

## LMC 6650 CRN 26291 Project Studio: MN (Material Interaction Design) Spring 2024

Spring 2024

Michael Nitsche

Wed 9:30-12:30PM

TSRB 317 (corner lab)

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office hours: Tue 11-12 but TBC

Call it “material-based,” “more-than-human,” or “posthuman” – design is turning away from its human-centered obsession. These conceptual alternatives promote own ways to speculate about possible sustainable futures. Futures that incorporate material needs in novel ways and shift the position of the human. Research, debates, and opportunities in this space remain wide open. This class will build on material-focused approaches to investigate what a future of sustainable maker practices might look like. How can we reduce, re-think, re-focus, re-[...] by designing practices not for “humans first”?

Students should expect readings and discussions on material-based design approaches, theories, and case studies. They will work with material engagement as well as practice observations to cultivate their own designs. Focusing on specific maker practices, tools, and materials, students will develop unique design concepts. The class will culminate in the implementation of these designs as (speculative) prototypes.

The course reaches across disciplines as it includes approaches from material culture, STS, HCI, and craft research. Some readings will be confusing, some exercises might be irritating. Openness for this kind of “weird” is a requirement. The class has not particular technology requirements but some hardware skills are most welcome as the final prototypes will most likely live in the field of tangible interaction design.

### Schedule

(note that changes are bound to happen please check the announcements on Canvas)

Day	Topic	Projected reading
<b>Working on the problem</b>		
1/10	<b>Intro to course</b>  Debating the syllabus and procedures  Examples from the past  Q I: What is the problem?  Exercise “Writing to the sick teacher”	

<b>Working on the theory/ background</b>		
1/17	<p>Pre-discuss: syllabus settling/ procedures</p> <p><b>Theory</b></p> <p>Materialism</p> <p>Q I: What is “material-based” or “more-than-human” design?</p> <p><b>Tour:</b> craft lab (11-11:45)</p> <p><b>Guest talk:</b> Katherine Bennett</p>	<p>Syllabus stabilized</p> <p>Bennett Ingold (Textility) Nitsche (section 1.1)</p> <p>(Wakkary) (Haraway) (Barad)</p> <p><b>ASSIGNMENT:</b> pick your material</p>
<b>Working on material-based methods</b>		
1/24	<p><b>Methods based on materials</b></p> <p>Student presentations of papers</p> <p>Activity/ Method: “material experience” exercise</p>	<p><b>DUE:</b> paper presentations</p>
<b>Working on human methods</b>		
1/31	<p><b>Methods based on human bodies</b></p> <p>Q I: What is somaesthetic design/ embodied design ideation?</p> <p>Presentation of your chosen material (as experiential as possible) &lt; material ideation encounter</p> <p><b>Tour:</b> prototyping lab (11-11:45)</p> <p>Exercise: Do a soma design encounter</p>	<p>Höök Wilde/ Vallgarda/ Tomico Karana</p> <p><b>DUE:</b> present your chosen material; perform a material encounter with your chosen material with us</p>
<b>Turn to craft</b>		
2/7	<p><b>Craft – Design – Interaction</b></p> <p>Q I: The value of “need” Q II: The value of “risk”</p> <p>Method: Practice Observations and activity networks</p>	<p>Nitsche chap 4 Sennett Pye (Malafouris) (Keller&amp;Keller)</p>

	Student presentations on their material analyses < material personal encounter analysis	<b>DUE:</b> material analysis presentations <b>ASSIGNMENT:</b> start your crafter observation (selection, contacting, scheduling, prep)
2/14	<b>No session (Nitsche at TEI)</b>	Do your crafter observations
<b>Turn to care</b>		
2/21	<b>Material agency as sustainable force in HCI/DM</b>  Q I: What is material agency in a sustainable practice? Q II: What is HCI's relation to materials as sources for sustainability? Or care?	Rosner (TBC)
<b>Project Phase</b>		
2/28	Presentation of practice observations with first ideation concepts < material-based design  <b>Guest:</b> Carl DiSalvo	<b>DUE:</b> Practice observation presentation
3/6	Work on project/ catch up session TBC: Performance and Materialism	(Barad)
3/13	Work on project Presentation of related paper to your material/ design in class	<b>DUE:</b> related paper presentation
3/20	Spring Break	
3/27	Presentation of technical prototype in class	<b>DUE:</b> technical prototype of digital intervention
4/3	Work on project	
4/10	Presentation of projects in class	<b>DUE:</b> final project presentation
4/17	Individual discussion of documentation Discussion: Class reflection	
4/24	Assembly of write ups/ editorial session	
5/1		<b>DUE:</b> Final write up + Documentation

