

ENV 2002: Special Topics in The Environment:

## Photovoltaic Imaginaries: Community Based Experiments in Sustainability Transitions

Fall 2022

Instructors: Robert Soden and Matt Ratto

Tues: 4-6pm

Classroom: ES1042

### Short description

This course combines seminar style reading and discussion and participatory design and prototyping with a community-based organization to investigate the particular forms of culture, sociality, and governance that emerge around small-scale, community-based solar energy systems. In addition to learning about solar technologies, students will also gain practical experience with community engaged research and learn about core concepts in science and technology studies (STS) and critical design.

### Detailed description:

This seminar style course will investigate the particular forms of culture, sociality, and governance that emerge around small-scale, community-based solar energy systems. We will focus on a specific emerging case study, the energy needs and aspirations of a small group of refugees in Lebanon. The course instructors are currently working with Techfugees Lebanon and Canada to explore how solar charging can address SDG#7, equitable access to energy within this context. Collective outcomes from the course include potential designs for community-based solar systems and a case study writeup that can be used to continue and extend this work.

In addition, the course will explore design methods appropriate for community-based research. A starting point will be to explore how shifting from user needs to community aspirations can better support development goals (Toyama, 2017; Kumar, 2014; Kumar et al, 2019) and what forms of design practice can support this shift.

On the first day of the course, students will sign up to lead one of the weekly seminars. They will be responsible for creating a short presentation on the theme and readings for that week, generating questions, and leading the group discussion. Specific attention will be put to collectively/individually exploring how the readings and discussed concepts connect to the planned case.

Three times during the course, these reading seminars will be supplemented with hands-on workshops intended to deepen student knowledge of some of the material dimensions

associated with solar energy and to connect the concepts and perspectives from the readings. Additionally, as determined by the instructors, periodic guest lecturers will provide professional and academic insights from their respective areas of knowledge and expertise.

## Learning outcomes

- **Technical:** understand the basics of storing, generating, and distributing energy
  - Construct a power bank using DIY powerbank kit and recycled li-ion batteries
  - Construct a solar charger, including panel and solar charging circuit
  - Work through models of energy distribution
  
- **Design:** learn about certain design practices such as cultural probes, critical making, and service design and consider issues of design justice
  - Design, carry out, and analyze results from a cultural probe
  - Participate in two critical making workshops
  - Participate in a service design workshop
  
- **Conceptual:** understand and reflect on concepts of socio-technical imaginaries, generative justice, and energy STS.
  - Accomplished via readings, in course discussions, and application in making exercises

## Course Evaluation

<i>Grading Component</i>	<i>Due Date</i>	<i>Weighting</i>
Participation	Weekly	20%
Reading Responses (10 throughout the semester)	5:00pm on Monday before class	20%
Lead Class Discussion	1 class during the semester	20%
Final Project: <i>Proposals</i>	October 18th	5%
<i>In-Class Research Presentation</i>	December 6th	10%
<i>Final Paper</i>	Final Exam period	25%

**Attendance and Participation (20% overall):** You are expected to attend all classes, complete assigned readings prior to class meetings, and participate in class discussions. You should come to class with the assigned readings/notes so that you can locate specific pages/issues as referred to in discussion. Seminar discussions will be guided, but open. A successful and enjoyable seminar depends on the active and respectful participation of all those present.

**Reading Responses (20% overall):** Written commentaries in the form of critical reflections, roughly 500 words (1 page single spaced) in length, are required each week at 5:00pm the evening before class. You can choose to write on one of the articles/books, or on a point addressed by several of the readings. Commentaries must be concise, and should be analytical and reflective rather than descriptive. They should reflect a critical reading of the material within the context of the class and/or your own research work. In addition, you should read and respond to other students' contributions before class begins.

**Lead Class Discussion (20% overall):** Everyone is responsible for leading one class discussion. You must write a response paper that week and post your commentary and discussion questions by 5pm the day before class. Leading discussion includes a short presentation (15-20 min) designed to generate class discussion, guiding the overall discussion, and providing a summation of main points and discussion questions.

**Final Project (40% overall):** There will be a final research paper due at the end of the class. This final piece of work is intended to help rather than hinder your program of research. Therefore, deviations from the standard term paper are encouraged (research proposal, journal article draft, thesis chapter... etc.), the only requirement is that the subject of the written work overlap significantly with some of the material covered in the seminar. Paper proposals (1-2 pages) with a preliminary bibliography need to be submitted by Week 6. Each student will present their work, in class, during Week 13.

## Class Policies

**Late Penalty for Assignments:** If you are having difficulty completing your work for any reason, please discuss this with the professors before the due date, to arrange an alternative schedule. If you have not agreed an alternative plan prior to the due date, work submitted up to one week late will receive half marks; after this, it will not be accepted. Note: If you are unavoidably absent from the university, please contact the instructors as soon as you return, to discuss the situation.

