple voices that compose them (Presner, Shepard and Kawano 2014; Harris 2015). Such engagements with larger "realms of pluralism and interpretation" (Bergmann and Lally 2021, 32) offer more room for interpretation as well. Indeed, connections between the multiple voices and perspectives are not curated by the mapmaker, they are not made *à priori*, they are not designed to impose a spatial reading of these stories, rather, they aim to provide multiple spatial entry points to them. Atlascine produces atlases that offer what Didi-Huberman (2011, 13) calls "interstitial zones of exploration", spaces that are to be discovered by the user instead of being imposed by the mapmaker. The atlas does not provide answers, but rather enables connections that were not anticipated. To use another expression by Didi-Huberman (2011, 14), it applies the "atlas principle" (*atlas principe*), as it encourages creative interpretation.

Issues and limits

Despite its successes, Atlascine still faces challenges related to resource use, maintenance, accessibility and design. Like other software development projects, Atlascine requires ongoing access to human and financial resources to be maintained and updated. Alases designed with Atlascine also need to be accompanied, nourished, maintained, taken care of, explained and updated to reach out to their audiences (Shahamati et al. 2022). Like for any mapping projects, mapmakers need to pay more attention to events that follow their map's publication if they want them to be properly used and play a role in society (Denieul-Pinsky

2024). Atlascine's development trajectory also ended up being more iterative than had been hoped, as much development came through corrections and inputs from its user community. Despite all these improvements over the years, the platform still suffers from some technical and accessibility issues, both for atlas builders and users. For example, maps that contain a lot of information can only be accessible with a high-speed Internet connection, limiting use in remote areas. The platform also struggles on mobile phones due to its desktop-based design with multiple panels, though has been adapted to function on mobile nonetheless. In terms of cartographic conventions, its enforcement of proportional symbols, whose dimensions are limited to color and size, also forecloses the use of more diverse geometries that could be more suitable for certain projects.

As with any manual content analysis, the tagging process can be labor intensive. Although progress has been made in Natural Language Processing (NLP), geographical text analysis (GTA) and geospatial artificial intelligence (GeoAI) techniques (Murrieta-Flores, Jiménez-Badillo and Martins 2022; Mai et al. 2022; Janowicz, Sieber and Crampton 2022), the quality of place name identification beyond proper noun place names, and their association to themes and sentiments in texts, remains challenging, especially for stories that are not in English, that evoke places rather than mention them, and that include vernacular place names that do not appear in mainstream gazetteers (Caquard, Shaw and Alavez 2022). At a more conceptual level, the lack of transparency in the way AI algorithms often operate – or at least the lack of basic understanding of how these algorithms work as mapping practitioners (Janowicz, Sieber and Crampton 2022) – raises important issues for a platform where the transparency of the mapping process is considered essential, where the mapmaker is held responsible for annotation decisions and for Atlases containing highly sensitive stories.

Despite these limitations, Atlascine has over the years become a reliable platform that provides access to hundreds of hours of stories and interviews that have been shared to be heard and listened to. The future of Atlascine will require finding a balance between assuming this responsibility of keeping these stories accessible and responding to both the requirements of future storytellers and atlas developers, while at the same time remaining actively engaged with emerging technologies and concepts in the social sciences and humanities that are constantly reshaping the way we create, think about and engage with maps.

CONCLUSION

Since its first version released in 2008, Atlascine has evolved from a prototype designed as a praxis to address theoretical issues raised in critical cartography to a robust open-source platform informed by contemporary cartographic concepts and oral history principles. The tool is now used in a variety of research projects across oral history, art history, urban planning, and literary studies in which stories and interviews need to be studied spatially as well as made publicly accessible in an ethical and engaging way.

The platform advances six key principles relating to the mapping process and output that should be core to story mapping endeavours. A key principle when mapping stories which illuminates the power and the limits of turning language into cartographic symbols is that the map should never replace the story and the voice of the mapmaker should not replace the storytellers', rather, the map accompanies them. Meanwhile, the integrity of each story mapped is preserved. This second principle relates closely to the previous one and emphasizes the importance of respecting the original stories in their entirety: not only the fragments of stories that are mappable, but all the fragments that bind stories together and that provide the necessary context to grasp the multiple transformations and erasures at play in any cartographic processes. This feeds into a third principle, which is to make the cartographic process as

transparent as possible, thus pre-emptively revealing the limitations and weaknesses of this process and of its outcomes (i.e. the map), therefore opening them up for discussion, critique and contestation. As for what the role of the map should be, it conveys spatial structure while also conveying complexity, challenging visual oversimplification of mapmaking processes and prompting deeper engagements with the source material. Meanwhile, Atlascine acts as a portal and entrypoint into stories and as a navigation tool between them. It acts as an invitation to engage with each story individually as well as collectively through common places and themes, facilitating the dialogue between these stories, while also providing an important and inherently pluralist reading of places.