## Grading and Main Deliverables

Assignment	Description	% of final grade
Method presentation	<p>You will do presentation of a method-related paper in class (probably in pairs)</p> <p><b>Criteria:</b> clarity of presentation, slides, materials; covering key points; demonstrating a critical perspective; timely delivery; engagement in hands on exercise; lead a discussion in class afterwards</p> <p><b>Deliverable:</b> presentation in class and ppt on Canvas</p>	10%
Paper presentation	<p>Select a paper from the HCI community (e.g. EKSIG, CHI, TEI, DIS, DRS); it should relate to your chosen material and design; present the paper in class;</p> <p><b>Criteria:</b> put the work in relation to the discussions we had in class; relate it to the readings (in class but also beyond class where you can); develop the key contributions and provide key questions that arise from the work; lead a discussion in class to tackle these questions</p> <p><b>Deliverable:</b> presentation in class and ppt on Canvas</p>	10%
Final Project	<p>For the final project you will ideate, design, and implement a proof-of-concept prototype for a material-based interaction design. The main concern is that the design should be clearly inspired by the material conditions first and emphasize the differences, new questions, problems, or opportunities that such a new focus provides.</p> <p>You will first explore the material itself using the methods we discussed in class; explore its forms of material agencies, needs, connections, abilities, appearances, states etc.</p> <p>Second, you will identify a practitioner's relationship to that material; observe a crafter working with this material, learn about techniques, tools, workspaces, map out the practice, include our concerns of "care" and "material relating"; this presentation should conclude with your first rough ideation of your (if possible multiple) idea</p> <p>Third, you will do an informal presentation of a technical test of the main technological feature.</p> <p>Finally, you present your project in class.</p>	
	<p>First you research the material; document this exploration and experimentation exhaustively – and then more! Work with iterative design sketches that you collect and expand on; utilize tools (like the methods we used in class) that help you to visualize the relationships and dependencies; the outcome is a detailed material exploration that identifies key relations through various data (images, videos, design notes,</p>	10%

	<p>quantifiable data, relational experiments, speculations) you present the process how you arrived at this collection as well as resulting data in class; connect the process also to our readings and in-class discussions</p> <p><b>Criteria:</b> use of multiple methods, details in the exploration, aesthetics (visuals, textures, moving images, sketches), richness of the overall result, timeliness, presentation (fluency, preparedness, shared roles)</p> <p><b>Deliverable:</b> presentation in class and ppt on Canvas</p>	
	<p>Second, you will do a practice observation of a crafter working with that material.</p> <p>You will visit a crafter who works with this material and observe their techniques, tools, work conditions, approaches to the material (as much as possible). Take as many images as possible and prepare your questions in advance.</p> <p>You should end your practice presentation with a first ideation presentation where you sketch out your initial idea(s) and how they relate to the material and the practice</p> <p><b>Criteria:</b> depth of visual as well as other material (did you cover multiple areas from space to tools to practices to variations in techniques?)</p> <p><b>Deliverable:</b> presentation in class, ppt on Canvas + at least 10 images of process + 10 of the result</p>	10%
	<p>Prototype presentation: part of the evolution from the concept to the design to the implementation is the delivery of a low fi prototype of your project; you present the prototype informally in class</p> <p><b>Criteria:</b> does the technical solution work and is it feasible? If not: do you have an alternative?</p> <p><b>Deliverable:</b> presentation in class + 10 images on Canvas</p>	
	<p>Final presentation: you will present your project in class</p> <p><b>Criteria:</b> is your design material-based? Does the project build connections between the material itself and the practice observed toward your own interpretation? Is the result engaging and does it further the discussion? Connect the project to at least 2 readings; fluency of the presentation (timely, focused, all members active, well-structured, good visuals, good delivery)</p> <p><b>Deliverable:</b> presentation of the piece and an explanatory ppt in class; submit ppt and at all available material (at least 10 images covering process and 10 covering the result) on Canvas</p>	25%
Documentation	<p>You will document your results; this will be done in two ways:</p> <ul style="list-style-type: none"> <li>➤ a short YouTube style video (~ 2 min) that explains its nature, evolution, and results (worth 5%)</li> <li>➤ a critical write up, which will take the form of a pictorial (modeled after DIS pictorials) (worth 10%)</li> </ul> <p>both on Canvas</p>	15%

Participation	active in discussions, active in example sessions; active in design meetings, teamwork, homework; activity and engagement in all meetings; attendance is not participation!	20%
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No use of cell phones (including texting) in class.

100-90% = A

89-78% = B

77-64% = C

63- = D

Grading of individual pieces will be in percentage

Late submissions lead to automatic reductions of the grade unless a valid excuse is provided.

