Libraries maintain a large number of computational search tools for their users. From the end-users’ point of view, these are mostly discovery engines—software products designed to help the user find the information they are seeking. Today, because most information is consumed digitally, these same systems offer access to the users as well. Much like Google, users type words into a box, press search, and are given result sets based on complex algorithms that are largely opaque to the users.

While it may be true that there is a spatial component to most information, in operational bibliographic systems, true geospatial search is mostly absent.

For my context, true geospatial information search:
• takes into account an extent
• requires a system that understands the spatial hierarchies of toponymy

Either one of these technically challenging, but doing both at the same time is proving to be elusive. Why is this?

Spatial search that takes extent into account is in widespread use in geoportals—all of the various search engines that provide access to maps and spatial data. The end-user manipulates an interactive web map to an area of interest, enters a keyword or two, and search results are ranked accordingly. Spatial extent is simultaneously an easy to understand concept for the user, and a metadata element that drives search results. This search paradigm is seen mostly in tools designed to store and provide access to spatial information. OpenGeoPortal in academic libraries, data.gov at the US federal level, and the European Union’s INSPIRE geoportal all use this paradigm.

In bibliographic databases (search engines that provide discovery of books, journal articles, etc.), spatial search is often connected to specific controlled vocabularies. Mainstream library catalogs typically lump spatial vocabularies together with other subject-oriented vocabularies. American universities almost universally use the Library of Congress Subject Headings, which has a rich vocabulary of place names that are combined with other terms, such as the subject phrases:

- Environmental impact analysis—Illinois—Peoria
- Housing—Illinois—Peoria Metropolitan Area—Statistics
- Public buildings—Illinois—Peoria County

Unfortunately, systems index these terms simply as text, ignoring all of the semantic meaning attached to the words. From the point of view of the system, Peoria is an equivalent...
concept to Statistics, and the relationship between the three Peorias is obscured except for the most skilled of system users. Separating the concepts semantically is the job of the end-user.

In some arenas, the situation is actually degrading. Even though the American Geosciences Institute’s GeoRef database contains a spatial subject field, my library’s vendor of the database, ProQuest, has combined place name subject terms with topical terms—resulting in Holocene and Peoria receiving equal meaning and weight. Systems that segregate place names into a discretely searchable field are actually disappearing.

Fortunately, the world is organized in such a way that most of the time, for most searches, Google-style free-text searching mostly returns satisfactory results. Librarians call this satisficing, but many of us think we can do better. Moreover, as the volume of digital data increases, and the variety of formats that libraries manage explodes, users are more frequently encountering the outer limits of what systems can return. At the same time, the users’ expectations continue to rise. Encouraged by the location based services available on their mobile phones, the widespread use of “slippy maps,” and media that portrays digital search technologies as magical, users expect discovery systems to perform better.

The limitations inherent in this ecosystem of bibliographic tools are very well described. A plethora of research projects have provided computational and knowledge organization techniques to apply to this problem domain. For example, for at least fifteen years, semantic web researchers have been developing linked data standards and tools, and a huge community is emerging that marks up texts and data—both manually and through automated techniques.

However, the tools most commonly used in academic libraries continue to lag behind. Why? Careful analysis from a socio-technical standpoint can help to answer this question. Qualitative research methods from sociology and anthropology, as manifested in a field often dubbed Science and Technology Studies (STS), are increasingly being applied to help solve problems in technology design. STS maps the intersection of technology and culture. It treats the various factors of system design as independent actors in a network (hence actor-network theory). One strain of thought in STS, often associated with Bruno Latour, treats human and non-human actors equally: hardware and software artifacts, datasets, laboratories, and universities are treated just the same as programmers, system administrators, scientists, and librarians. If there are actors preventing the uptake of better spatial search technologies in library discovery services, actor-network analysis should be able to identify them.

The research question implied by this argument is not simply “What are the socio-technical impediments to spatial search in academic libraries?” Rather, it is: “Given the complex socio-technical factors at play, how can academic libraries and the research enterprise work together to enhance each other’s work?”

I plan to participate in this Specialist Meeting in order to closely observe how spatial search research questions are developed, and to present the perspective of the operational end of the university. As research projects develop, how can the library serve as both resource for, and beneficiary of, the research? How can we best encourage research that results in tools that we can apply toward operational goals?