TRANSPORTATION - SENSORS - AND THE SMART CITY
GEOG 491/591  ADVANCED GIS

DATE  3-30-15  LECTURE  #1 - COURSE INTRODUCTION
Do you consider this something good or bad?

Path is too indirect
Puddles/drainage
Debris
Steep slope/hill

Select keywords ...
multiple responses selected
Take a photo ...
Write a note ...

LAST Comment on the associated impacts. These are considered advanced questions.
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TOPIC
TRANSPORTATION - SENSORS - AND THE SMART CITY

DATE
3-30-15

LECTURE
#1 - COURSE INTRODUCTION
Crowdsourcing the Collection of Transportation Behavior Data

Where did you come from?
Where are you going?
How did you get here?
How long did it take you?
Overall experience?

TOPIC

TRANSPORTATION - SENSORS - AND THE SMART CITY

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TRANSPORTATION - SENSORS - AND THE SMART CITY

DATE: 3-30-15
LECTURE: #1 - COURSE INTRODUCTION
Welcome

Advanced GIS: Transportation – Sensors – and the Smart City

Whether they are inside our smartphones, embedded in our appliances, attached to buildings and utilities or flying above our heads – sensors are contributing an unprecedented amount of real-time "big data" that has the potential to alter the way cities function and how we move around within them.

This course will explore how sensors can be employed for the collection and visualization of transportation data. The objective of the course is to expose students to sensor technologies that facilitate the ubiquitous collection of data pertaining to individual movement and perceptions as related to transportation behavior. In particular we will focus on a new bike sensor currently being installed on our campus. Students will learn about the technology of sensors, the type of data they produce, how such data can be used, and the societal issues that
• CITIZEN SENSOR
• EMBEDDED SENSORS
• TRANSPORTATION / MOBILITY
• NETWORKED DATA
• GEO spatially AWARE

TRANSPORTATION - SENSORS - AND THE SMART CITY

DATE 3-30-15  LECTURE #1 - COURSE INTRODUCTION
COURSE & TOPIC INTRODUCTION

DATE: 3-30-15
LECTURE: #1 - COURSE INTRODUCTION

COURSE
- Instructors
- Lectures
- Readings
- Labs
- Assignments
- Office Hours
- Attendance

TOPIC
- Smart Cities
- Sensors
- Transportation
- GIS - Mapping

http://blogs.uoregon.edu/sensorscourse
<table>
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- **KEN KATO**  
  Associate Director, InfoGraphics Lab

- **JACOB BARTRUFF**  
  Senior Developer, InfoGraphics Lab

- **RUDY OMRI**  
  Course GTF, Geography Department
• MONDAYS
  Bigger Picture Concepts

• WEDNESDAYS
  Deeper Look at Technical Aspects

• READINGS
  Discussion Based on Readings

• CLASS ACTIVITIES
  Based on Lecture and Readings

• LAB SETUP AND RESPONSE
  Provide an Overview of Upcoming Lab and Answer Questions

• GUEST LECTURES
  Visits from Professionals

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ADVANCED GIS: TRANSPORTATION - SENSORS - AND THE SMART CITY

Geog 491/591 Spring 2015

LECTURES

Lectures are Mondays and Wednesdays. The lectures will be structured to explore a new topic each week. The Monday lecture will initiate the topic and introduce the big picture concepts, led by Ken Kato – Associate Director of the InfoGraphics Lab. The Wednesday lecture will take the topic further, looking deeper under-the-hood, to explore the technical side the topic — looking at the APIs, code, systems architecture, methods, etc, led by Jacob Bartruff – Senior Developer of the InfoGraphics Lab. The readings are posted below. The readings will prepare you for the lecture and discussion. You are expected to have completed the readings prior to the lecture for which they are listed. The readings are all available online (linked

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1 ACADEMIC/RESEARCH

1 POPULAR/MAINSTREAM

READ BEFORE LECTURE

DATE: 3-30-15

LECTURE: #1 - COURSE INTRODUCTION

TOPIC

READINGS
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| DATE      | 3-30-15                                   |
| LECTURE   | #1 - COURSE INTRODUCTION                  |

- PREPARATION FOR ASSIGNMENTS
- TIME TO GET YOUR HANDS DIRTY
LABS

March 31
Lab 1: An intro to WordPress and RunKeeper

April 7
Lab 2: Accessing and mapping your location sensor data

April 14
Lab 3: An intro to Tableau data visualization

April 21
Lab 4: Comparing multiple variables from sensors

April 28
Lab 5: How to develop a sensor project proposal

May 5
Lab 6: Proposal preparation

May 12
Lab 7: Setting up your sensor project
• ASSIGNMENT 1
  Collecting Sensor Data

• ASSIGNMENT 2
  Visualizing Sensor Data

• ASSIGNMENT 3
  Designing a Sensor-based Project

• ASSIGNMENT 4
  Final Project
DIGITAL SUBMISSION
Personal website using Word Press