These different principles reveal the underlying goal of the Atlascine project, which is to reconnect the multiple pieces that are part of the mapping process, but that are often disconnected throughout this process. The goal is indeed to reconnect the theory with the praxis, the map and the story, the mapmaker, storyteller and map user, the fragments of the stories mapped and those unmapped, the various steps of the mapping process, and the abstractness of cartographic symbols with concrete human experience. Over the years, the Atlascine project has become an endeavor to engage with these multiple reconnections and to reflect on them. Throughout these reconnections, it has evolved from a prototype that saw stories as cartographic case studies and geographic data sources to a platform that envisions mapping as a way to take care of stories and to approach them for what they are and what they say, instead of what we would like them to be or what we can extract from them.

ACKNOWLEGEMENTS

REFERENCES

Alavez, José. 2022. "If I Die Far from You: Deep Mapping Grief and Loss in the Context of Migration." PhD Thesis, Montreal, CA: Concordia University.

Armitage, Susan H. 1983. "The Next Step." *Frontiers: A Journal of Women Studies* 7 (1): 3–8. https://doi.org/10.2307/3345955.

Ayers, Edward L. 2010. "Turning toward Place, Space, and Time." In *The Spatial Humanities*, edited by David J. Bodenhamer, John Corrigan, and Trevor M. Harris, 1–13. GIS and the Future of Humanities Scholarship. Indiana University Press. http://www.jstor.org.lib-ezproxy.concordia.ca/stable/j.ctt16gzj77.4.

Barker, Elton, Rainer Simon, Valeria Vitale, Rebecca Kahn, and Leif Isaksen. 2019. "Revisiting Linking Early Geospatial Documents with Recogito." *E-Perimetron* 14 (3): 150–63.

Bergmann, Luke, and Nick Lally. 2021. "For Geographical Imagination Systems." *Annals of the American Association of Geographers* 111 (1): 26–35. https://doi.org/10.1080/24694452.2020.1750941.

Bodenhamer, David. 2015. "Narrating Space and Place." In *Deep Maps and Spatial Narratives*, Indiana University Press, 7–27. Bloomington & Indianapolis: Bodenhamer D., Corrigan J. and Harris T. M.

Bodenhamer, David, John Corrigan, and Trevor Harris. 2021. *Making Deep Maps | Foundations, Approaches, and Methods | David J. Bod*. London: Routledge. https://www-taylorfrancis-com.lib-ezproxy.concordia.ca/books/edit/10.4324/9780367743840/making-deep-maps-david-bodenhamer-john-corrigan-trevor-harris.

Bodenhamer, David, John Corrigan, and Trevor M. Harris. 2015. "Introduction." In *Deep Maps and Spatial Narratives*, Indiana University Press, 7–27. Bloomington & Indianapolis: Bodenhamer D., Corrigan J. and Harris T. M.

Boyd, Doug. 2013. "OHMS: Enhancing Access to Oral History for Free." *The Oral History Review* 40 (1): 95–106.

Caquard, Sébastien, and William Cartwright. 2014. "Narrative Cartography: From Mapping Stories to the Narrative of Maps and Mapping." *The Cartographic Journal* 51 (2): 101–6. https://doi.org/10.1179/0008704114Z.000000000130.

Caquard, Sebastien, and Jean-Pierre Fiset. 2014. "How Can We Map Stories? A Cybercartographic Application for Narrative Cartography." *Journal of Maps* 10 (1): 18–25. https://doi.org/10.1080/17445647.2013.847387.

Caquard, Sébastien, Emory Shaw, and José Alavez. 2021. "How Distant Is Close Enough? Exploring the Toponymic Distortions of Life Story Geographies." *GeoHumanities* 8 (1): 102–21. https://doi.org/10.1080/2373566X.2021.1965898.