Any 1 day delay, meaning anything after 5pm of the due day, will have 10% reduced from the grade; any 2 day delay will have 20% reduced, 3 day delays will not be accepted.

The Honor Code of Georgia Tech applies (see <http://www.honor.gatech.edu/>).

### Attendance

A student is allowed three excused absences but increased absences and tardiness to come to class will affect the participation grade. With the fourth absence, the student's participation grade will be automatically lowered by 8 points, with the fifth an additional 8, six absences are an automatic failure of the class.

If a student needs to miss a class, contact the instructor 24 hours in advance. If Institute Approved Absences collide with class times please contact the instructor in advance to make sure the workload can be distributed.

Late submissions of any deliverable will receive a lowered grade (8% if up to 24 hour late, an additional 8% if up to 48 hours late, no submission is accepted beyond 2 days after the due date).

### Inclusivity Statement

The Ivan Allen College of Liberal Arts supports the Georgia Institute of Technology's commitment to creating a campus free of discrimination on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation, gender identity, or veteran status. We further affirm the importance of cultivating an intellectual climate that allows us to better understand the similarities and differences of those who constitute the Georgia Tech community, as well as the necessity of working against inequalities that may also manifest here as they do in the broader society.

There is zero tolerance for discrimination or harassment on any basis, including but not limited to race, color, religion, sex, national origin, age, disability, sexual orientation, gender identity, or veteran status. Georgia Tech is committed to providing its staff, faculty, and students the opportunity to pursue excellence in their academic and professional endeavors. This opportunity can exist only when each member of our community is assured an atmosphere of mutual respect. Georgia Tech's full antiharassment policy is online here:

<http://www.policylibrary.gatech.edu/anti-harassment-policy>

Violation of any of these expectations will result in appropriate penalties, including but not limited to reduction of grade, rescinding of lab access, or disciplinary action.

These statements might read a bit impersonal and detached but I want to re-emphasize that the class space should be free of harassment of any kind and be a safe space for us to creatively engage together.

### What to do if you fall behind or are stressed

Your health is more important than this class. Sometimes it is difficult for the instructor to have enough personal contact to see how you are. But you should know that your health and wellbeing are much more important than any grade or coursework. Let us help if any situation develops – the earlier the better. Again, please inform the instructor of any issues or challenges and do not hesitate to reach out.

Coursework can be demanding and everybody can encounter challenges sometimes. There are many reasons, such as an illness or a family emergencies, that might affect focus and studying conditions. If this happens to you, come and see the instructor about it as soon as possible to make alternate arrangements for work that has been missed, and continue coming to class. If you encounter more pressing difficulties, anxieties, or mental health challenges, then please let the instructor know but also turn to the support we have in place at the Institute. This includes the Counseling Center (<https://counseling.gatech.edu/>) and CARE (<https://care.gatech.edu/>).

### ADAPTS Accommodation

Students who feel that they may need an accommodation for any sort of disability, please make an appointment to see the instructor during office hours.

Students with disabilities should also contact Access Disabled Assistance Program for Tech Students (ADAPTS) to discuss reasonable accommodations. For an appointment with a counselor call (404) 894-2563 (voice) / (404) 894-1664 (TDD) email [dsinfo@gatech.edu](mailto:dsinfo@gatech.edu) or visit Suite 123 in the Smithgall Student Services Building. More information at: <http://www.adapts.gatech.edu/>.

### Sharing of work

Please be aware that your work might be accessible to others in future classes or in other academic presentations. This regards your code, presentations in class, as well as the videos and other deliverables. Participation in the course implies permission for sharing work with others in the class and with future students if your work is judged to be a valuable example. It might even be shared beyond Georgia Tech in a talk or possible other form. If you are not comfortable with this, please let the instructor know. Unless you inform the instructor in writing (email) that you do not want your work shared with others, it is assumed that it is available. The project videos might be shared openly by the instructor or the department online as showcases for the class or the program. They might be posted (with proper credits) on the instructor's video channel. Unless you inform the instructor in writing (email) that you do not want your work shared, it is assumed that it is available.

### Learning Outcomes

- Demonstrate the ability to analyze and critically evaluate existing digital media artifacts, services, and environments using formal knowledge, and to explain and defend one's critical evaluation.
- Demonstrate the ability to devise, design, create, and assess prototypical digital media artifacts, services, or environments and to contextualize them within recognized traditions of practice.
- Demonstrate ability to use common digital media authoring tools
- Demonstrate ability to set up and use common tools for writing code and managing the software development process
- Demonstrate use of digital media to create prototypes

- Demonstrate good time management skills
- Demonstrate ability to set realistic goals
- Can develop interactive media artifacts
- Can design and create digital artifacts that create the experience of agency for the interactor.
- Can communicate, coordinate, and work productively as a team member.
- Can summarize their work orally and in written form using formal terminology
- Can justify the design choices in their works

