“Memory of the past, observation of the present, foresight of the future are indispensable. But they are indispensable to a present liberation, an enriching growth of action.”

Course Staff and Schedule

Instructor: Prof. Robert Goodspeed (rgoodspe at umich.edu)
Office: 2223C Art & Architecture Building
Office Hours: Friday 1:00-3:00 PM (sign up by Canvas link)
Credits: 3
Prerequisites: UP 506 or NRE 531, or similar GIS background with permission of the instructor

Class Schedule: Tuesday and Thursday, 2:30 – 4:00 PM, Room 2204 Art & Architecture Building

Summary and Learning Objectives

Growing uncertainty about the future has made considering the long-term implications of public decisions more difficult than ever. All planning specialties must now consider uncertainties associated with forces like climate change, new technologies, economic restructuring, and changing social preferences. Given the failure of conventional methods of prediction, professionals are increasingly turning to scenario planning to consider future uncertainty. Instead of proposing only a most likely or must desired future scenario, practitioners using scenario planning construct multiple possible futures. Doing so requires combining art with science: applying not only creativity but also rigorous analysis. The goal of scenario planning is to make better plans and decisions by challenging stakeholder assumptions and encouraging learning.

The goal of the course is to introduce students to this exciting professional technique, as well as provide hands-on experience using GIS-based planning support systems (PSS) used to implement scenario planning. This course contains four modules: (1) an overview of scenario planning theory and concepts, (2) an exploration of the applications of the method in various sub-fields of urban planning, (3) an examination of some of the modeling tools used for scenario planning, and (4) an opportunity to use leading PSS tools to construct scenarios and explore their economic, land use, transportation, and environmental dimensions. The course will involve readings, discussion, and a series of individual and group assignments which culminate in detailed student-generated scenarios for a site in Ann Arbor where large-scale development has been proposed.

Student Audience and Prerequisites

The course is designed for students from all concentrations in the Masters of Urban Planning program, as well as students interested in this planning method from across the University. However, UP 506 (Intro. to GIS) or an equivalent course is a required prerequisite. Students without this prerequisite but with adequate background in GIS can enroll with the permission of the instructor.

Materials

The course utilizes readings from one book, the remainder of the readings will be provided on Canvas.

Resources
Additional references are provided below for many of the class sessions. This section provides additional resources to learn about research and practice of scenario planning.

Journals
- Futures ([http://www.journals.elsevier.com/futures/](http://www.journals.elsevier.com/futures/))

Professional Organizations
- Open Planning Tools Group (listserv and annual symposium) ([http://scenarioplanningtools.org](http://scenarioplanningtools.org))
- Computers in Urban Planning and Urban Management (CUPUM)
  - *Biannual international conference of scholars and practitioners involved in urban modeling and analysis.*
- U.S. Federal Highway Administration Scenario Planning Group

Assignments
- **Class Attendance and Participation** (5%)
- **Discussion Posts:** Before any Tuesday class, students should post 250-word response, reaction, or question emerging from the materials to the Canvas forum. These are due by 5PM on the day before. Students must complete comments for all but one week for each module, a total of 10. Posts will be graded according to a separate rubric. (15%)
- **Assignments:** See below: Futures Method Report, Scenario Definition Essay, Tool Report, Final Presentation. (45%)
- **Laboratory Assignments:** Described below. (9) (35%)

Course Policies
In addition to those specified here, policies which may apply to students in this class include those of the Urban and Regional Planning Program, Taubman College, students' home academic units, and the University.

Academic Integrity
Taubman College Policy on Plagiarism: "Plagiarism is knowingly presenting another person’s ideas, findings, images or written work as one’s own by copying or reproducing without acknowledgement of the source. It is intellectual theft that violates basic academic standards. In order to uphold an equal evaluation for all work submitted, cases of plagiarism will be reviewed by the individual faculty member and/or the Program Chair. Punitive measures will range from failure of an assignment to expulsion from the University."

