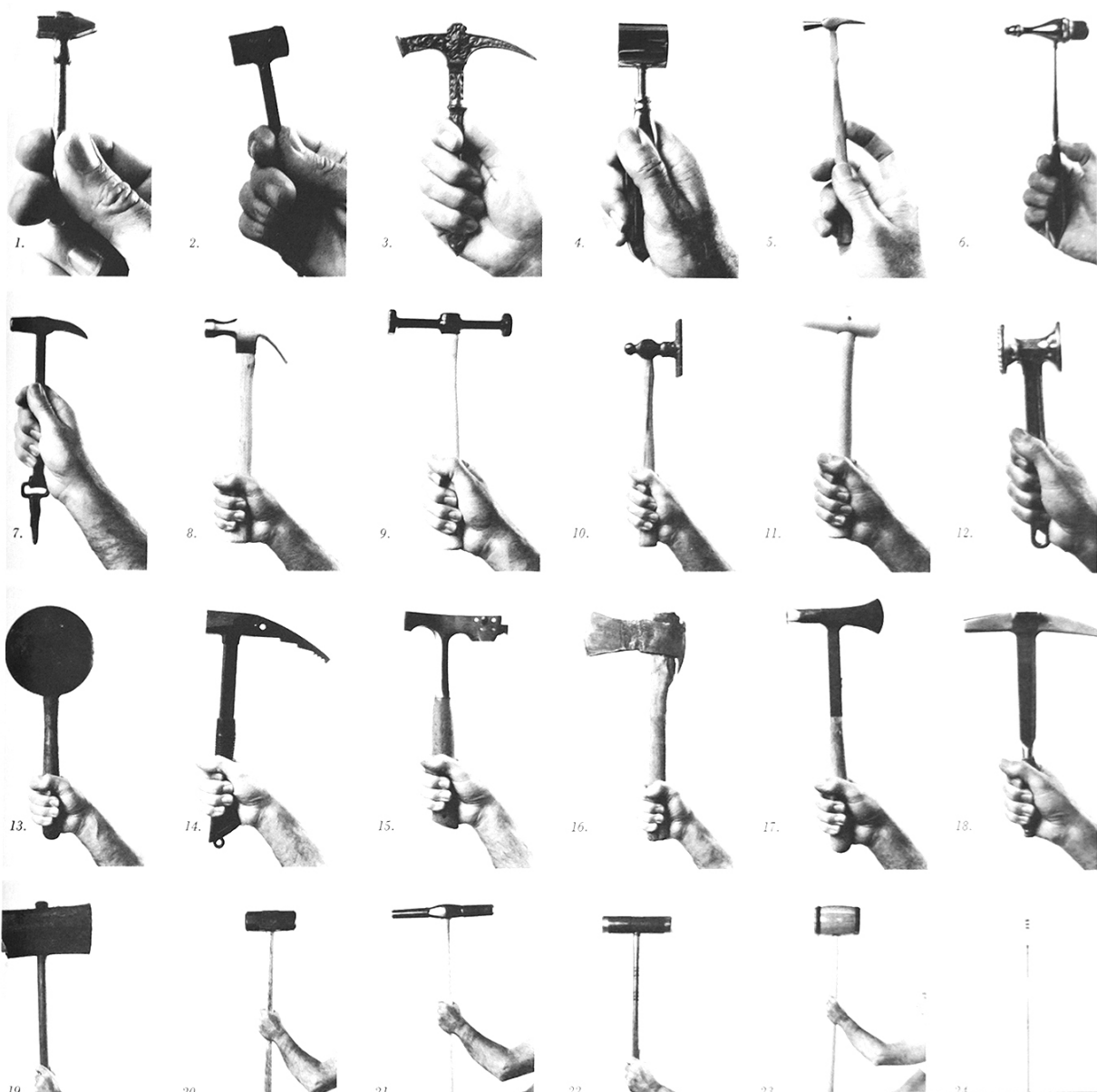# Workflows

Arch 521
Media Tech VI
Department of Architecture
South Dakota State University

Federico Garcia Lammers
Assistant Professor
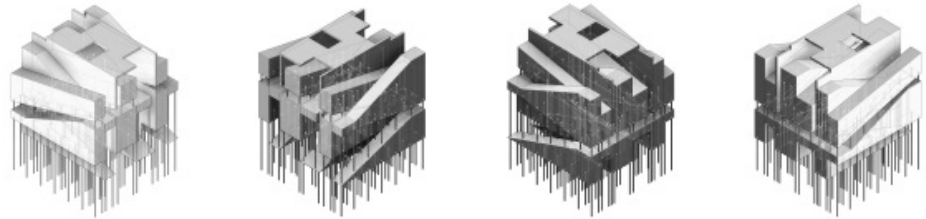
Fall 2019

Hans Hollein. Man Transforms: Aspects of Design, 1976-77

Workflows

Arch 521
Media Tech VI
Department of Architecture
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Federico Garcia Lammers   **Fall 2019**
Assistant Professor

Revit Cube Model. M.Albert and A. Rausch
Arch 521 + 251. Fall 2017 + 2018

Course Information

Arch 521. Media Tech VI: Workflows. Fall 2019
Department of Architecture (DoArch). South Dakota State University. 2 Credits
Wednesday: 10:00 - 12:00pm. AME Room 311
Prerequisite course: Arch 421/422

Contact Information

All emails MUST include ARCH 521 as the subject of the email. Students MUST identify themselves in emails. Instructor will respond to emails within 48hrs, not including weekends.

