# GEOG 8200: Frontiers in Geographic Information Science: Visualizing big spatial and temporal data

The Ohio State University
Autumn 2016

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Time: **Wednesday 9:00 - 11:48 AM**
Location: **1116 Derby Hall**
Course URL: http://carmen.osu.edu

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Office Hours: Monday 10 to 11:30 AM or by appointment

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The past few years saw the rapid rise of big data that come in from a variety of sources such as social media, all kinds of censors and monitors, Census Bureau, remote sensing, and the Internet of Things. These data are often multidimensional with social, economic, and environmental information, and, importantly, they also include spatial and temporal components. Effectively visualizing and analyzing such data sets is a huge challenge to many disciplines.

In this graduate seminar, we examine the theories and methods that can be used for visualizing big spatial and temporal data. We are going to discuss topics such as the nature of big data, latest techniques and applications of big data, theory and practice in quantitative and information visualization and cartography, and advances in computational theory and methods of handling big data.

## Weekly Schedule

This seminar consists of two parts: discussions and workshops. The discussion part of the course is roughly divided into two sections: background about big data and visualization (weeks 1 to 6), and visualization theories and methods (weeks 7 to 15). The workshop part of the course is designed to provide hands-on experience of data visualization. We introduce the web environment in week 5 and then move on to data visualization techniques in week 8. In week 10, we will work on a critical techniques that enable interactivity in data visualization.

Detailed discussion topics are included in this schedule page that will be handed out for readings sign-up on the first day of class.

## Course Requirements

Students are required to participate in class discussions and presentations. In the first week of class, each student will sign up to lead discussions. Generally two students will sign up for one week, each covering about a half of the reading materials. Each week, the two students who present should include the following information in the presentation: the context of the reading material with respect to the general theme of this class, some details from the reading, and your

critical thinking about the topic. After the presentation, each student should also discuss the questions/comments posted by the other students.

The other students who are not leading the discussion must carefully read the papers and post questions and comments on the Carmen discussion board. Each student (not leading discussion) must post at least one question/comment for each paper. Questions and comments should be intellectually stimulating or critical. We will not accept trivial questions such as "what do you think of this paper?" or "what are the contributions of this paper?"

The workshops will be designed to introduce key techniques of data visualization. There will be some moderate amount of homework assignments based on these workshops.

Each student must complete a research project. There are two kinds of project for this course. First, a student can prepare a spatio-temporal data set and develop an effective visualization for the data. Students who choose this route should also write an extended abstract of 4 pages. The second type of project will be a literature review in which the student chooses a particular topic of visualizing big spatio-temporal data within his/her own research field. I am also open to discuss with students about other types of final project. All students must present their project at the end of the class. The writing part of the project is due on **December 12**.

It is important to attend each class. Students who cannot attend a class must present a reasonable excuse. Any student who misses a class must still submit the required questions and comments on Carmen, and also provide the answers or responses to his or her own questions/comments. The answer or response must be at least one page, double spaced. Students who miss two or more classes must make special arrangements with me.

## Grading

Attendance and participation: 25%
Discussion: 25%
Homework: 10%
Project: 40%

## Student with Disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

## Policy on Plagiarism and Academic Misconduct

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. It is the responsibility of the Committee on Academic Misconduct to investigate or

establish procedures for the investigation of all reported cases of student academic misconduct. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentlife.osu.edu/csc/.