Accommodations for Students with Disabilities
It is Taubman College policy to “meet the educational needs of all persons, including those with physical or perceptual limitations, who are interested in the study of architecture, urban planning and/or urban design.” If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD (734-763-3000; http://ssd.umich.edu) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential and will be treated as such.
Course Overview and Assignments

Scenario planning has emerged as an influential professional technique in urban planning and related fields since it integrates diverse forms of knowledge, systems analysis, future-oriented thinking, and a consideration of uncertainty. Scenario planning most accurately refers to a diverse area of planning practice which involves a variety of assumptions, tools, and methods. As a consequence, the course has two primary learning objectives for graduate students in planning: to cultivate reflective practitioners, and to provide specific technical skills to empower students to implement these ideas themselves or by working with a team.

Reflective Practitioners: Theory, Method, and Cases
The primary goal of this class is to cultivate reflective practitioners (Schön 1983), who are prepared to implement forms planning appropriate to the questions and problems they will face in their lives and as professionals. To do this, the course provides an introduction to theories, debates, and modeling tools used in scenario planning. Students then consider how these ideas have been translated into contemporary practice through the study of several cases. In many advanced scenario planning projects, urban planners involved work with consultants and multifunctional teams to integrate scenario creation, stakeholder engagement, and modeling and analysis. Therefore, the course examines several advanced modeling tools in detail, in order to empower future planners to be educated consumers of tools used in practice. Through scholarly articles and technical documentation students examine a range of tools for sketch planning and urban modeling, examining their logic, assumptions, weaknesses and strengths.

Technical Skills: Ann Arbor Project
The second aim of this course is to provide specific technical skills to implement one approach to scenario planning feasible to implement within the confines of the course. As summarized below, working both individually and in groups, the class will collectively create two scenarios for the selected project site in Ann Arbor. The scenario types and content will be determined by the class, and might include predictive, explorative, or normative scenarios (Börjeson et al. 2006, W4).

Assignments:
The schedule and diagram below provide a description of how these assignments are related, and are linked to the course readings and cases.

Module 1
- **A1 Futures Method Report**: Working in assigned groups, the students are asked to review materials for one of several alternative planning methods: visioning, strategic planning, general or comprehensive planning, forecasting, and utopian imagination. This assignment reinforces the unique nature of scenario planning, but also begin to explore how ideas might be fruitfully combined in practice.
- **L1 Stakeholder Identification**: The class considers the multiple stakeholders for the physical development of the project site, identifying the key issues for each stakeholder.
- **L2 Project Context Research**: Each student is asked to prepare summary slides exploring issues identified by the stakeholder identification assignment.
- **L3 Scenario Narrative Development**: Drawing on their emerging understanding of the site, students work as a group in class to construct four scenarios by selecting two major uncertainties and placing them on two axes.
- **A2 Scenario Definition Essay**: Students will write a short essay synthesizing the readings on scenario planning.

Module 2
- **L4 Building Prototype Exercise**: Working individually, students construct building prototypes which might be used for either a forecast or transforming scenario.
- **L5 Development Type Exercise**: Next, using the buildings created in the previous assignment, also working individually, students will create development types which could be used for either scenario.
- **L6 Suitability Analysis**: Next, students will create a suitability map for their development type for the project site using a simplified attractiveness and constraint raster analysis.

Module 3
- **A3 Tool Report**: Working in small groups, students present on various scenario planning tools.
- **L7 Scenario Construction**: Finally, the big moment has arrived! In a participatory workshop setting, working in groups, the students will sketch and refine the scenarios, drawing on the suitability analysis and development type indicators.
- **L8 Scenario Analysis**: Working individually, students implement a site-level transportation analysis.

**Module 4**
- **L9 Scenario Visualization & Communication**: Students will work in groups to produce representations of their scenarios, which will be used for the final presentation. This includes charts, tables, maps, and/or 3D representations from CityEngine.
- **A3 Final Presentation**: Using the outcomes from the previous labs, the class as a group prepares and deliver a summary presentation open to Taubman College and invited stakeholders.