## References

(selection – we will read only a fraction of these)

Problem statement:

- Cielemecka, Olga, and Christine Daigle. 2019. "Posthuman sustainability: An ethos for our anthropocenic future." *Theory, Culture & Society* 36 (7-8):67-87.
- Latour, Bruno. 2017. *Facing Gaia. Eight Lectures on the New Climatic Regime*. Cambridge, UK: Polity Press.
- Leonard, Nicholas. 2020. "The Arts and New Materialism: A Call to Stewardship through Mercy, Grace, and Hope." *Humanities* 9 (3): 84.
- Wakkary, Ron. 2021. *Things we could design: For more than human-centered worlds*: MIT press. (intro)

Design:

- Akama, Y., Light, A., & Kamihira, T. (2020, June 15–20, 2020). Expanding participation to design with more-than-human concerns. Proceedings of the 16th Participatory Design Conference 2020, Manizales, Colombia.
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- Lupton, D. (2019). Toward a more-than-human analysis of digital health: inspirations from feminist new materialism. *Qualitative Health Research*, 29(14), 1998-2009.
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- Nitsche, Michael. 2022. *Vital Media. Making, Design, and Expression for Humans and Other Materials*. Cambridge, MA: MIT Press.
- Oogjes, D., & Wakkary, R. (2022). Weaving stories: Toward repertoires for designing things. Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems,



- Oogjes, Doenja. 2022. "*Repertoires for designing with nonhumans*" Ph.D., School of Interactive Arts and Technology Simon Frasier University.
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- Wakkary, R. (2020). Nomadic practices: A posthuman theory for knowing design. *International Journal of Design*, 14(3), 117.
- Wiberg, Mikael. 2016. "Interaction, new materials & computing—Beyond the disappearing computer, towards material interactions." *Materials & design* 90: 1200-1206.

#### Design to personal:

- Cole, David, and Hannah Perner-Wilson. 2019. "Getting Lost and Unlearning Certainty: Material Encounters in an Electronic Craft Practice." In *The Critical Makers Reader: (Un)Learning Technology*, edited by Loes Bogers and Letizia Chiappini, 107-126. Amsterdam, NL: Institute of Network Cultures.
- Nicenboim, Iohanna, Doenja Oogjes, Heidi Biggs, and Seowoo Nam. 2023. "Decentering through design: Bridging Posthuman Theory with More-than-Human Design Practices." *Human-Computer Interaction*:1-27.

#### Theory:

- Barad, Karen. 2007. *Meeting the Universe Halfway. Quantum Physics and the Entanglement of Matter and Meaning*. Durham; London: Duke University Press.
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- Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins*. Princeton, Oxford: Princeton University Press.

#### Methods I: On humans and practices

- Andersen, Kristina. 2013. "Making magic machines." 10th European Academy of Design Conference.

- Andersen, Kristina, and Ron Wakkary. 2019. "The magic machine workshops: making personal design knowledge." Proceedings of the 2019 CHI conference on human factors in computing systems.
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- Mäkelä, Maarit, and Nithikul Nimkulrat. 2011. "Reflection and Documentation in Practice-led Design Research." Nordic Design Research Conference 2011, Helsinki, FIN.
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#### Methods II: Beyond humans

- Barati, Bahareh, Elisa Giaccardi, and Elvin Karana. 2018. "The Making of Performativity in Designing [with] Smart Material Composites." Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, Montreal QC, Canada.
- Cila, Nazli, Elisa Giaccardi, Fionn Tynan-O'Mahony, Chris Speed, and Melissa Caldwell. 2015. "Thing-Centered Narratives: A study of object personas." *Proceedings of the 3rd seminar international research network for design anthropology*.
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- Rognoli, Valentina, Bruna Petreca, Barbara Pollini, and Carmem Saito. 2022. "Materials biography as a tool for designers' exploration of bio-based and bio-fabricated materials for the sustainable fashion industry." *Sustainability: Science, Practice and Policy* 18 (1):749-772.
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#### Craft and HCI:

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#### Future Crafts:

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#### Some related projects:

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- Mellis, David A., Sam Jacoby, Leah Buechley, Hannah Perner-Wilson, and Jie Qi. 2013. "Microcontrollers as material: crafting circuits with paper, conductive ink, electronic components, and an "untookit"." *Proceedings of the 7th International Conference on Tangible, Embedded and Embodied Interaction*, Barcelona, Spain.
- Oogjes, D., Wakkary, R., Lin, H., & Alemi, O. (2020). Fragile! Handle with Care: The Morse Things. *Proceedings of the 2020 ACM Designing Interactive Systems Conference*.
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