MAS.858: “Can Space Enabled Designs Advance Justice and Development?”
Faculty: Professor Danielle Wood, Assistant Professor of Media Arts & Sciences and
Aeronautics & Astronautics
Director of the Space Enabled Research Group, MIT Media Lab
Fall 2021
(Draft version as of 8 August 2021)

Course Website: https://canvas.mit.edu/courses/11508 (To be published by the first class meeting)

Course Meeting Times: Mondays, 9am to 12pm in E14-493
Office Hours are by appointment, email Prof Wood’s Assistant, Alessandra Davy-Falconi, at andreapb@media.mit.edu. Subscribe to the email list for office hour updates here: https://mailman.mit.edu:444/mailman/listinfo/wood_officehours

Course Prerequisite: Permission of the Instructor; No previous knowledge of space technology or development is required.

Course Units (3-0-9): This is a 12-unit class in which the primary expectations are that students perform the following: come to class having read the assigned texts; submit brief reflections on the readings; participate in class discussions; lead a class discussion once during the semester; and submit a paper on a topic that is agreed upon by the student and instructor.

Course Description
This course examines the theoretical underpinnings of the mission statement of the Space Enabled Research Group at the MIT Media Lab. The mission statement is to advance justice in Earth’s complex systems using designs enabled by space. The class explores each key phrase in this statement using readings, discussions and individual projects. The Space Enabled Research Group engages with the concept of justice in three ways. First, advancing justice can refer to ameliorating the harm caused by long term patterns of social hierarchy and moving toward liberatory self-determination for intersectional groups that consistently experience oppression, such as Black women, low-income immigrants, Indigenous people impacted by climate change, or transsexual people in the U.S. who speak English as a second language. Second, justice refers to the concept that in a just world, the benefits of a public service technology – such as space technology – would be available to people living in all nations and from all socioeconomic levels. This is currently not the case due to driving forces of the modern era, including colonialism, racism, exploitative capitalism and imperialism, which have concentrated both wealth and technology access heavily within certain countries, companies or urban centers. The third concept of justice is that a just future is one in which countries are advancing toward meeting the 17 Sustainable Development Goals of the United Nations. The course posits that six technologies from space have been used to support sustainable development for decades, but that barriers remain that limit the impact of these technologies. The six technologies are satellite earth observation, satellite communication, satellite positioning, microgravity research, space spinoffs and fundamental scientific research. The Space Enabled Research Group conceives of the challenges listed in the 17 Sustainable Development Goals – such as ensuring everyone has access to clean water, food and health care – as complex systems problems. Complex systems are defined by their complicated interactions between the natural environment, human decision making and technology. Complex systems operate under internal and external uncertainty and they generally exhibit emergent properties. Designers cannot completely define the behavior of a complex system, but they can seek approaches that tend to maximize the likelihood of desired
outcomes. The course is divided into three sections: Justice and Development; Complex Systems; and Designs Enabled by Space. For each section, the class reads excerpts from several texts, discusses key themes and writes reflective responses. Throughout the class, each student is working on their own research paper to further explore what it means for space enabled designs to advance justice and development. Thus, the class also teaches foundational skills in defining and executing a research project or proposal.

**Note on related course:** This course is the first in a series of two courses taught in fall and spring most years. The spring course is called “Space Technology and the Development Leader.” It is not necessary that a student takes the fall course first, although students are encouraged to take both courses, in either order, to understand the full range of concepts. Both courses examine aspects of the mission statement of the Space Enabled Research Group at the MIT Media Lab which is to advance justice in Earth’s complex systems using designs enabled by space.

**Learning Objectives**

After taking this class, students should be able to:

- Articulate arguments, perspectives and context for the authors assigned in class on the topics of justice, development, complex systems, design and space technology
- Define the role of capitalism, patriarchy, racism and heteronormative culture to oppress intersectional identity groups, especially in the context of the Americas, Europe and Africa, as defined by class readings and related readings
- Define the liberatory movements, efforts toward resisting oppression, and efforts seeking self-determination that members of intersectional identity groups have pursued, as discussed by the class readings and related readings
- Describe the impacts that the historical patterns driven by colonialism and racism have had on the global distribution of technology, wealth and development by identifying historical trends from the 16th through the 21st century
- Define justice and development in the context of each students’ research by building on the authors discussed in the class
- Define a complex system and explain its characteristics of stochasticity, emergence, and network structure
- Define design and the role of design to influence the behavior of a complex system
- Describe examples of the ways that six space technologies have been used to support the United Nations Sustainable Development Goals
- Describe approaches to designing space systems that support broad accessibility and long-term environmental sustainability, on Earth and in Space
- Write reflective responses that capture learning from the readings
- Conceive and design a research proposal or write a research paper that follows the steps of the scientific method while addressing a socio-technical topic
Advancing justice in Earth’s complex systems using designs enabled by space

Six Space Technologies
support the UN’s Global Goals for Sustainable Development

Satellite Earth Observation
Satellite Positioning
Microgravity Research
Satellite Communication
Technology Transfer
Inspiration from Research

Six Research Methods
design complex systems that apply space technology for sustainable development

Design
Art

Data Science
Social Science

Satellite Engineering
Complex Systems Modeling

Twitter @space_enabled
Instagram @space_enabled
www.spaceenabled.media.mit.edu

Icons sourced from www.heypik.com
Structure of Class Meetings

The class participants will meet once per week for three-hour virtual sessions. Attendance in the class meetings is mandatory for those taking the class for credit; class participation is a vital aspect of class learning and participation. Each student will have the opportunity to lead part of the class activities during the semester. Listeners to the class are also welcome, and the instructor encourages listeners to read the texts for each class meeting as much as possible. A typical class session includes the following activities; note that this may be adjusted as needed to meet the overall goals of the course and the order may vary:

- Section 1: Opening activities led by instructor & Students gives short presentation on assigned reading (as needed)
- Section 2: Either a presentation/discussion by the instructor or student presentations on class projects
- Section 3: Instructor or guest speaker lectures

Overview of Assignments and Grading

All students taking the subject for credit produce several key outputs during the semester, including the following:

1) Weekly reading reflections on assigned readings
2) One or more short summary presentation(s) on a reading assigned by the instructor; the number of presentations depends on how many students take the subject for credit
3) Four brief progress reports presentations on the semester project
4) A draft version of the final paper for the semester project
5) A revised, final version of the paper and presentation for the semester project

In order to complete these assignments, students must read the texts assigned in the calendar below. Students must also identify and complete additional readings that will support their individual research project. The Instructor provides optional resources that provide background information for the methods used in the class project.

Summary of the Individual Semester Project. Each student taking the class for credit will complete a semester-long, individual research project. The students select a topic for the Individual Semester Project that relates to their interests and the Learning Objectives of the subject. The student can select from three options for the semester project, as follows:

1) Write a research proposal related to the themes of the subject that plans a large-scale research project, such as would be appropriate for a Masters or Doctoral thesis, using the scientific method as the foundational process.
2) Write a research paper that can be completed within one semester and that applies the scientific method to answer a research question related to the themes of the subject.
3) Propose a customized project related to the thesis research or a practical project pursued by the student that also relates to the themes of the subject. In this case, the Instructor and student will negotiate together the set of deliverables that meet the subject learning objectives and supports the students’ goals.

If a student selects the research proposal, here are the expectations for the project deliverables. The research proposal is a paper that includes the following sections: discussion of the research question, motivation, literature review with an identification of literature gap and contribution, research design, data collection and analysis methods, sources of error and plans to mitigate error, expected findings, and a reflection on the significance of research for the themes of the subject. The final version of the research proposal will be due at the end of class, but students will give interim presentations and submit a draft version of the final paper. The Instructor will give
feedback on each of these interim deliverables during class or via the Canvas Course Management System. The interim presentations will show progress by the student on the proposal sections described above. The draft research proposal should include all the sections required for the research proposal listed above. Each of the interim presentations and the draft paper will be graded and points will be deducted for unexcused late submissions.

If a student selects the **research paper**, here are the expectations for the project deliverables. The research paper is a formal, academic document written in the style of the scientific method that includes the following sections: discussion of the research question, motivation, literature review with an identification of literature gap and contribution, research design, data collection and analysis methods, results and interpretation, assessment of error or uncertainty in the results, discussion of findings and conclusions, and a reflection on the significance of research for the themes of the subject. The final version of the research proposal will be due at the end of class, but students will give interim presentations and submit a draft version of the final paper. The Instructor will give feedback on each of these interim deliverables during class or via email. The interim presentations will show progress by the student on the sections described above. The draft research paper should include all the sections required for the research paper listed above. Each of the interim presentations and the draft paper will be graded and points will be deducted for unexcused late submissions.