### Schedule Overview

<table>
<thead>
<tr>
<th>Week</th>
<th>Modules</th>
<th>Topics</th>
<th>Assignments</th>
<th>Cases or Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1: Introduction to SP Theory and Practice</td>
<td>SP and Its Alternatives</td>
<td>A1: Futures Method Report</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>SP Origins and Concepts</td>
<td>L1: Stakeholder Identification</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Scenario Types &amp; Construction</td>
<td>L2: Project Context Research</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Participation</td>
<td>L3: Scenario Narrative Development A2: Scenario Definition Essay</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2: Practice Areas</td>
<td>Urban Land Use and Transportation</td>
<td>L4: Building Types</td>
<td>San Francisco</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Climate Change</td>
<td>L5: Development Types</td>
<td>Central New Mexico</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Environmental Planning</td>
<td>L6: Suitability Analysis</td>
<td>Florida</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Advanced Modeling 2: Spatial &amp; Systems Dynamics</td>
<td>L8: Scenario Analysis</td>
<td>LEAM, Systems Dynamics</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Scenario Visualization &amp; Communication</td>
<td>L9: Scenario Visualization &amp; Communication</td>
<td>CityEngine</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>SP as a Sociotechnical Infrastructure</td>
<td>Draft Presentation</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Conceptualizing &amp; Measuring Learning</td>
<td>A4: Final Presentation</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Close &amp; Party</td>
<td></td>
<td></td>
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</tbody>
</table>
Overview of Laboratory Assignments

- **A1 Futures Methods Report (G)**
- **A2 Scenario Definition Essay (I)**
- **A3 Tool Reports (G)**
- **A4 Final Presentation (G)**

1. (1) Stakeholder Assessment (I)
2. (2) Project Context Research (I)
3. (3) Scenario Narrative Development (G)
4. (4) Building Types (I)
5. (5) Development Types (I)
6. (6) Suitability Analysis (I)
7. (7) Scenario Construction (G)
8. (8) Scenario Analysis (I)
9. (9) Scenario Visualization & Communication (G/I)

**Scenario 1**
- (4) Building Types (I)
- (5) Development Types (I)
- (7) Scenario Construction (G)
- (8) Scenario Analysis (I)
- (9) Scenario Visualization & Communication (G/I)

**Scenario 2**
- (4) Building Types (I)
- (5) Development Types (I)
- (7) Scenario Construction (G)
- (8) Scenario Analysis (I)
- (9) Scenario Visualization & Communication (G/I)

**Key**
- (G) – Group Assignment
- (I) – Individual Assignment
Course Connections with MUP Concentrations

The techniques of scenario planning can be used at various scales and across multiple sub-fields of planning. Although the labs most directly connect to the professional practice of land use planning, the type of planning they demonstrate is most accurately described as spatial planning (Albrechts 2004, W2), since like the professional practice it mimics, the project integrates into a discussion of land use topics such as real estate financial analysis, housing affordability, environmental concerns, travel behavior, street design, and other topics. The table below illustrates readings/lectures, labs, and cases which particularly link with one of the five concentrations in UM’s Master of Urban Planning program. Although the labs and cases are U.S.-focused, there are readings discussing tools and practices from Europe, South Africa, and Australia, and many of the modeling tools discussed are used worldwide.

<table>
<thead>
<tr>
<th>Reading/Lectures</th>
<th>Land Use and Environment Pl.</th>
<th>Housing, Comm. &amp; Econ. Dev.</th>
<th>Global and Comparative</th>
<th>Physical Pl. &amp; Design</th>
<th>Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W7 Land Use and Trans, W6 Environmental Pl.</td>
<td>W5 Participation &amp; Equity</td>
<td>W2 European SP, W7 Environmental Pl., W9 European Articles, W12 Australia</td>
<td>W12 Visualization</td>
<td>W6 Land Use and Trans</td>
</tr>
<tr>
<td>Labs</td>
<td>L5 Development Types, L6 Suitability Analysis, L7 Scenario Const.</td>
<td>L1 Stakeholder Assessment, L4 Building Types</td>
<td>-</td>
<td>L2, Site Analysis, L5 Devt Types, L9 Visualization</td>
<td>L8 Scenario Analysis</td>
</tr>
<tr>
<td>Cases</td>
<td>Great Lakes Shorelands</td>
<td>Great Lakes Shorelands &amp; Envision Tomorrow</td>
<td>-</td>
<td>Envision Tomorrow</td>
<td>Central New Mexico</td>
</tr>
</tbody>
</table>

