

CMCI STUDIO
CRITICAL MAKING STUDIO
Critical Making Studio 3: Parametric Product Design
Spring 2021

APRD 5017

Day / Time: Monday, 1:30 pm – 4:00 pm

Location: CMCI Studio – 1301 Walnut St. & Zoom Meeting

Instructor: RJ Duran

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Slack: @rjduran. #cmstudio on cmci-studio.slack.com.

Office hours by appointment.

COURSE DESCRIPTION

Critical Making 3: Parametric Product Design is a studio-based course that explores algorithmic modeling strategies, computational design, and digital fabrication for product development.

Students will develop basic skills with McNeel Rhinoceros and Grasshopper -- a visual programming environment for algorithmic modeling, to design parametric systems and how to translate digital objects into physical form through digital manufacturing.

Students will be introduced to the emerging field of parametric product design by developing projects that explore a multitude of form-finding strategies in surface patterning and complex geometric modeling of everyday objects spanning a variety of scales and applications. Familiar examples of product categories ripe for design experimentation include common objects such as pens and speakers, household items such as furniture and lighting, and personal items such as clothing, razors, and jewelry. In addition, students will develop an understanding of how to evaluate and optimize their designs based on product constraints, use cases, materiality, form, and function of physical objects produced through iterative cycles of production.

The course will culminate in a final project leveraging tools, techniques, skills, and knowledge gained throughout the semester. Project examples include physical prototypes, fully formed products, high fidelity product renderings, and production based workflows.

COURSE OBJECTIVES

1. Develop students' awareness of current research and creative application of emerging paradigms and practices in parametric design.
2. Develop understanding and skill with digital design tools supporting parametric modeling workflows.
3. Further students' creative practices and proficiencies that support the generation of quality work through hands-on project-based making.
4. Advance creative work through critique, reflection, presentation, and documentation.

CLASS EXPERIENCE

This studio course is project-based and hands-on. Each week will consist of instructor-led discussions introducing new concepts. Students will work individually and in groups with class time being a combination of lecture sessions and working sessions. Informal critiques will take place frequently in class discussions. Students will develop deliverables in response to project parameters and their areas of interest. Deliverables will reach varying levels of fidelity based on project structure and instructor expectations.

SCHEDULE

The course is organized into weekly meetings consisting of instructor led project-driven topics organized as workshops and studio work sessions. It is expected that all students are active participants in each session. The final 5 weeks are dedicated to developing a final project and presenting it to the class. *Note the first 2 weeks of the semester we do not have class due to the offset start date and MLK Holiday. In addition, this year we do not have a traditional Spring Break.*

Week	Date	Topic	Location*
1	Jan 25	Overview / Intro to Rhino	Zoom
2	Feb 1	Rhino	Zoom
3	Feb 8	Intro to Grasshopper	Zoom
4	Feb 15	Pattern Algorithms	Zoom
5	Feb 22	Digifab Studio: Laser Cutting	Studio
6	Mar 1	Digifab Studio: CNC Milling	Studio
7	Mar 8	Digifab Studio: CNC Routing	Studio
8	Mar 15	Digifab Studio: 3D Printing	Studio
9	Mar 22	Studio (<i>Final Project Proposal Due</i>)	Studio
10	Mar 29	Final Projects	Studio
11	Apr 5	Final Projects	Studio
12	Apr 12	Final Projects	Studio
13	Apr 19	Final Projects	Studio
14	Apr 26	Final Project Presentations	Studio

* Class location will vary throughout the semester. Check the course website for up to date information.

COURSE DELIVERABLES

Course deliverables consist of assignments and a final project. Assignments are assigned weekly with deliverables to be submitted as blog posts on a blog managed by the student.

Assignments are typically due by the start of the next class period, unless otherwise noted, and submitted on the **#cmstudio** slack channel.

Final projects can be done independently or as a group of 2-3 people. In groups, the workload must be distributed as decided by the team members and guided by project parameters. All students are required to provide documentation of their unique contributions to the project.

This studio-based course is 3 credit hours which means students should expect to dedicate at least 2-3 hours per credit hour. This translates into 6-9 hours per week. Consider 6 hours a minimum expectation for one studio course and plan accordingly.

EVALUATION

Work is evaluated based on the following:

1. Attendance and Participation. This is a project-based course and will involve the presentation of concepts, sketches, and prototypes as well as the critique of fellow classmates. All students are expected to be active participants in both activities.
2. Quality and Quantity of project deliverables. This studio-based course requires a healthy level of *creative immersion and balance* to be successful. Explore your creative process through making and always deliver to the best of your abilities. Achieve quality through quantity.