If the student selects a **customized project** they should submit to the instructor a one paragraph abstract describing the scope and objectives of the project, describing the research methods and disciplines in which the project is based and proposing the deliverables that they plan to submit. This abstract should be submitted before the deadline for the first Interim Project Presentation. The Instructor will review this proposed project scope with the student and negotiate an acceptable scope that fits the learning objectives of the subject.

Regardless of the type of semester project a student selects, they are still responsible for completing the subject assignments of the weekly reading reflections, short presentations about assigned readings; progress report presentations on the project; a draft version of the semester project paper and a final version of the semester project paper.

Grading will be on an absolute scale and not "on a curve." That means that in principle, everyone in the class can earn an 'A' if they perform at an 'A' level. All assignments will be graded on a letter basis according to the MIT definition of grades:

- **A** - Exceptionally good performance, demonstrating a superior understanding of the subject matter, a foundation of extensive knowledge, and a skillful use of concepts and/or materials.
- **B** - Good performance, demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject.
- **C** - Adequate performance, demonstrating an adequate understanding of the subject matter, and ability to handle relatively simple problems, and adequate preparation for moving on to more advanced work in the field.
- **D** - Minimally acceptable performance, demonstrating at partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating deficiencies serious enough to make it inadvisable to proceed further in the field without additional work.
- **F** - Unsatisfactory performance.

Plusses and minuses will be used in conjunction with the letters in grading all work. The final grade will include plusses and minuses. The final grade will include the components described under “Detailed List of Assignments.”
Detailed List of Assignments
As noted above, all students taking the subject for credit produce several key outputs during the semester, including the following:

1) Weekly reading reflections on assigned readings
2) One or more short summary presentation(s) on a reading assigned by the instructor; the number of presentations depends on how many students take the subject for credit
3) Four brief progress reports presentations on the semester project
4) A draft version of the final paper for the semester project
5) A revised, final version of the paper and presentation for the semester project

This section provides additional information about the requirements for each assignment and the percentage of the final semester grade that applies to each category of deliverable.

Weekly Reading Reflections (10% of overall semester grade)
Each student should submit weekly reading reflections in response to the Required Readings for the weeks indicated in the calendar. Submit via the Canvas Course Management Website in either Word or PDF format. Reflections are typically due the day before class; please see the calendar below for details of the deadlines. Each reading reflection should be approximately one page for each assigned text and should address the following questions for each Required Readings.

1) Who is the author of this reading and when did they write? What organization or identity do they represent and how does that impact our understanding of the text?
2) How does this reading relate to the topic for the relevant class meeting as noted in the syllabus?
3) How does the reading relate to the broad themes of the class, including defining justice, conceiving of development challenges as complex systems, or applying space enabled technology to advance justice and development?
4) What aspects of this reading did you disagree with or want to understand better?
5) How does the reading help you explore justice or development, in general and in your own research?
6) In what ways do you see the use of antiracist, segregationist or assimilationist ideas (as defined by Kendi) by the author or the people the author writes about?

Reading Summary Presentations (10% of overall semester grade)
Each student taking the subject for credit will give one or more Reading Summary Presentations during the semester. The number of times that a student gives a Reading Summary Presentation will be based on the total number of students taking the subject for credit. Students may be assigned to work independently or in small teams. The Instructor will assign students to read and summarize a specific, required text on a specific date to be announced after the first class meeting. The text is required reading for the presenting student and for other students taking the subject. If feasible, the Instructor will consider the preferences and schedule of the presenting student when assigning the Reading Summary Presentation. Students should upload the slides for their Reading Summary Presentation to the Canvas Course Management System on the day before the class meeting in either PDF or PowerPoint format by 10pm ET.
During the Reading Summary Presentation, students will use slides to discuss the following topics:
1) Who is the author of this reading and when did they write? What organization and intersectional identity do they represent and how does that impact our understanding of the text?