W# = Week, L# = Lab
Schedule

Module 1: Scenario Planning Theory and Concepts

Week 1 – Introduction and Course Overview
Course overview and student introductions. Discussion on Dewey’s argument for future-oriented action and the need for techniques to introduce intelligence, and cities as complex systems.

Thurs., Jan. 7: Introduction

Week 2 – Thinking About the Future: Scenario Planning and Its Alternatives
Scenario planning is only one way planners have thought about the future. First we discuss some of the basic concepts, considering ideas such as visioning, forecasting, scenarios, plans, and project implementation, and discuss how they relate to one another. On Thursdays, students present in small groups about the method they have chosen.

Tues., Jan. 12: Lecture and Discussion, “Thinking About the Future in Planning”
1. Hopkins and Zapata, ETF Ch. 1

Additional Readings

Thurs., Jan. 14: A1 Futures Method Reports (due in class)

Visioning

Strategic Planning

General and Comprehensive Planning

**Forecasting**

• Isserman, ETF Ch. 9

**Utopian Imagination**


**Week 3 – Scenario Planning Origins and Concepts**

*This week we explore the origins and development of scenario planning ideas. Originally conceived of as a method for “thinking the unthinkable” in the Cold War, the technique was adopted in business in the 1980s, especially by firms in industries susceptible to geopolitical uncertainty (e.g., oil). We then begin to explore how the ideas have been applied to planning.*

Tues., Jan. 19: Lecture and Discussion


Thurs., Jan. 21: Lecture and Discussion

1. Smith, ETF Ch. 5

Lab 1: Stakeholder Identification (Due Friday, Jan. 22 at noon)

Additional References:

**Management Focus**

National-scale Focus

Urban Planning Focus

Week 4 – Scenario Types & Construction
This week we examine scenario types and development methods in detail, and then consider how they have been implemented in urban planning. Students then construct narrative scenarios for the project site.

Tues., Jan. 26:
3. Avin, ETF Ch. 6.
5. Cummings, ETF Ch. 12.

Additional Reading:

Thurs., Jan. 28: Project Context Presentations and Discussion
- L2 Project Context Research due in class

Sat., Jan 30 (tentative): Project Site Visit

Week 5 – Participation and Equity
One of the most important qualities of public sector scenario planning is the importance of democratic accountability, often achieved through stakeholder involvement or public participation. If one of the most important outcomes of scenario planning is learning and other cognitive changes by decision-makers, participation is not only required for accountability but also for the efficacy of the method. At the interface of quantitative data and public understanding is the concept of indicators, which scenario planning practice relies on. We’ll also consider the related issue of social equity this week.

Tues., Feb. 2:
1. Zapata, ETF Ch. 13.

Additional Reading:
Module 2: Contemporary Scenario Planning Practice Areas

Week 6 – Urban Land Use and Transportation

Two planning specialty areas which have adopted scenario planning methods are the related fields of transportation and land use planning. Given the strong linkages between land use patterns and transportation demand, they are frequently considered together, however given the siloed nature of U.S. planning, scenario planning can be also used for either sector alone.

Tues., Feb. 9: Lecture and Discussion

Additional Reading:

Thurs., Feb. 11: Case Discussion, San Francisco Environment and Equity Scenario, Guest: Bob Allen, Urban Habitat
1. Case documents on Canvas

Lab 4: Building Types (due Tues., Feb. 16)

Week 7 – Climate Change, Anticipatory Governance and Robust Plans

The challenge of planning for climate change is transforming planning practice, and has also caused theorists to question the usefulness of scenario planning techniques. We consider this debate by studying a recent experimental project which sought to integrate climate change analysis into a regional transportation planning process.