Caquard, Sébastien, and Benjamin Wright. 2009. "Challenging the Continuity System of the Technological Map: A Cinematographic Perspective." In *Art and Cartography*, 193–206. Springer Berlin Heidelberg.

Corrigan, John. 2015. In *Deep Maps and Spatial Narratives*, edited by John Corrigan, David J. Bodenhamer, and Trevor M. Harris, 54–71. Indiana University Press. https://doi.org/10.2307/j.ctt1zxxzr2.7.

Crampton, Jeremy, and John Krygier. 2006. "An Introduction to Critical Cartography." *ACME: An International E-Jour Nal for Critical Geographies* 4 (1): 11–33.

Crampton, J.W. 2003. *The Political Mapping of Cyberspace*. Chicago: University of Chicago Press.

Del Casino, Vincent J., and Stephen P. Hanna. 2006. "Beyond the 'Binaries': A Methodological Intervention for Interrogating Maps as Representational Practices." *ACME: An International E-Jour Nal for Critical Geographies* 4 (1): 34–56.

Denieul-Pinsky, Léa. 2024. "Mapping Cadastral Records as Evidence of Colonial Land Theft: A Kanehsata'kehró:Non-Backed Investigation into the Archives of Quebec's Sulpician Priests." PhD Thesis, Montreal, CA: Concordia University.

D'Ignazio, Catherine, and Lauren Klein. 2016. "Feminist Data Visualization." In . Baltimore.

Dodge, M, and R Kitchin. 2001. *Mapping Cyberspace*. London and New York: Routledge.

Ercole, Pierluigi, Daniela Treveri Gennari, and Catherine O'Rawe. 2017. "Mapping Cinema Memories: Emotional Geographies of Cinemagoing in Rome in the 1950s." *Memory Studies* 10 (1): 63–77.

Ethington, Philip J., and Nobuko Toyosawa. 2015. "Inscribing the Past: Depth as Narrative in Historical Spacetime." In *Deep Maps and Spatial Narratives*, edited by David J. Bodenhamer, John Corrigan, and Trevor M. Harris, 72–101. Indiana University Press. https://doi.org/10.2307/j.ctt1zxxzr2.8.

Frisch, Michael. 1990. *A Shared Authority*. Albany: State University of New York Press. https://sunypress.edu/Books/A/A-Shared-Authority.

———. 2008. "Three Dimensions and More: Oral History Beyond the Paradoxes of Method." In *Handbook of Emergent Methods*, edited by Sharlene Nagy Hesse-Biber and Patricia Leavy, Guilford Press, 221–37. New York.

Geiger, Till, Niamh Moore, and Mike Savage. 2010. "The Archive in Question." Working Paper. NCRM. https://eprints.ncrm.ac.uk/id/eprint/921/.

Hamer, Felicity T C. 2024. "Concordia Oral History Exhibition Opens in Rwanda Concordia News. June 7, 2024. https://www.concordia.ca/cunews/stories/2024/06/07/concordia-oral-history-exhibition-opens-in-rwanda.html.

Hammond, Cynthia, and Vanessa Sicotte. 2023. "Atlas La Ville Extraordinaire." 2023. https://rs-atlascine.concordia.ca/la-ville-extraordinaire/index.html.

Harris, Trevor M. 2015. "Deep Geography - Deep Mapping: Spatial Storytelling and a Sense of Place." In *Deep Maps and Spatial Narratives*, Indiana University Press, 28–53. Bloomington & Indianapolis: Bodenhamer D., Corrigan J. and Harris T. M.

Hayes, Amos, Peter L. Pulsifer, and J.P. Fiset. 2014. "The Nunaliit Cybercartographic Atlas Framework." In *Modern Cartography Series*, 5:129–40. Elsevier. https://doi.org/10.1016/B978-0-444-62713-1.00009-X.

Hayes, Amos, and D. R. Fraser Taylor. 2019. "Developments in the Nunaliit Cybercartographic Atlas Framework." In *Modern Cartography Series*, 7:205–18. Elsevier. https://doi.org/10.1016/B978-0-444-64193-9.00013-0.

High, Steven. 2014. "Oral History at the Crossroads: Sharing Life Stories of Survival and Displacement." In *Oral History at the Crossroads*. University of British Columbia Press. https://doi.org/10.59962/9780774826853.

