Syllabus

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Office hours: M, W 10:30 – 12:30

Course objective:
Geographic Information Science (GIScience) employs a suite of methods and techniques for studying both social and physical systems. While applications may vary, the methods and techniques of in particular Remote Sensing (RS) and Geographic Information Systems (GIS) have common theoretical and methodological issues and backgrounds. This seminar focuses on proven and innovative GIScience methods and techniques that are used to investigating the current state of the environment with respect to climate change. Global climate change is no longer seriously questioned. Neither is the cause, the impact humans have by emitting gases into the atmosphere and thereby increasing the so-called greenhouse effect. However, the effects of warming are not yet fully understood, neither on a global nor a local scale. Using aspects of global climate change in general and for the San Francisco Bay area as a case study, this seminar attempts to develop a broader and deeper understanding of the methodological questions, implications, and analysis techniques of GIScience techniques.

Course outline:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Activities</th>
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<tr>
<td>1</td>
<td>Aug. 28</td>
<td>Introduction – Setting the agenda</td>
<td>1a</td>
<td>Discussion</td>
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<td>2</td>
<td>Sept. 4</td>
<td>Labour day - No class</td>
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<td>3</td>
<td>Sept. 11</td>
<td>What is Geography and its future direction</td>
<td>2a, 3a, 4a, 5a, 6a, 7a, 8a, 9a</td>
<td>Discussion</td>
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<td>4</td>
<td>Sept. 18</td>
<td>GIScience? Foundations and limits of GIS.</td>
<td>10, 11, 12a</td>
<td>Discussion</td>
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<td>5</td>
<td>Sept. 25</td>
<td>Lidar</td>
<td>13, 14, 15</td>
<td>Discussion</td>
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<td>6</td>
<td>Oct. 2</td>
<td>Structure from motion photogrammetry</td>
<td>16, 17, 18</td>
<td>Discussion</td>
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<td>7</td>
<td>Oct. 9</td>
<td>Object-based image analysis (OBIA)</td>
<td>19, 20, 21</td>
<td>Discussion</td>
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<td>8</td>
<td>Oct. 16</td>
<td>Applications of RS and GIS to land cover mapping</td>
<td>22, 23, 24</td>
<td>Discussion</td>
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<td>9</td>
<td>Oct. 23</td>
<td>Applications of RS and GIS to water resources</td>
<td>25, 26, 27</td>
<td>Discussion</td>
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<td>10</td>
<td>Oct. 30</td>
<td>TBD</td>
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<td>11</td>
<td>Nov. 6</td>
<td>Student selected papers</td>
<td>TBD</td>
<td>Discussion</td>
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<tr>
<td>12</td>
<td>Nov. 13</td>
<td>Student selected papers</td>
<td>TBD</td>
<td>Discussion</td>
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<tr>
<td>13</td>
<td>Nov. 20</td>
<td>Student selected papers</td>
<td>TBD</td>
<td>Discussion</td>
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<td>14</td>
<td>Nov. 27</td>
<td>Thanksgiving break</td>
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<td>15</td>
<td>Dec. 4</td>
<td>Paper presentation</td>
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<td>Presentation</td>
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<tr>
<td>16</td>
<td>Dec. 11</td>
<td>Paper presentation</td>
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<td>Presentation</td>
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<tr>
<td>17</td>
<td>Dec. 18</td>
<td>Paper presentation</td>
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<td>Presentation</td>
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Notes: * not eligible for paper analysis

Format, attendance, and participation:
The class will consist mostly on critically evaluating published papers, with an emphasis on the methodological component. Each paper will be assigned to a discussion leader, who also prepares a short 2-3 page analysis. This paper analysis is due on the day the paper is discussed. However, attendance and active participation by all members of the seminar is expected. Students are also expected to give a 30 minute presentation of their final paper at the end of the seminar. The paper should be 15 pages 1/1/2 lines spaced with full bibliography. The paper should focus on methodological aspects. Provide a draft of your paper one week before the presentation.

Evaluation:
Paper analysis: 3*10% = 30%
Final paper: 70%

Grading (+/- scheme):
A: 90 – 100%
B: 75 – 89.99%
C: 60 - 74.99%
D: 50 – 59.99%
F: <50%
Week 1: Introduction

Week 2: What is Geography and its future direction

Week 4: GI Science? Foundations and limits of GIS

Week 5: LiDAR: Theory and applications

Week 6: Structure from motion photogrammetry

Week 7: Object-based image analysis
Week 8/9: Applications of RS and GIS to land cover mapping

Week 10: Applications of RS and GIS to water resources