2) Briefly summarize the key messages the author conveys to readers. Describe examples from the text that support the key messages.

3) In what ways do you see the use of antiracist, segregationist or assimilationist ideas (as defined by Kendi) at work in the text?

4) What aspects of this Reading Summary Presentation and the other readings assigned for the class meeting did you disagree with or want to understand better?

The students leading the reading summary should create a Shared Google Slides presentation with slides that the other subject participants can edit during the discussion. After each Reading Summary Presentation, as time allows, the subject participants will break into small groups and discuss the following topics and write notes about these questions in the shared Google Slides presentation.

5) How do the texts help you explore justice or development, in general and in your own research?

6) How does the texts relate to the broad themes of the class, including defining justice & development, complex systems, or applying space enabled technology to advance justice and development?

Class Participation (10% of overall semester grade)

This grade includes attendance in class, contributing to inclusive and positive dialog, and applying concepts from the readings in the class discussions. Please follow these guidelines to ensure a supportive environment for class discussion.

1. Let's acknowledge that the material we discuss in this class is complex, sensitive and requires different effort for different people.
2. Let’s make this a safe place for dialog by listening respectfully and disagreeing gently.
3. No one is required to speak, but everyone is welcome to speak.
4. What we discuss in this class is confidential; you can repeat what you share, but do not share what others share.
5. Let’s leave room to make sure everyone has a chance to speak; moderate yourself to ensure you balance listening and speaking.
6. Speak from your own experience and be ready to listen to the experiences of others

Interim Presentations on the Individual Semester Project (Parts 1, 2, 3 & 4) (30% of the overall semester grade)

On the date indicated in the calendar below, students taking the subject for credit will give interim presentations on their progress for the Individual Semester Project. The required material for Interim Project Presentations depends on which version of the Individual Semester Project that the student selects. The specific timing and dates of the presentations will be announced by the Instructor based on the total number of students taking the subject for credit. The Interim Project Presentations will be brief, approximately five minutes, and they will give the opportunity for the Instructor and fellow subject participants to give brief comments. Note that time limits will be strictly enforced to allow time for everyone to present. Students should create slides for the Interim Project Presentations; the slides should be submitted to the Canvas Course Management System.
in PDF or PowerPoint format. In order to complete the assignments for each Interim Presentation, students will need to consult outside texts based on the selected topic of their Individual Semester Project. As appropriate, the students can also consult recommended readings and resources that are provided with each assignment for the Research Proposal and Research Paper Interim deliverables. Students are encouraged to consult these resources early to help them progress in their Individual Semester Project.

Here are the details for the Interim Project Presentations for the three options for the Individual Semester Project.

<table>
<thead>
<tr>
<th>Interim Presentation Part</th>
<th>Research Proposal</th>
<th>Research Paper</th>
<th>Customized Project</th>
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</thead>
<tbody>
<tr>
<td>Part 1</td>
<td>Discussion of the research question and motivation</td>
<td>Discussion of the research question, motivation,</td>
<td>Each student selecting the customized project should coordinate with the Instructor to define the scope of the Interim Presentations before the deadline for Interim Presentations</td>
</tr>
<tr>
<td>Part 2</td>
<td>Literature review with an identification of literature gap and contribution</td>
<td>Literature review with an identification of literature gap and contribution</td>
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<tr>
<td>Part 3</td>
<td>Research design; data collection and analysis methods</td>
<td>Research design; data collection and analysis methods; Initial results</td>
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<tr>
<td>Part 4</td>
<td>Sources of error and plans to mitigate error, expected findings, and a reflection on the significance of research for the themes of the subject</td>
<td>Updated results and interpretation, assessment of error or uncertainty in the results, discussion of findings and conclusions, and a reflection on the significance of research for the themes of the subject.</td>
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</tbody>
</table>

Submission of Draft Individual Semester Project Paper (10% of the overall semester grade)

On the date indicated in the calendar below, each student will submit a complete or nearly complete draft of their research proposal. Although this is not the final version, the expectation is that the major reading and analysis for the project is finished and the draft covers all the sections expected for the Individual Semester Project, as outlined above for each of the three options (Research Proposal, Research Paper or Customized Project). The Instructor will provide feedback to each student to suggest ways to improve the draft before the final submission. The paper should be submitted to the Canvas Course Management System in Word or PDF format.