3. Collaboration will also be a factor of evaluation if you choose to work on projects in teams of no more than 2-3 people. The division of duties on any project needs to be clearly defined and documented by all team members and will factor into individual evaluations.

GRADING & ATTENDANCE

Grades for the course will follow the standard A through F letter grading system and will be determined by the following breakdown:

Participation – 25%

- All students are expected to attend and participate in every class session. You are expected to contribute to discussions, engage in group work, give feedback to your peers, and otherwise fully participate in class.
- If missing is unavoidable, notify faculty and any teammates you are currently working with as far in advance as possible.

Assignments – 50%

- Quality and clarity of documentation
- Engagement with the subject matter
- Deliverables completed

Final Project – 25%

RESOURCES

All course resources can be found at <http://make.cmci.studio/>.

Updated: January 14, 2021

Appendix: University Policies & Procedures

A full list of CU's academic policies can be found online at <https://www.colorado.edu/policies>.

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

Requirements for COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert [CU Boulder Medical Services](#).

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more information, see the policies on [COVID-19 Health and Safety](#) and [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the "Accommodation for Disabilities" statement on this syllabus.

Before returning to campus, all students must complete the [COVID-19 Student Health and Expectations Course](#). Before coming on to campus each day, all students are required to complete a [Daily Health Form](#). In this class, you may be reminded of the responsibility to complete the [Daily Health Form](#) and given time during class to complete it.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home and complete the [Health Questionnaire and Illness Reporting Form](#) remotely. In this class, if you are sick or quarantined, please notify CMCI STUDIO faculty by email or Slack.

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If

you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please notify me as quickly as possible regarding any possible absences so that we can plan your work accordingly.

See the [campus policy regarding religious observances](#) for full details.

Athletic Events

The Boulder Campus has two separate but similar policies governing conflicts between a student's athletic events and his or her classes and exams. One policy governs students involved in intercollegiate varsity athletic events. The other policy governs students involved in Club Sports events. Each policy is accompanied by a detailed report with guidance on how instructors may deal with conflicts when they arise. Both policies may be viewed in detail on the Boulder Faculty Assembly's website:

Policy on conflicts involving Intercollegiate Athletics,
<http://www.colorado.edu/FacultyGovernance/committees/IAC.html>

Policy on conflicts involving Club Sports
<http://www.colorado.edu/FacultyGovernance/committees/studentaffairs.html>

The two policies are substantially similar, having the following terms in common:

- That it is the student's responsibility to notify each instructor, in the first week of the semester and in writing, about any known conflicts between academic requirements and athletic events.
- That instructors have full authority to decide whether and/or how to accommodate those conflicts. While an instructor has the right to refuse to make accommodations, he or she is permitted to provide such accommodations.
- That coaches are forbidden from initiating contact with instructors regarding schedule conflicts, grades, or academic progress. The Intercollegiate Athletics Office of Academic Support Services and the Recreation Center's Collegiate Club Sports coordinators may contact instructors about certain topics. There is no rule preventing faculty from contacting these support organizations. Policy terms that are specific to intercollegiate varsity events, as opposed to club sports events, include: That intercollegiate varsity athletic events during final exams, which are normally forbidden by university policy, must be approved in writing by the BFA Intercollegiate Athletics Committee well in advance of the event. Students involved in these events must then work with their instructors in regard to any missed work.

Departmental Policy on Class Attendance

In an effort to accommodate student demand for courses, the Department of Advertising, Public Relations and Media Design (APRD) will administratively drop enrolled students who do not attend both of the first two class meetings in a semester of term.

CMCI Diversity, Equity, and Inclusion (DEI)

A Commitment and Invitation from Our College: CMCI strives to be a community whose excellence depends on diversity, equity, and inclusion. We aim to understand and challenge systems of privilege and disadvantage in higher education, such as those based on class, race, ethnicity, gender, sexuality, and dis/ability. We seek to reach across social and political divides and to make space for voices historically underrepresented in higher education and marginalized in society. In other words, diversity is not just a future reality for which we try to prepare students. It is a priority we want to put into practice here, now, and together, in order to foster places of learning where all members can thrive. Our question for you is, how are we doing? Please contact the CMCI diversity team (email [Lisa Flores](#) or visit the [CMCI Diversity, Inclusion, and Equity Staff](#) page)...

- if you need support or other resources but don't know where to turn
- if any aspect of your educational experience with CMCI does not reflect the commitment expressed here, or if you want to share a positive instance of this commitment in action
- if you have any questions, concerns, or ideas related to diversity
- We want to hear from you so that we can do better, and to support you however we can!