

ARCHITECTURE AND SCIENCE

Course Number: ARCH 591.ASC

Time: TH 9:00-11:50

Location: 4W Architecture

Instructor: Prof. Susan Johnson-Roehr

Office: Architecture 307

Office Hours: M/W 12:15-1:15
or by appointment

E-mail: sjohns50@illinois.edu

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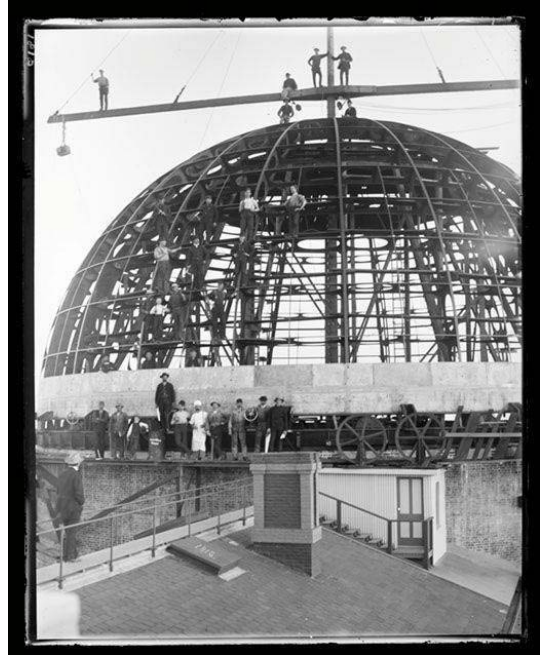


Photo courtesy Special Collections, UCSC

Introduction

This seminar is based on a critical review of selected texts, primary sources, and buildings that have helped define the relationship between architecture and science since the late seventeenth century. As a group, we will explore the definitions of science and technology as they have emerged and changed during three centuries of scientific work and building design. We will engage with critical analyses of space in an attempt to answer specific questions: Is architecture a science? What constitutes a laboratory? An observatory? How have these typologies changed over time? We will also engage with the larger concepts of "modernity," "progress," and "development" as they relate to science and architecture. At the end of the course, students will be able to reflect on the changing meanings of these concepts, as well as identify significant moments and buildings related to the history of science.

Requirements:

3-credit option (ARCH 591.ASD):

Attendance/Participation	25%
Class Presentation	25%
Proposal for Research Topic w/preliminary bibliography	10%
Research Project	40%

4-credit option (ARCH 591.ASC or ARCH 591.ASD + ARCH 401):

Students registered for the 4-credit option of the course will do an additional written assignment consisting of two 3-4 page book reviews.

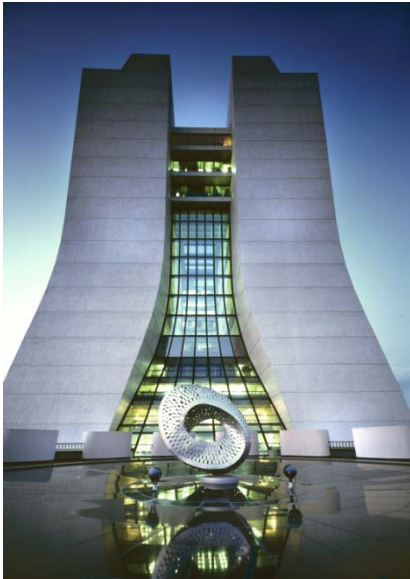
Attendance/Participation	10%
Class Presentation	20%
Book Reviews	20%
Proposal for Research Topic w/preliminary bibliography	10%
Research Project	40%

Reading Assignments:

Readings for the class are available online or on reserve at Ricker Library of Architecture and Art. The majority of the required articles are available via JSTOR (permalinks included in schedule below). In the few cases when the assigned reading is not available through JSTOR or on reserve, I will make the reading available via e-mail or as a download from Compass.

Discussion Questions and Images:

You should formulate a short list of questions to facilitate group participation. The questions should be e-mailed to me three days before our class meetings (on Monday). I may add additional questions to list before I circulate it to the class Monday evening or Tuesday morning. Each week, one student will be responsible for bringing relevant images (PowerPoint) or other materials to class to assist our discussion. These may be examples of work discussed in the reading or anything else that you think might contribute to our understanding of the material.