Submission of Final Version of Individual Semester Project Paper (20% of the overall semester grade)
On the date indicated in the calendar below, each student will submit the final version of the deliverable for their Individual Semester Project with all the sections required for their selected type of project (Research Proposal, Research Paper or Customized Project). The topic should be based on approval by the Instructor after Interim Presentation Part 1. The paper should be submitted to the Canvas Course Management System in Word or PDF format.

*Final Class Presentation (10% of the overall semester grade)*

On the date indicated in the calendar below, each student will give an oral presentation based on the final version of the paper for their Individual Semester Project. The final research presentation will include the same topics as paper depending on their type of project (Research Proposal, Research Paper, Customized Project). Students should use slides to create presentation visuals; they must submit the slides via PowerPoint or PDF format electronically to the Canvas Course Management site on the date indicated on the calendar below, several days before the date of their presentation.

*Policy on Late Submission of Assignments*

If students submit assignments late without requesting an extension, their grade will be deducted 2 percentage points per day until it is submitted, up to a maximum of 20 percentage points of deduction. Students are welcome to request extensions for assignments if they have concerns about submitting on time. They should email the Instructor before the deadline, request the extension and identify the date on which they plan to submit the assignment. The instructor will either confirm the new submission date or negotiate a different date with the student. If students submit by the newly agreed upon deadline, no points will be deducted. When the final grade for the student is calculated, the student will be given a grade of Incomplete if assignments are missing with no coordination with the Instructor. Once the assignments are submitted, the Instructor will grade the assignments and deduct up to 20 percentage points for the assignments that were missing at the end of the semester (unless there is a need to consider extenuating circumstances such as health or personal emergencies). Students are encouraged to work with the Office of Graduate Education or the Student Support Services (for undergraduates) if you have concerns about completing assignments or responding to emergencies or health needs. The Instructor acknowledges that students are managing many sources of stress outside of academic work and is open to finding approaches to meet student needs for extensions.
Books and Readings
The course has an intensive reading load. The following is the primary text for this course. The readings from this book will not be provided. Students are recommended to purchase this text or access a copy from the library.


Additional readings are excerpts from longer texts and are outlined in the calendar below; the additional readings are providing to students via the Canvas Course Management System.

As needed during class, we will use a Google Drive Folder (To be Provided) to make materials available to class participants for breakout group discussions and readings:

Calendar
The calendar below provides information on the topics and readings that will be addressed at each class meeting. It also provides the due dates for assignments. For the Interim Project Presentations, students will be divided into two groups that present on alternating as needed.

<table>
<thead>
<tr>
<th>Class</th>
<th>Learning Objectives</th>
<th>Readings and Preparation</th>
<th>Assignments Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1: 9/13</td>
<td>No Student Reading Summary Presentation</td>
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<tr>
<td>Class 2: 9/20</td>
<td>No Student Reading Summary Presentation</td>
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</tbody>
</table>
| Class 3: 9/27 | **What are Justice & Development?**  
Part III  
Pursuing Justice & Development by eliminating sources of oppression and increasing self-determination for Intersectional Identity Groups |
| **Required Reading** |
| • Kendi, Ibram X. *Stamped from the beginning: The definitive history of racist ideas in America*. Nation Books, 2016. **(Part II)**  
• Excerpt from Kendi, Ibram X. *How to Be an Antiracist*. One World/Ballantine, 2019. **(Chapter 12)** |
| Due 9/26 at 5pm:  
• Reading Reflections  
Due 9/26 at 10pm  
Interim Project Presentation 1 Slides (Group A only) |
| Class 3: 9/27 | **Student Reading Summary Presentation** |
| | • Students To Be Confirmed |
| Due 9/26 at 10pm:  
Interim Project Presentation 1 Slides for Student Presenter only |
| Class 4: 10/4 | **What are Justice & Development?**  
Part IV  
Pursuing Justice & Development via Emancipatory Internationalism and Struggles against Colonialism and Imperialism |
| **Required Reading** |
• Amsden, Alice Hoffenberg. *The rise of “The Rest”: Challenges to the west from late-industrializing economies*. Oxford University Press, USA, 2001. **(Chapters 1-3)**  
• Riach, G. *An analysis of Gayatri Chakravorty Spivak’s ‘Can the Subaltern Speak?’* Routledge, 2017, p9-14 |
| Due 10/3 at 5pm:  
• Reading Reflections  
• Abstract for Research Proposal paper  
Due 10/3 at 10pm  
Interim Project Presentation 1 Slides (Group B only) |
| Class 4: 10/4 | **Student Reading Summary Presentation** |
| | • Students To Be Confirmed |
| Due 10/3 at 10pm:  
Interim Project Presentation 1 Slides for Student Presenters only |