**Academic Integrity:** Very few of us have truly original ideas – we almost always build on ideas and information provided by others. However, it is a serious offense to represent someone else’s words as your own, or to submit work that you have previously submitted for marks in another class or program. Assignments, reading summaries and exams will be reviewed for evidence of these infractions. Penalties for these offences can be severe and can be recorded on your transcript. Trust your own ability to think and write and make use of the resources available at U of T that can help you do so (e.g. professors, TAs, writing centres). See the U of T writing website, especially the “How Not To Plagiarize” document at <http://advice.writing.utoronto.ca/using-sources/> and the website of the Office of Student Academic Integrity.

**Accommodation:** The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: [accessibility.services@utoronto.ca](mailto:accessibility.services@utoronto.ca) or <http://studentlife.utoronto.ca/as>

### **Important**

Depending on our conversations and your interests, the reading list is subject to (slight) modifications. We’ll announce this both in class and on Discord.

## Course Schedule

### **September 13 - Week 1: Introductory Discussion & Workshop**

#### *In-Class Activities:*

- Introductions
- Course Overview & Syllabus Discussion
- What it means to do community research? What is Design Justice?
- Workshop 1

#### *Required Readings:*

- Costanza-Chock, S., 2020. Design justice: Community-led practices to build the worlds we need. The MIT Press. Introduction.

#### *Suggested Readings:*

- [Dumit, Joseph. “How I Read.”](#)
- [Edwards, Paul N. \(2000\). How to read a book. Ann Arbor, 1001, 48109–41092.](#)

## September 20 - Week 2: Energy Transitions & Socio-Technical Imaginaries 1

### *In-Class Activities:*

- Discussion of readings

### *Required Readings:*

- Jasanoff, S., & Kim, S.-H. (2013). Sociotechnical Imaginaries and National Energy Policies. *Science as Culture*, 22, 189–196.  
<https://doi.org/10.1080/09505431.2013.786990>
- Szeman, I. (2020). On Solarity: Six Principles for Energy and Society After Oil. *Stasis*, 9(1), Article 1. <https://doi.org/10.33280/2310-3817-2020-9-1-128-143>
- "Photovoltaic Imagination: Solar Strategies for Community Integrated Research and Graduate Training" by R. Soden; M. Ratto; A. Verhoeven; B. Simon - <https://computingwithinlimits.org/2022/papers/limits22-final-Soden.pdf>
- Abbing, R.R., 2021, June. 'This is a solar-powered website, which means it sometimes goes offline': a design inquiry into degrowth and ICT. In LIMITS Workshop on Computing within Limits.

### *Suggested Readings:*

- Tega Brain, Alex Nathanson, and Benedetta Piantella. 2022. Solar Protocol: Exploring Energy-Centered Design. In LIMITS '22: Workshop on Computing within Limits, June 21–22, 2022.

### *Homework Due:*

- Cultural Probe (Energy Logging)
- Reading Reflections
- Sign up to lead in-class discussion

## September 27 - Week 3: Presentations from Concordia & Cultural Probe Methods

### *In-Class Activities:*

- Presentation from Concordia
- Discussion of Readings

### *Required Readings:*

- Gaver, B., 2020. The presence project. MIT Press. (Selections)
- Boehner, K., Vertesi, J., Sengers, P. and Dourish, P., 2007, April. How HCI interprets the probes. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 1077-1086).

- Wallace, J., McCarthy, J., Wright, P.C. and Olivier, P., 2013, April. Making design probes work. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 3441-3450).

*Suggested Readings:*

- Recommendation From Concordia
- Jen Liu, Design for Collaborative Survival: An Inquiry into Human-Fungi Relationships - <https://dl.acm.org/doi/10.1145/3173574.3173614>

*Homework Due:*

- Cultural Probe (Energy Logging)
- Reading Reflections

## **October 4 - Week 4: Politics of Energy & Infrastructure**

*In-Class Activities:*

- Discussion of readings
- Start of probe design

*Required Readings:*

- Baker, S., 2021. Revolutionary Power: An Activist's Guide to the Energy Transition. Island Press. (Selections)
- Winner, L., 2010. The whale and the reactor: A search for limits in an age of high technology. University of Chicago Press. (Selections)

*Suggested Readings:*

- Jackson, Steven J, Paul N Edwards, Geoffrey C Bowker, and Cory P Knobel. "Understanding Infrastructure: History, Heuristics and Cyberinfrastructure Policy." First Monday 12, no. 6 (2007). <https://doi.org/10.5210/fm.v12i6.1904>
- Burrell, Jenna. "Thinking Relationally about Digital Inequality in Rural Regions of the US." First Monday 23, no. 6 (2018). <https://doi.org/10.5210/fm.v23i6.8376>

*Homework Due:*

- Cultural Probe Write-Up
- Reading Reflections

## **October 11 - Week 5: Lebanon, Infrastructure, and Power**

*In-Class Activities:*

- Discussion of readings
- Completion of probe design

*Required Readings:*

- Nucho, J. R. (2016). Chapter 5: The Eyes of Odars City-to- City Collaborations and Transnational Reach. In *Everyday Sectarianism in Urban Lebanon* (pp. 108–126). Princeton University Press. <https://doi.org/10.1515/9781400883004-009>
- جدلية, J.-, & Jadaliyya. (n.d.). Strategies of Power and the Emergence of Hybrid Mini-Grids in Lebanon. *Jadaliyya - جدلية*. Retrieved August 22, 2022, from <https://www.jadaliyya.com/Details/43932>

*Suggested Readings:*

- Nucho, J. R. (2016). Introduction. In *Everyday Sectarianism in Urban Lebanon* (pp. 1–29). Princeton University Press. <https://doi.org/10.1515/9781400883004-004>
- Rizk, N., 2020. Artificial intelligence and inequality in the Middle East: The political economy of inclusion.

