How to Move a Megalith
ARCHITECTURAL DESIGN WORKSHOP

MIT ARCHITECTURE
ARCH 4.181
FALL 2024
W 2:00 – 5:00
RM 2-103
CREDITS: 9 (3-0-9) g

Syllabus

INSTRUCTOR

Brandon Clifford - bcliffor@mit.edu

OVERVIEW

The term "megalith" simply refers to a 'big stone,' but behind this seemingly simple definition lies centuries of human ingenuity and cultural significance. In this course, we delve into the cultural act of bringing a stone to life, exploring the techniques and technologies used by ancient civilizations to transport and position these monumental structures.

Through a combination of theoretical learning and hands-on practical exercises, students will gain a comprehensive understanding of calculus-based curvature modeling and solver computation, necessary to drive the location of a megalith's center of mass. By mastering these concepts, participants will unlock the secrets of effortlessly moving massive objects and performing feats of spectacular prowess.

Students will embark on a journey of discovery, learning how to design, compute, and execute the precise movements required to transport megalithic stones. From principles of leverage and mechanical advantage to employing cutting-edge computational techniques, participants will explore a range of strategies for overcoming the logistical challenges inherent in moving objects of such monumental scale.

Moreover, this course goes beyond mere technical proficiency, encouraging students to consider the broader cultural and historical contexts surrounding megalithic engineering. Through engaging discussions and interactive activities, participants will explore the societal implications of megalithic construction, examining how these monumental structures have shaped human civilizations throughout history.

STRUCTURE

Throughout the course, students will engage in bi-weekly exercises aimed at mastering computational methods crucial for megalithic tasks. These exercises will culminate in the development of proficiency in calculus-based curvature modeling and solver computation, enabling students to analyze and manipulate the center of mass of megalithic objects effectively. Ultimately, students will work towards a megalithic performance, enacting the timeless act of moving and standing a big heavy stone of their own.

Evaluation Criteria and Grading

The following criteria will be used for the evaluation of your work, both in terms of helping your progress and in final grading:

- Investigation: How rigorous are your investigations?
- Translation of Investigation: How clearly are your findings communicated in your presentation of your investigations?
- Presentation Quality: To what degree do your presentations convey what they ought to?
- Participation: How actively and how constructively are you involved in class discussions and exercises?
- Contribution: To what degree do your findings constitute a contribution to the class, field, or larger context? To what degree are those findings novel?

A: Excellent - Project surpasses expectations regarding inventiveness, appropriateness, verbal and visual ability, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class.

B: Above Average - Project is thorough, well researched, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. The project is complete on all levels and demonstrates potential for excellence.

C: Average - Project meets the minimum requirements. Suggestions made in class are not pursued with dedication or rigor. The project is incomplete in one or more areas.

D: Poor - Project is incomplete. Basic skills including graphic skills, modelmaking skills, verbal clarity or logic of presentation are not level appropriate. Student does not demonstrate the required design skill and knowledge base.

F: Failure - Project is unresolved. Minimum objectives are not met. Performance is not acceptable. This grade will be assigned when you have more than two unexcused absences.

Policies

Attendance at all class meetings is mandatory. If any meeting (lecture or workshop session) is to be missed, please notify the instructor prior to the scheduled class. Please remember to silence cell phones and be courteous when using laptops in class. Most importantly, be respectful and engage during fellow students' pin-ups. This course is committed to the principle of equal access. Students who need disability accommodations are encouraged to speak with the faculty member/department administrator early in the semester so that accommodations can be implemented in a timely fashion.

Undergraduates: If anything is getting in the way of your academics, please consult with S3 (s3-support@mit.edu). The walk-in queue is open from 10-12 and 2-4 on weekdays. Appointments can be virtual or in-person, depending on your comfort and convenience.

Graduates: A variety of issues may impact your academic career including faculty/student relationships, funding, and interpersonal concerns. In the Office of Graduate Education (OGE), GradSupport provides consultation, coaching, and advocacy to graduate students on matters related to academic and life challenges. If you are dealing with an issue that is impacting your ability to attend class, complete work, or take an exam, you may contact GradSupport by email at gradsupport@mit.edu or via phone at (617) 253-4860.

The MIT online course management system, aka Canvas, will be used exclusively in the course. Lecture handouts and exercise descriptions will be available there shortly after class is held. Students will also be submitting exercises and materials through this system and must do so by the assigned due date.

Suggested Readings

Brown, Peter Lancaster. *Megaliths, Myths and Men an Introduction to Astro-Archaeology*. Blandford Press, 1976.

Clifford, Brandon. “The McKnelly Megalith: A Method of Organic Modeling Feedback,” in *ACADIA Posthuman Frontiers: Data, Designers and Cognitive Machines,* 440–449. Ann Arbor (Michigan), USA, 2016.

Clifford, Brandon. "Out of Scope: How Megaliths Challenge Architecture’s Role." In *Interdisciplinary Design Thinking in Architecture Education*, edited by Julie Ju-Youn Kim, 72-75. Routledge, 2023.

Dean, Carolyn. *A Culture of Stone : Inka Perspectives on Rock*. Durham, NC: Duke University Press, 2010.

Graeber, David, and David Wengrow. *The Dawn of Everything: A New History of Humanity*. New York: Farrar, Straus and Giroux, 2021.

Heggie, D. C. *Megalithic Science : Ancient Mathematics and Astronomy in North-West Europe*. New York, N.Y: Thames and Hudson, 1981.

Hunt, Terry L., and Carl P. Lipo. *The Statues That Walked: Unraveling the Mystery of Easter Island*. New York: Free Press, 2011.

Jarzombek, Mark. *Architecture Constructed*. London: Wiley, 2014.

Swingle, Tyler, Davide Zampini, and Brandon Clifford. “Walking Assembly: A Method for Craneless Tilt-Up Construction.” In *Impact: Design With All Senses*, 237–49. Cham: Springer International Publishing, 2020.

Thom, Alexander. *Megalithic Lunar Observatories*. Oxford: Clarendon Press, 1971.

Thom, Alexander. *Megalithic Sites in Britain*. Oxford: Clarendon Press, 1967.

Schedule

09/04	Introduction	Ex. 0
09/11	**CURVATURE** & **COM/COC**	Ex. 1
09/18	*Workshop*	
09/25	**ORGANIC MODELING** & Review Ex. 1	Ex. 2
10/02	*Workshop*	
10/09	**RECURSION SOLVER** & Review Ex. 2	Ex. 3
10/16	*Workshop*	
10/23	Review Ex. 3	Ex. 4
10/30	TBD	
11/06	TBD	
11/13	TBD	
11/20	**Penultimate** – Dress Rehearsal	
11/27	HOLIDAY – Thanksgiving Week	
12/04	Optional Resource Day	
12/??	**PERFORMANCE** – TBD	