October 11 is Indigenous Peoples Day Holiday – No Classes are held
<table>
<thead>
<tr>
<th>Class 5: 10/18</th>
<th>What are Justice &amp; Development? Part V Harnessing Innovation for Liberation Rather than Oppression</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kendi, Ibram X. Stamped from the beginning: The definitive history of racist ideas in America. Nation Books, 2016. <em>(Part IV)</em></td>
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<tr>
<td></td>
<td>Due 10/17 at 5pm:</td>
<td>Students To Be Confirmed</td>
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<tr>
<td></td>
<td></td>
<td>Reading Reflections</td>
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<tr>
<td></td>
<td></td>
<td>Interim Project Presentation 2 Slides (Group A only)</td>
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<tr>
<td>Class 5: 10/18</td>
<td>Student Reading Summary Presentation</td>
<td>Students To Be Confirmed</td>
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<td></td>
<td></td>
<td>Due 10/17 at 10pm: Reading Summary Slides for Student Presenters only</td>
</tr>
<tr>
<td>Class 6: 10/25</td>
<td>What are Justice &amp; Development? Part VI Harnessing Innovation for Liberation Rather than Oppression</td>
<td>Required Reading</td>
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<tr>
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<td>Due 10/24 at 5pm:</td>
<td>Due 10/24 at 10pm: Reading Reflections</td>
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<tr>
<td></td>
<td></td>
<td>Interim Project Presentation 2 Slides (Group B only)</td>
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<tr>
<td>Class 6: 10/25</td>
<td>Student Reading Summary Presentation</td>
<td>Students to be Confirmed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Due 10/24 at 10pm: Reading Summary</td>
</tr>
</tbody>
</table>
• Crawley, Edward, Bruce Cameron, and Daniel Selva. System architecture: strategy and product development for complex systems. Prentice Hall Press, 2015.(Chapter 2, 4, 5, 7) | Due 10/31 at 5pm:
• Reading Reflections
Due 10/31 at 10pm:
• Interim Project Presentation 3 Slides (Group A only) |
| Class 7: 11/1 | Student Reading Summary Presentation | • Students to be Confirmed | |
| Class 8: 11/8 | Complex Systems Part II: How do we use Systems Architecture to Design Complex Systems? | Required Reading
• Maier, Mark W. The Art of Systems Architecting. CRC press, 2009. (Chapter 5, 7, 8)
• Crawley, Edward, Bruce Cameron, and Daniel Selva. System architecture: strategy and product development for complex systems. Prentice Hall Press, 2015. (Chapter 2, 4, 5, 7) | Due 11/7 at 5pm:
• Reading Reflections
• Interim Project Presentation 3 Slides (Group B only) |
<table>
<thead>
<tr>
<th>Time</th>
<th>Class</th>
<th>Reading/Activity</th>
<th>Due Date/Time</th>
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</thead>
<tbody>
<tr>
<td>Class 8: 11/8</td>
<td>Student Reading Summary Presentation</td>
<td>Students to be Confirmed</td>
<td>Due 11/7 at 10pm: Reading Summary Slides for Student Presenters only</td>
</tr>
<tr>
<td>Class 9: 11/15</td>
<td>Space Enabled Designs Part I: Designing Space Systems to Support the Sustainable Development Goals</td>
<td>Due 11/14 at 5pm: Reading Reflection Due 11/14 at 10pm Interim Project Presentation 4 Slides (Group A only)</td>
<td></td>
</tr>
</tbody>
</table>