———. 2017. "Going beyond the 'Juicy Quotes Syndrome.'" In *Going Public*, by Elizabeth Miller, Edward Little, and Steven High, 110–38. University of British Columbia Press. https://doi.org/10.59962/9780774836647-005.

———. 2021. "Oral History as Creative Practice at Concordia University's Centre for Oral History and Digital Storytelling." *Bulletin de l'AFAS. Sonorités*, no. 47 (November), 108–21. https://doi.org/10.4000/afas.6359.

Janowicz, Krzysztof, Renée Sieber, and Jeremy Crampton. 2022. "GeoAI, Counter-AI, and Human Geography: A Conversation." *Dialogues in Human Geography* 12 (3): 446–58. https://doi.org/10.1177/20438206221132510.

Kabiljo, Lea. 2023. "Beyond the Interview: Oral History x Photography Research-Creation Methodology for the Enhancement of Social-Emotional Competences for Teacher Candidates in Art Education." Phd, Concordia University. https://spectrum.library.concordia.ca/id/eprint/993146/.

Kelly, Meghan. 2019. "Mapping Syrian Refugee Border Crossings: A Feminist Approach." *Cartographic Perspectives*, no. 93, 34–64.

Kelly, Meghan, and Amber Bosse. 2022. "Pressing Pause, 'Doing' Feminist Mapping." *ACME: An International Journal for Critical Geographies* 21 (4): 399–415.

Kitchin, Rob, and Martin Dodge. 2007. "Rethinking Maps." *Progress in Human Geography* 31 (3): 331–44. https://doi.org/10.1177/0309132507077082.

Knowles, Anne Kelly, Levi Westerveld, and Laura Strom. 2015. "Inductive Visualization: A Humanistic Alternative to GIS." *GeoHumanities* 1 (2): 233–65. https://doi.org/10.1080/2373566X.2015.1108831.

Kwan, Mei-Po. 2002. "Feminist Visualization: Re-Envisioning GIS as a Method in Feminist Geographic Research." *Annals of the Association of American Geographers* 92 (4): 645–61. https://doi.org/10.1111/1467-8306.00309.

Lavorel, Marie. 2020. "Faire résonner les récits de vie : la plateforme numérique « Archives vivantes »." *Intermédialités : histoire et théorie des arts, des lettres et des techniques / Intermediality: History and Theory of the Arts, Literature and Technologies*, no. 36, 1–24. https://doi.org/10.7202/1080959ar.

Lo Presti, Laura. 2022. "Leaving or Rescuing the (Story) Map? – Commentary to Saxinger, Sancho Reinoso and Wentzel." *Fennia - International Journal of Geography* 200 (1): 68–71. https://doi.org/10.11143/fennia.120599.

Luchetta, Sara. 2017. "Exploring the Literary Map: An Analytical Review of Online Literary Mapping Projects." *Geography Compass* 11 (1): e12303. https://doi.org/10.1111/gec3.12303.

Maharawal, Manissa M., and Erin McElroy. 2018. "The Anti-Eviction Mapping Project: Counter Mapping and Oral History toward Bay Area Housing Justice." *Annals of the American Association of Geographers* 108 (2): 380–89. https://doi.org/10.1080/24694452.2017.1365583.

Mai, Gengchen, Chris Cundy, Kristy Choi, Yingjie Hu, Ni Lao, and Stefano Ermon. 2022. "Towards a Foundation Model for Geospatial Artificial Intelligence (Vision Paper)." In *Proceedings of the 30th International Conference on Advances in Geographic Information Systems*, 1–4. SIGSPATIAL '22. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/3557915.3561043.

Massey, Doreen B. 2005. *For Space*. London: SAGE.

Moore, Paul. 2016. "Circuits of Cinema: Mapping Itinerant Shows." *Paul S. Moore* (blog). 2016. http://psmoore.ca/visualizing-space-of-itinerants/.

Moretti, Franco. 2005. *Graphs, Maps, Trees: Abstract Models for Literary History*. London: Verso.

Murrieta-Flores, Patricia, Diego Jiménez-Badillo, and Bruno Martins. 2022. "Digital Resources: Artificial Intelligence, Computational Approaches, and Geographical Text Analysis to Investigate Early Colonial Mexico." In *Oxford Research Encyclopedia of Latin American History*. https://doi.org/10.1093/acrefore/9780199366439.013.977.