ASSIGNMENTS

DATE  3-30-15  LECTURE  #1 - COURSE INTRODUCTION
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- NOT GRADED
- NOT MANDATORY
- BUT A GOOD IDEA...
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<tbody>
<tr>
<td>KEN KATO</td>
<td>Thursday’s 2:30 - 3:30, Condon 163</td>
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<tr>
<td>JACOB BARTRUFF</td>
<td>Wednesday’s 1:00 - 2:00, Condon 163</td>
</tr>
<tr>
<td>RUDY OMRI</td>
<td>TBA</td>
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**#1 - COURSE INTRODUCTION**

**DATE**  3-30-15  **LECTURE**  #1 - COURSE INTRODUCTION
• **WHAT DOES IT MEAN?**
  A smart city uses digital technologies to enhance performance and wellbeing, to reduce costs and resource consumption, and to engage more effectively and actively with its citizens. A smart city should be able to respond faster to city and global challenges than one with a simple transactional relationship with its citizens.

• **WHERE ARE THE SMART CITIES?**
  • The city of Santander (Spain) has 20,000 sensors connecting buildings, infrastructure, transport, networks and utilities.
  • The city of Porto, Portugal [link]

• **WHO IS STUDYING THEM?**
  MIT City Science [link]
  MIT Senseable City Lab [link]
  NYU Urban Systems [link]

• **WILL THEY BE “BETTER” CITIES?**
  Are all of the outcomes positive?
  Who are the winners / losers?
WHAT EXACTLY IS A “SENSOR”?

- CITIZEN SENSOR
- EMBEDDED SENSORS
- TRANSPORTATION/MOBILITY
- NETWORKED DATA
- GEOSPATIALLY AWARE
• WHAT IS ROLE OF GIS IN A SMART CITY?
• IS SPATIAL SPECIAL?
• AGILE - OPEN - ACCESSIBLE

GIS - MAPPING - LOCATION

DATE  3-30-15  LECTURE  #1 - COURSE INTRODUCTION
• DEMAND ON TRANSPORTATION NETWORK
  Mobility and congestion are challenges for every city. More and more of them are turning to technology to provide better, faster and cheaper ways to get around. (link)

• INTELLIGENT CONNECTIVITY
  As it applies to urban mobility: how people and things move through cities. Enabling effective transport of citizens and goods is critical to a city’s economic and social vitality, the well-being of its inhabitants, and its consumption and emissions footprint. (link)

• BICYCLING
  What do sensors (ex. a bike counter) offer to city transportation planners, engineers, cyclists, citizens, entrepreneurs or innovators?
• THE SMART CITY
   A working knowledge of “smart cities”

• SENSORS
   The role that “sensors” play in a smart city

• TRANSPORTATION/MOBILITY
   Opportunities to address issues/challenges of transportation / mobility within a smart city

• LOCATION, LOCATION, LOCATION
   The role GIS / Mapping / Geospatial Technologies will play in smart cities

• PRACTICE
   Complete you own project using multiple sensor-fed data streams to examine the topic of bicycle transportation at the University of Oregon.
SMART CITIES OF THE FUTURE
THE EUROPEAN PHYSICAL JOURNAL

CAN WE TRUST SMART CITIES?
govtech.com
• POSTING YOUR ASSIGNMENTS
  Word Press

• LOCATION-BASED SENSORS
  Run Keeper

### THIS WEEK’S LAB

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FACADE INTEGRATED TECHNOLOGIES TESTING FACILITY

THE ONLY FACILITY OF ITS KIND IN THE U.S., THE FACADE INTEGRATED TECHNOLOGIES FACILITY (FIT) IS A FULL-SERVICE, HIGH PERFORMANCE FACADE ANALYSIS RESEARCH LABORATORY.

FIT PROVIDES A WORLD CLASS TESTING FACILITY AND UNIQUE LABORATORY FOR EXPERIMENTAL FULL-SCALE TESTING OF ENVELOPE COMPONENTS BY MEASURING THEIR ENERGY PERFORMANCE, SYNERGY WITH OTHER SYSTEMS, OCCUPANT IMPACT, AND OCCUPANT ACCEPTANCE OF FACADE TECHNOLOGIES.

CLICK ON ANY OF THE TESTING CELLS IN THE IMAGE TO THE RIGHT OR FROM THE LIST BELOW TO VIEW REAL-TIME ENVIRONMENTAL DATA AND LEARN MORE.

- CORBUSIER
- WRIGHT
- FATHY
- NERVI
- EAMES

SOLAR AWNING

FACULTY RESEARCH / INNOVATION
Foundational Technology

We are developing foundational technology that makes use of Nature’s ability to assemble molecules into simple structures, the formation of which can be tapped as a source of information about the environment on a molecular level. Significant implications are expected in environmental monitoring and personal health care.