Attendance:

Attendance is mandatory. You should sign the attendance sheet at the beginning of each class. If you are more than twenty minutes late to class, I will consider you absent. If you are unable to attend, written confirmation should be given to me promptly. Three absences will automatically lower your grade by one full letter for the course (ie., an A- will become a B-). Every absence after three will result in a lowering of your grade by an additional letter.

Research Project:

The research project will be due on **Monday, May 7, 2012**. There are two research options for this seminar. 1) A 12-16 page research paper (12 pt. font, not including bibliography), fully supported with citations and illustrations from published sources; or 2) A shorter paper of approximately 8 pages, supported with an original visual/spatial analysis through a set of drawings and/or maps. The goal of both projects is to analyze one particular aspect of the relationship between science and architecture. You may choose to write about a specific building *not covered in class*, a set of buildings (a health sciences campus, for instance), or a particular theoretical issue. The topic will be decided in consultation with me. I will be holding **special office hours during Week Six** of the semester. Students should sign up for a time slot and meet with me to discuss their topics (I will pass around a sign-up sheet in class).

A short 1-2 page description of the topic + preliminary bibliography is **due in class on March 15, 2012**. Your bibliography, like your final paper, should conform to Turabian or Chicago Style formats. If you are unclear as to what this format requires in terms of footnotes and works cited pages, please consult the appropriate style guide at the University Library.

Research Presentation:

All students will make a short (twenty minutes maximum) presentation on the **final day of class, April 26, 2012**. As a useful guide, you should expect to use no more than ten PowerPoint slides for your talk (averaging 2 minutes per slide). This presentation should provide your classmates with a clear conception of your research question, as well as the steps you took to answer this question. If necessary, you should prepare handouts to circulate during your presentation. A copy of any materials uses (slides, handouts) should be burned to a CD/DVD and turned in with your research paper on **Monday, May 7, 2012**.

Book Reviews:

Students opting for the 4-credit version of the course must write two 3-4 page review of a book (or a collection of 4-5 articles) during the semester. Students, in consultation with me, will select two books related to the course. The first book review is due in class on March 15, 2012. The second book review is due the last day of class, April 26, 2012. Your review should include the following: a summary of the author's thesis; a synopsis of the book's/article's content; a consideration of the author's point of view; theoretical groundings; a critique of the book's strengths and weaknesses; and an evaluation of its contribution to an understanding of our course theme.

**Academic Accommodations:**

Students with disabilities that affect their ability to participate fully in class are encouraged to bring this to my attention so accommodations can be made with Disability Resources and Educational Services (<http://www.disability.uiuc.edu/>).

Classroom Environment:

University of Illinois will not tolerate inappropriate behavior as defined in the Student Code of Conduct (http://admin.illinois.edu/policy/code/FullCode_web.pdf).

Academic Honesty:

University of Illinois has a very clear policy on academic honesty. The work completed for this course should be your own. Plagiarism is not an acceptable practice in any class, and all acts of academic misconduct will be handled according to University policy. If you are confused as to what constitutes plagiarism, please see <http://www.library.illinois.edu/ugl/howdoi/plagiarism.html>, the University Library's website on avoiding plagiarism. If you are still uncertain after reading this site, please contact me well before the due date for the research paper.

Schedule:

Week One (January 19)

Introduction

Reading:

- ❖ Williams, Raymond. "Science" and "Technology." From *Keywords* (Oxford: Oxford University Press, 1985): 276-79; 315-16. [Compass]
- ❖ Bennett, Tony. "Science" and "Technology." From *New Keywords: A Revised Vocabulary of Culture and Society* (Malden, MA: Blackwell, 2005): 315-17; 342-44. [Compass]
- ❖ Picon, Antoine. "Architecture and the Sciences." In *Precisions: Architecture Between the Sciences and the Arts*, edited by Akos Moravanszky and Ole W. Fischer, 49-81. Berlin: Jovis Verlag, 2008. [Compass]

Week Two (January 2)

Tycho Brahe and the Early Modern Laboratory

Reading:

- ❖ Hannaway, Owen. "Laboratory Design and the Aim of Science: Andreas Libavius versus Tycho Brahe." *Isis* 77, No. 4 (December 1986): 584-610. <http://www.jstor.org/stable/233163>
- ❖ Shackelford, Jole. "Tycho Brahe, Laboratory Design, and the Aim of Science: Reading Plans in Context." *Isis* 84, No. 2 (June 1993): 211-230. <http://www.jstor.org/stable/236232>