*Homework Due:*

- Reading Reflections

## **October 18 - Week 6: Workshop 2 - Generating Electricity**

*In-Class Activities:*

- Assemble a solar charging circuit and measure output (critical making activity to be determined)

*Required Readings:*

- Nucho, J.R., 2022. Post-grid Imaginaries: Electricity, Generators, and the Future of Energy. *Public Culture*.
- <https://www.energy.gov/eere/solar/how-does-solar-work> (read overview, sections on solar radiation basics, watch solar voltaics video, PV101, and solar design basics.

*Suggested Readings:*

- Other sections on solar website

*Homework Due:*

- Reading Reflections
- Project Proposals

## **October 25 - Week 7: Energy Infrastructures & Imaginaries 2**

*In-Class Activities:*

- Discussion of Readings

*Required Readings:*

- Collective, A.O., 2022. Solarities: Seeking Energy Justice. U of Minnesota Press. (Selections)
- Hirsch, S. and Ribes, D., 2021. Innovation and legacy in energy knowledge infrastructures. *Energy Research & Social Science*, 80, p.102218.
- Niet, I.A., Dekker, R. and van Est, R., 2022. Seeking public values of digital energy platforms. *Science, Technology, & Human Values*, 47(3), pp.380-403.
- Winthereik, B.R., Helmreich, S., O'Doherty, D., Amador-Jiménez, M. and Marres, N., 2021. Five theses on energy polities. *Energy Worlds in Experiment*; Maguire, J., Watts, L., Winthereik, BR, Eds, pp.95-111.

*Homework Due:*

- Reading Reflections

## **November 1 - Week 8: Workshop 3 - Distributing Energy**

*In-Class Activities:*

- Discussion of Readings
- Workshop 3

*Required Readings:*

- Tuck, E., 2009. Suspending damage: A letter to communities. *Harvard educational review*, 79(3), pp.409-428.
- Asad, M., 2019. Prefigurative design as a method for research justice. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), pp.1-18.

*Homework Due:*

- Reading Reflections

## **November 8 - Reading Week**

## **November 15 - Week 10: Presentations from the Toronto Team**

*In-Class Activities:*

- Presentations from Toronto Team
- Discussion of Readings

*Required Readings:*



- Suggested by Toronto Team

*Suggested Readings:*

- Suggested by Toronto Team

*Homework Due:*

- Research Proposal Presentations
- Reading Reflections

## **November 22 - Week 11: Labour 2**

*In-Class Activities:*

- Discussion of Readings

*Required Readings:*

- Hao, A.K. and Hernandez, A.P., 2022. How the AI industry profits from catastrophe. Online at: <https://www.technologyreview.com/2022/04/20/1050392/ai-industry-appen-scale-data-labels/>
- Altenried, Moritz. (2020). "The platform as factory: Crowdwork and the hidden labour behind artificial intelligence." *Capital & Class* 44(2): 145-158.
- Jarrahi, Mohammad Hossein, Will Sutherland, Sarah Beth Nelson, and Steve Sawyer. (2020). "Platformic management, boundary resources for gig work, and worker autonomy." *Computer supported cooperative work* 29(1): 153-189.

*Suggested Readings:*

- Irani, Lilly C., and M. Six Silberman. (2013). "Turkopticon: Interrupting worker invisibility in amazon mechanical turk." In *Proceedings of the SIGCHI conference on human factors in computing systems*, pp. 611-620.
- Posada, J., 2022. Embedded reproduction in platform data work. *Information, Communication & Society*, pp.1-19.

*Homework Due:*

- Reading Reflections

## **November 29 - Week 12: Responsibility, Care, Complicity**

*In-Class Activities:*

- Discussion of Readings

*Required Readings:*

- Eglash, R., 2016. Of marx and makers: An historical perspective on generative justice. *Teknokultura*, 13(1), pp.245-269.
- Ratto, M., 2019. Not Just Guns but Bullets, Too: "Deconstructive" and "Constructive" Making within the Digital Humanities. *Debates in the Digital Humanities*, pp.307-318.

- Jackson or Jackson and Ratto, "Hope".

*Suggested Readings:*

- de La Bellacasa, M.P., 2011. Matters of care in technoscience: Assembling neglected things. *Social studies of science*, 41(1), pp.85-106.
- Ratto, M., 2016. Making at the end of nature. *interactions*, 23(5), pp.26-35.

*Homework Due:*

- Reading Reflections

## **December 6 - Week 13: Final Presentations**

*In-Class Activities:*

- Final Project Presentations

*Required Readings:*

- None

*Homework Due:*

- In-Class Presentations