- **Doctoral Dissertation**: Wood, Danielle, Building Technological Capability within Satellite Programs in Developing Countries," Doctoral Dissertation, Massachusetts Institute of Technology, 2012, [http://hdl.handle.net/1721.1/79502](http://hdl.handle.net/1721.1/79502) (Chapter 2)

- **Hakimdavar, Raha; Hubbard, Alfred; Policelli, Frederick; Pickens, Amy; Hansen, Matthew; Fatoyinbo, Temilola; Lagomasino, David; Pahlevan, Nima; Unninayar, Sushel; Kavvada, Argyro; Carroll, Mark; Smith, Brandon; Hurwitz, Margaret; Wood, Danielle; Schollaert Uz, Stephanie. 2020. "Monitoring Water-Related Ecosystems with Earth Observation Data in Support of Sustainable Development Goal (SDG) 6 Reporting." Remote Sens. 12, no. 10: 1634. [https://doi.org/10.3390/rs12101634](https://doi.org/10.3390/rs12101634)
<table>
<thead>
<tr>
<th>Class 9: 11/15</th>
<th>Student Reading Summary Presentation</th>
<th>Students to be confirmed</th>
<th>Due 11/14 at 10pm: Reading Summary Slides for Student Presenters only</th>
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<tr>
<th>Class 10: 11/22</th>
<th>Student Reading Summary Presentation</th>
<th>Students to be Confirmed</th>
<th>Due 11/21 at 10pm: Reading Summary Slides for Student Presenters only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 10: 11/22</td>
<td>Space Enabled Designs Part II: Designing Space Systems that are Accessible &amp; Sustainable</td>
<td>• Wood, D. &amp; A. Weigel, “Building Technological Capability within Satellite Programs in Developing Countries.” Acta Astronautica, Vol 69, Issues 11-12, December 2011, p1110-1122, <a href="http://dx.doi.org/10.1016/j.actaastro.2011.06.008">http://dx.doi.org/10.1016/j.actaastro.2011.06.008</a></td>
<td>Due 11/29 at 5pm: • Reading Reflections Due 11/29 at 10pm</td>
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<table>
<thead>
<tr>
<th>Class 11: 11/29</th>
<th>Space Enabled Designs Part III: Designing Space Systems that Contribute to Self-Determination &amp; Liberation</th>
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<td>• Wood, D. &amp; A. Weigel, “Building Technological Capability within Satellite Programs in Developing Countries.” Acta Astronautica, Vol 69, Issues 11-12, December 2011, p1110-1122, <a href="http://dx.doi.org/10.1016/j.actaastro.2011.06.008">http://dx.doi.org/10.1016/j.actaastro.2011.06.008</a></td>
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<tr>
<td>Class 11: 11/29</td>
<td>Student Reading Summary Presentation</td>
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<tr>
<td>Class 12: 12/6</td>
<td>Students presentations of research proposals</td>
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Due 12/5 at 10pm: Submit Final Paper for Individual Semester Project (Group A & B)

In addition to the required readings listed above, the readings provided below are optional readings that give further insight into the topics discussed in the class. The Instructor will reference some of these readings during class lectures.

On Justice & Anti-Racism
• Jacobs, Harriet Ann. *Incidents in the life of a slave girl: Written by herself.* 1861
• Kendi, Ibram X. *How to be an Antiracist.* One World/Ballantine, 2019.
• Syllabus from Ekene’s Year Long Course: [Black Mobility and Safety in the US](#)
• MIT Black History [https://www.blackhistory.mit.edu/](https://www.blackhistory.mit.edu/)
• MIT’s Connections to Slavery [https://libraries.mit.edu/mit-and-slavery/](https://libraries.mit.edu/mit-and-slavery/)
• Davis, Angela Y. *Freedom is a constant struggle: Ferguson, Palestine, and the foundations of a movement.* Haymarket Books, 2016.
• Steele, Claude M. *Whistling Vivaldi: And other clues to how stereotypes affect us (issues of our time).* WW Norton & Company, 2011.
• Policing the Black Man, Edited by Angela Davis: [https://www.amazon.com/Policing-Black-Man-Prosecution-Imprisonment-ebook/dp/B018CHH2X0](https://www.amazon.com/Policing-Black-Man-Prosecution-Imprisonment-ebook/dp/B018CHH2X0) (Links to an external site.)
On Development as Innovation and Self-Determination