Tues., Feb. 16: Lecture and Discussion

Thurs., Feb. 18: Central New Mexico Climate Change Scenario Planning Project. Guest from US DOT Volpe Center
1. Case documents on Canvas
2. US Department of Transportation Volpe Center Project Website: http://www.volpe.dot.gov/transportation-
Lab 5: Development Types (due Tues., Feb. 23)

**Week 8 – Environmental Planning**
The field of environmental planning as also adopted scenario methods, using it to explore uncertainty, scale, and normative concerns.

Tues., Feb. 23: Discussion and Lecture

**Additional Readings:**

Thurs., Feb. 25: Case: Land Use and Climate Change Scenarios for the Peninsular Florida Landscape Conservation Cooperative, Juan Carlos Vargas-Moreno and Michael Flaxman.

Lab 6: Suitability Analysis (due Tues., March 8)

**Week 9 – Spring Break**

**Module 3: Modeling Urban Scenarios**

**Week 10 – Introduction**
Planners and designers have always desired tools to evaluate their proposals. Therefore, the field of modeling urban scenarios can draw on the large and diverse field of planning support systems and applied spatial analysis. After considering the role of these tools in context, students present in small groups on one of a set of planning tools used in professional practice.


Additional Readings:

Thurs., March 10: A2 Tool Report Presentations (group assignment, due in class)

**CommunityViz**
- Placeways LLC. 2012. Scenario 360 v. 4.3 Quick Reference Guide.

**Index**

**What If?**
- Klosterman, ETF Ch. 10.

**UrbanSim**

**Urban Strategy**

**GeoDesign/GeoPlanner**
Week 11 – SP & Advanced Modeling Tools

Although the hands-on coursework will use sketch-planning tools, this week we will consider a class of models which attempt to model urban land use and transportation systems.

Tues., March 15: Urban Modeling Overview Discussion

Thurs., March 17: Scenario Construction
Lab 7: Scenario Construction (start in class, write-up due March 24)

Additional Resources

Week 12: Systems Dynamics & Analysis Tools

While many of the urban models discussed in Week 10 draw on economic theory to simulate development or travel behavior, other modeling approaches are possible. This week we consider system dynamics models, as well as student-provided analysis tools.

Tues., March 22: System Dynamics Lecture and Discussion

Thurs., March 24: Analysis Tools Show-and-Tell
- Students should prepare a short overview of an analysis tool of their choosing which could be useful for scenario planning

Lab 8: Scenario Analysis (due Tues., March 29)
Additional Reading


Module 4: Advancing Practice & Final Presentations

Week 13: Scenario Visualization and Communication

Communicating the results of a scenario planning analysis is one of the most important skills for a successful project. This week students complete a lab and continue developing their project.

Tues., March 29: Discussion

1. Cummings, ETF Ch. 12.

Additional Reading


Thurs, March 31: Scenario Visualization Part 1


Lab 9: Scenario Visualization & Communication (start in class, individual part 2 due Tues., April 7)

Week 14: Scenario Planning as a Sociotechnical Infrastructure

Discussions of scenario methodologies and modeling can lose sight of the fact that planning is an institutionalized practice which must be conducted with the associated resources and constraints. This week we return to the context of planning, considering scenario planning as a sociotechnical infrastructure.

Tues., April 5: SP Infrastructures in Theory and Practice


Thurs., April 7: Draft Presentation

Additional Resources

Week 15: Learning and Final Presentation

Tues., April 12: Discussion of Theory and Research on Scenario Planning and Learning

Additional Resources

Thurs., April 14: Semester Debriefing

Wed., April 20th, 1:30 – 3:30 PM: A3 Stakeholder Presentation (final exam time)