Instructor: Dr. Karen E. Frey  
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Phone: (508) 793-7209  
Office: Jefferson Academic Center 205A  
Office Hours: Thursdays 3:00–5:00pm, or by appointment

Course Objectives: This graduate-level seminar focuses on the applications of satellite-based radar remote sensing to a full suite of Earth Science related fields. Radar remote sensing offers fundamentally different potential applications compared to optical remote sensing owing to its sensitivity to wetness and surface roughness as well as its independence from sunlight and cloud conditions. As such, radar remote sensing lends itself to a variety of fields, including the investigation of forest ecology, land cover/land use, soil moisture, snow and ice, hydrology, geomorphology, oceanography, and urban spaces. This seminar introduces students to both seminal and recent, cutting-edge research in the field of radar remote sensing. In particular, students will focus on satellite-based radar scatterometer, synthetic aperture radar (SAR), and interferometric SAR (InSAR) studies. Students will additionally focus on independent research projects that will allow them to analyze and apply radar data within their particular fields of interest.

Readings: Weekly readings will be assigned at least one week prior to class discussion of the material and will be placed on the Cicada course website. Readings will focus on satellite-based scatterometer, SAR, and InSAR research and will be particularly tuned to the interests of students in the course.

Student Responsibilities: As a student in this course, you are expected to attend and participate in each class meeting. Your grade will be determined from three components: (1) overall class participation and contribution to the seminar; (2) discussion leadership; and (3) mini-projects/data processing.

1) Class Participation and Overall Contribution to the Course  
Owing to the nature of this course as a seminar, it is imperative that you attend class regularly and actively participate in discussions of topics. It is critical that everyone complete the readings before class and come prepared to discuss them. The more
actively involved we are in discussions, the more rewarding the seminar will be for
everyone!

2) Discussion Leadership
Twice during the semester, you (along with one or two other students) will lead the
discussion of the readings for that week. You should (a) first summarize the readings
(this should take the form of a powerpoint presentation and/or the option of a written
outline/handout for your classmates), with the assumption that your audience has at
least a first-order familiarity with the publications; and then (b) pose questions for the
students in the class to promote discussion for the class meeting. Don’t be afraid to be
creative in your ways to promote class discussion!

3) Mini-Projects/Data Processing
Several times during the course of the semester, students will have the opportunity to
work with satellite-based radar data. More specifics will follow as individual topics are
formulated throughout the semester. Two weeks during the semester (Week 10 and
15), students will have the opportunity to informally present and discuss some of their
findings with both radar scatterometer and SAR data.

Example Course Topics:
We will cover multiple topics during the course of the semester, the
composition of which will be dependent upon individual student interests.
Below are some example radar remote sensing related topics:

Applications of Satellite Radar Scatterometer Data:
Terrestrial hydrology/geomorphology, forest ecology/land cover,
sea ice/oceanography, snow/glaciers/ice sheets, urban
development, etc.

Applications of Synthetic Aperture Radar (SAR) Data:
Terrestrial hydrology/geomorphology, forest ecology/land cover,
sea ice/oceanography, snow/glaciers/ice sheets, urban
development, etc.

Applications of Interferometric Synthetic Aperture Radar (InSAR)
Data:
DEM generation, volcanic deformation, ground subsidence, ice
flow, hydrological applications

Course Website: Readings, assignments, announcements, and other documents will be placed on the Cicada
course website.

Honor Code Policy: There are clear policies of academic integrity at Clark University. Please see
www.clarku.edu/offices/aac/integrity.cfm if you have any questions about what this entails.

ADA Policy: Persons with disabilities requiring special accommodations to meet the expectations of this
course are encouraged to bring this to my attention as soon as possible.
# Course Schedule*

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<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC**</th>
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<td>1</td>
<td>1/17</td>
<td>Course Overview and Introductions</td>
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<td>Radar Introduction and Fundamentals</td>
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<td>3</td>
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<td>Discussion/Radar Scatterometer Studies</td>
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<td>Discussion/Radar Scatterometer Studies</td>
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<td>12</td>
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<tr>
<td>13</td>
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<td>Discussion/SAR Studies</td>
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<tr>
<td>14</td>
<td>4/17</td>
<td>Discussion/Interferometric SAR Studies</td>
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<tr>
<td>15</td>
<td>4/24</td>
<td>Presentation of Mini-Projects/Data Processing</td>
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*This course schedule is subject to change as necessary; advance notice will be provided to the extent possible

**Weekly readings will be provided via the Cicada course website