"If every object and event in the world were taken as distinct and unique—a think in itself unrelated to anything else—our perception of the world would disintegrate into complete meaninglessness. The purpose of classification is to give order to the thing we experience." (Abler et al. 1971)

There is nothing more basic than categorization to our thought, perception, action, and speech. Everytime we see something as a kind of thing, for example, a tree, we are categorizing. (Lakoff 1987)

Topics include
- Basics of classification, categorization and conceptualization (CCC)
- What’s special about spatial CCC?
- CCC across disciplines
- Cognitive approaches to CCC
- Methodological approaches across disciplines
- The relation of CCC and language
- Similarity measures
- CCC and ontologies

Landscape/picture classification visualized using multidimensional scaling

The classification, conceptualization and categorization of spatial information is an interdisciplinary research field central to many disciplines and disciplinary subfields. Since the diversion from the classic view on categories in the 1970s, the topic has spurred a large number of research programs. Cognitive conceptualization processes are inspirational to many more technical approaches. At the same time, understanding cognitive conceptualization is essential for designing human-computer/machine interfaces. This course is designed to provide an understanding of basic cognitive concept and conceptualization theories with a particular focus on spatial information. Building on this basic understanding we will explore research methods to elicit and analyze conceptual knowledge: Classic methods and tools used in psychology and interface design, analysis using clustering methods, visualizations using MDS and tailored visual analytics tools, exploratory data analysis incorporating unstructured information such as natural language. The centrality of this topic (CCC) and the methodological focus of this course allows for an interdisciplinary approach linking the course to evolving topics such as cultural differences, ontology research, (spatial) semantics, spatial thinking, and more.

CatScan: A spatio-temporal grouping tool
KlipArt: Analyzing conceptualization and language interactively

Exploration of word frequencies using wordle and other exploratory linguistic tools

Visualizing similarities and developing new assessments such as the visualized Levenshtein distance

Instructor: Dr. Alexander Klippel; klippel@psu.edu; www.cognitiveGIScience.psu.edu