Week Three February 2

Architecture as Science: Jacques-François Blondel

Reading:

- ❖ Schmidt, Freek H. "Expose Ignorance and Revive the "Bon Goût": Foreign Architects at Jacques-François Blondel's École des Arts." *Journal of the Society of Architectural Historians* Vol. 61, No. 1 (March 2002): 4-29. <http://www.jstor.org/stable/991809>
- ❖ Gerbino, Anthony. "François Blondel and the "Résolution des quatre principaux problèmes d'architecture" (1673)." *Journal of the Society of Architectural Historians* Vol. 64, No. 4 (December 2005): 498-521. <http://www.jstor.org/stable/25068202>

Week Four February 9

Engineering: Architecture, Science or Technology? The 1889 Paris Universal Exposition

Reading:

- ❖ Peters, Tom F. "Patterns of Technological Thought: Buildings from the Sayn Foundry to the Galerie des Machines." In *Building the Nineteenth Century*, 205-79 (Cambridge: The MIT Press, 1996). [Reserve in Ricker Library]
- ❖ Levin, Miram R. "The Eiffel Tower Revisited." *The French Review* Vol. 62, No. 6, Special Issue: 1789-1889-1989 (May 1989): 1052-1064. <http://www.jstor.org/stable/394841>
- ❖ Stamper, John W. "The Galerie des Machines of the 1889 Paris World's Fair." *Technology and Culture* Vol. 30, No. 2, Special Issue: Essays in Honor of Carl W. Condit (April 1989): 330-353. <http://www.jstor.org/stable/3105107>

Week Five (February 16)

Case Study: Lick Observatory

Reading:

- ❖ Holden, Edward S. "Notes on the Early History of the Lick Observatory." *Publications of the Astronomical Society of the Pacific* Vol. 4, No. 24 (June 11, 1892): 139-40. <http://www.jstor.org/stable/40667045>
- ❖ Holden, Edward S. "Memorandum on the Founding of the Lick Observatory of California." *Publications of the Astronomical Society of the Pacific* Vol. 4, No. 24 (June 11, 1892): 141-50. <http://www.jstor.org/stable/40667046>
- ❖ Fernlund, Kevin. "To Think Like a Star: The American West, Modern Cosmology, and Big History." *Montana: The Magazine of Western History* Vol. 59, No. 2 (Summer 2009): 23-44. [Compass]
- ❖ Study [historic photographs of Lick Observatory](#) available in the UC-Santa Cruz Digital Collections.

Week Six (February 23)

No class—individual appointments regarding research paper

Week Seven (March 1)

Case Study: Acoustics

- ❖ Thompson, Emily. "Dead Rooms and Live Wires: Harvard, Hollywood, and the Deconstruction of Architectural Acoustics, 1900-1930." *Isis* 88, No. 4 (December 1997): 597-626. <http://www.jstor.org/stable/237829>

- ❖ Stewart, G. W. "Architectural Acoustics: Some Experiments in the Sibley Auditorium," *Sibley Journal of Engineering* 17 (May 1903): 295-313 [Compass]
- ❖ Ringel, A. S. "Sound-Proofing and Acoustic Treatment of RKO Stages." *Journal of the Society of Motion Picture Engineers* Vol. 15 (September 1930): 352-369. [Compass]

Week Eight (March 8)

Case Study: Climate and Architecture

Reading:

- ❖ Fry, Maxwell and Jane Drew. *Tropical Architecture in the Humid Zone*. New York: Reinhold Publishing Corporation, 1956. Introduction, Chapters 1-3, skim appendices. [Reserve]
- ❖ Le Roux, Hannah. "The Networks of Tropical Architecture." *The Journal of Architecture* Vol. 8, no. 3 (Autumn 2003): 337-54. [Compass]
- ❖ Olgyay, Victor. "The Temperate House." *Architectural Forum* (March 1951): 179-94. [Compass]

Week Nine (March 15)

Case Study: Eero Saarinen and Corporate Research

Reading:

- ❖ Knowles, Scott G. and Stuart W. Leslie. "Industrial Versailles Eero Saarinen's Corporate Campuses for GM, IBM, and AT&T." *Isis* 92, No. 1 (March 2001): 1-33. <http://www.jstor.org/stable/237325>
- ❖ "Where Today Meets Tomorrow." G. M. Technical Center souvenir guide. 1956. [Compass]
- ❖ "The Greatest Frontier: Remarks at the Dedication Program of the General Motors Technical Center." May 16, 1956. [Compass]
- ❖ "Eero Saarinen's Masterpiece: The G. M. Technical Center." *Architectural Forum* (November 1951): 111-15. [Compass]

Week Ten Spring Break

Week Eleven (March 29)

Building the Space Race: Cold War Architecture

Reading:

- ❖ Launius, Roger D. "Abandoned in Place: Interpreting the U.S. Material Culture of the Moon Race." *The Public Historian* Vol. 31, No. 3 (Summer 2009): 9-38. : <http://www.jstor.org/stable/10.1525/tph.2009.31.3.9>
- ❖ Oates, Stephen B. "NASA's Manned Spacecraft Center at Houston, Texas." *Southwestern Historical Quarterly* Vol. 67, No. 3 (January 1964): 350-375. <http://www.jstor.org/stable/30241958>
- ❖ Benson, Charles D. and William B. Faherty. *Gateway to the Moon: Building the Kennedy Space Center Launch Complex*. Gainesville: University Press of Florida, 1978): 1-39, 247-97. (Skim the rest of the book)

Week Twelve April 5

Case Study: Salk Institute

Reading:

- ❖ "'A Different Kind of Beauty': Scientific and Architectural Style in I.M. Pei's Mesa Laboratory and Louis Kahn's Salk Institute" *Historical Studies in the Natural Sciences* 38:1 (Spring 2008) 173-221.
- ❖ Treib, Marc. "To End a Continent: The Courtyard at the Salk Institute." *Journal of the Society of Architectural Historians* Vol. 65, No. 3 (September 2006): 402-27. <http://www.jstor.org/stable/25068295>
- ❖ McCoy, Esther. "Dr. Salk Talks About His Institute." *Architectural Forum* Vol. 127, No. 5 (December 1967): 27-[35]. [Compass]
- ❖ "The Salk Institute." *Progressive Architecture* Vol. 74 (October 1993): 7, 39-53. [Compass]

Week Thirteen April 12

Case Study: Fermilab

Field trip to Fermilab (TBD)

Reading:

- ❖ Kobl, Adrienne and Lillian Hoddeson. "A New Frontier in the Chicago Suburbs: Settling Fermilab, 1963-1972." *Illinois Historical Journal* Vol. 88, No. 1 (Spring 1995): 2-18. <http://www.jstor.org/stable/40192872>
- ❖ Westfall, Catherine and Lillian Hoddeson. "Thinking Small in Big Science: The Founding of Fermilab, 1960-1972." *Technology and Culture* Vol. 37, No. 3 (July 1996): 457-92. <http://www.jstor.org/stable/3107161>

Week Fourteen April 19

Revisiting the Laboratory

Reading:

- ❖ Kohler, Robert E. "Laboratory History: Reflections." *Isis* Vol. 99, No. 4 (December 2008): 761-68. <http://www.jstor.org/stable/10.1086/595769>
- ❖ Gooday, Graeme. "Placing or Replacing the Laboratory in the History of Science?" *Isis* Vol. 99, No. 4 (December 2008): 783-795. <http://www.jstor.org/stable/10.1086/595772>
- ❖ Gieryn, Thomas F. "Laboratory Design for a Post-Fordist Science." *Isis* Vol. 99, No. 4: (December 2008): 796-802. <http://www.jstor.org/stable/10.1086/595773>
- ❖ Russell, James S. "In the Clark Center, the task for Foster and Partners and MBT was no less than to redefine the way interdisciplinary research is done." *Architectural Record* Vol. 192, No. 2 (February 2004): [94]-99. [Compass]
- ❖ "The DNA of science labs: can architecture help produce paradigm-shifting discoveries? A research center by Rafael Viñoly aims to find out what makes scientists—and the human mind—tick." *Metropolis* Vol. 26, No. 6 (February 2007): 74-80, 127, 129. [Compass]

Week Fifteen April 26

Student Presentations