Olmedo, Élise, and Sébastien Caquard. 2022. "Mapping the Skin and the Guts of Stories – A Dialogue between Geolocated and Dislocated Cartographies." *Cartographica: The International Journal for Geographic Information and Geovisualization* 57 (2): 127–46. https://doi.org/10.3138/cart-2021-0006.

O'Rourke, Kelley. 2024. "Grave Matters: Mapping the Untold Stories of the Saint-Colomban Cemetery." MSc Thesis, Montreal, CA: Concordia University.

Pearce, Margaret Wickens. 2008. "Framing the Days: Place and Narrative in Cartography." *Cartography and Geographic Information Science* 35 (1): 17–32. https://doi.org/10.1559/152304008783475661.

———. 2021. "What Shall We Map next? Expressing Indigenous Geographies with Cartographic Language." In *Mapping the Unmappable?: Cartographic Explorations with Indigenous Peoples in Africa*, edited by Ute Dieckmann, 317–40. transcript Verlag. https://doi.org/10.1515/9783839452417-011.

Pearce, Margaret Wickens, and Michael James Hermann. 2010. "Mapping Champlain's Travels: Restorative Techniques for Historical Cartography." *Cartographica: The International Journal for Geographic Information and Geovisualization* 45 (1): 32–46. https://doi.org/10.3138/carto.45.1.32.

Piatti, B., H. Bär, A. Reuschel, Lorenz Hurni, and W. Cartwright. 2009. "Mapping Literature: Towards a Geography of Fiction." In *Cartography and Art*, Springer, 177–92. Lecture

Notes in Geoinformation and Cartography. Berlin Heidelberg: W. Cartwright, G. Gartner, A. Lehn. http://www.literaturatlas.eu/downloads/vienna_piatti-mapping_literature.pdf.

Pickles, John. 2004. *A History of Spaces: Cartographic Reason, Mapping, and the Geo-Coded World*. London & New York: Routledge.

Presner, Todd, David Shepard, and Yoh Kawano. 2014. *Hypercities Thick Mapping in the Digital Humanities*. https://escholarship.org/uc/item/3mh5t455.

Roberts, Les. 2024. "Spatial Anthropology and Deep Mapping." In *The Routledge Handbook of Cartographic Humanities*. Routledge.

Rossetto, Piera. 2014. "Juifs de Libye: Notes Pour Une «cartographie» Des Lieux Migratoires." *Archivio Antropologico Mediterraneo* 16 (1): 87–99.

Rossetto, Tania. 2016. "Semantic Ruminations on 'Post-Representational Cartography.'" *International Journal of Cartography* 1 (2): 151–67. https://doi.org/10.1080/23729333.2016.1145041.

Roth, Robert E. 2021. "Cartographic Design as Visual Storytelling: Synthesis and Review of Map-Based Narratives, Genres, and Tropes." *The Cartographic Journal* 58 (1): 83–114.

Savage, Mike. 2008. "Sampling, Validity and the Longitudinal Archive." In . University of Sussex: NCRM. https://eprints.ncrm.ac.uk/id/eprint/4748/.

Shahamati, Sepideh. 2024. "Mapping the Invisible City: Revealing the Intangible Heritage of Parc-Extension through Narrative Cartography." PhD Thesis, Montreal, CA: Concordia University.

Shahamati, Sepideh, Léa Denieul-Pinsky, Yannick Baumann, Emory Shaw, and Sébastien Caquard. 2022. : A Free Open-Source Alternative to Google My Maps." *Cartographic Perspectives*, no. 99, 6–18. https://doi.org/10.14714/CP99.1729.

Sheftel, Anna, and Stacey Zembrzycki. 2016. "Who's Afraid of Oral History? Fifty Years of Debates and Anxiety about Ethics." *The Oral History Review* 43 (2): 338–66. https://doi.org/10.1093/ohr/ohw071.

Simon, Rainer, Elton Barker, Leif Isaksen, and Pau De Soto CaÑamares. 2017. "Linked Data Annotation Without the Pointy Brackets: Introducing Recogito 2." *Journal of Map & Geography Libraries* 13 (1): 111–32. https://doi.org/10.1080/15420353.2017.1307303.

Yang, Mengqian, and Sébastien Caquard. 2019. "Mapping The Shawshank Redemption: Film Tourism, Geography and Social Media." In *Media's Mapping Impulse*, Anton Escher, Chris Lukinbeal, Stefan Zimmermann, 281–300. Stuttgard: Verlag.