Federico Garcia Lammers, Assoc. AIA. Assistant Professor
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Website: doarchdeepdigs2019school.wordpress.com & Box.com

Course Description

This lecture and workshop course focuses on the integration and study of workflows associated with Building Information Modeling (BIM) and their role in methods of architectural production. (http://catalog.sdstate.edu/)

Computational tools continue to transform the way architects work and how they are being educated. Arch 521 is a media lecture course that focuses on post-orthographic BIM (Building Information Modeling) processes and their effects on the production of architecture. These effects are problematized by studying the role of workflows – reflective methods of intellectual and physical production. Arch 521 meets once a week for 2 hours. Media is what architects work through. It is a fundamental way of seeing and speculating about architecture. The work from this media course is framed by the relationship among three areas of study:

a. History / b. Tools / c. Contemporary Practice

The link between methods of production and reflection is the conceptual thread that highlights the relationship among the areas of study listed above.

There is a disciplinary path in which technical aptitude (technology) and theoretical aptitude (technics) continue to be driven further and further apart. The confusion between these two paths has led many architects to misinterpret user's manuals and statistical analysis as novel theories - referring to them as workflows. Shifts in "labor time" (graphical and construction) associated with the production of architecture has made it clear that the speed of the medium is decisive within any technical system. The goal of this course is to articulate that the speed of the medium affects contemplation and the development of technical knowledge. To move workflows away from the legacy of scientific management — the modernist pursuit of efficiency — it is necessary to think of technical contemplation as an intellectual act. Otherwise, workflows will continue to be a list of commands used to produce and manage predictable outcomes.

Learning Objectives

1. Understand the role of authorship in contemporary architectural production.

2. Understand the integration of computational tools within design and building processes.

3. Understand the post-orthographic implications of Building Information Modeling workflows.

4. Explore visual communication techniques using Autodesk Revit.

Methods of Assessment and Methodology

The semester is divided into lecture and workshops. Lectures unfold digital theories discussed in course readings and case studies. Workshops focus on the post-orthographic implications of modeling in Revit.

Technical theories exist in the space of contemplative thought afforded by technical systems. The study and development of workflows are the means through which these theories can be examined and expanded. There are two primary paths defined by workflows:

1. Precise technical definition of terms and conditions that affect the contemporary production of architecture (drawings, images, models, etc). In technical terms, contemporary digital tools do not produce orthographic drawings – they make images – producing 2D reports from 3D objects. The inability to parse out the ambiguities between these terms is affecting contemporary techno-theoretical discourse.

2. Study of the relationship between tools and management practices that have resulted in forms of consensual decision making, which has displaced the authorial figure in architecture. Workflows are the means through which to problematize collaboration and question the link between tools, people, and places.

Students in Arch 521 will work in Revit to explore points 1 and 2 outlined above.

Each student will receive a Revit File with a Cube Stair Model made by students in Arch 251 in Fall 2017. The existing Revit model will be dissected - probing at issues of outputting, orthography, and authorship; and reconfigured through Revit imaging techniques. These processes will be recorded, diagrammed and written about to develop new workflows from old models.

Grading Criteria

One of the fundamental issues addressed in this course is the development and analysis of productive workflows. Designing individual workflows are key pieces of demonstrating responsibility and meeting course expectations. As a result, NO extra credit, make-ups, or late submissions will be accepted in this course. If a student cannot submit their work on the specified due date, they should coordinate with their instructor in order to submit their work at an earlier date or have a classmate hand in their work.

20 pts = Punctuality, attendance, and class participation

30 pts = Imaging
        Set 1 (10 pts)
        Set 2 (10 pts)
        Set 3 (10 pts)

25 pts = Mid-Term Exam (Reflection)
25 pts = Final Exam (Reflection)

100 Total Points

A = 92 - 100
Exceptional performance; strongly exceeding the requirements of the course, showing strong academic initiative and independent resourcefulness.

B = 85 - 91, (Minimum grade required for professional degree credit)
Performance above the norm; accurate, complete, and beyond the minimum requirements of the course; work demonstrates marked progress and initiative.

C = 76 - 84
Satisfactory/adequate work; adequately meets minimum requirements and demonstrates satisfactory comprehension, communication skills, and effort; demonstrates little initiative to investigate the problem without substantial prodding of the instructor; work shows little improvement.

D = 68 - 75
Unsatisfactory/ inferior work; unsatisfactorily meets minimum requirements and demonstrates minimum comprehension, communication skills, and effort, at an inferior level; initiative lacking; improvement not noticeable.

F = 00 - 67
Does not meet minimum requirements; fails to adequately demonstrate comprehension or communication skills. No pluses or minuses will be given in this course.

Schedule   This is a preliminary outline and is subject to change. Changes will be announced in class and posted online.

wk 1	w: Aug. 28	**Course Introduction**	
wk 2	w: Sept. 4	**The Project of Authority** Albertian Notational System Hannah Ardent, Labor vs Work BIM and Authorship	Reading 1 / Mario Carpo, The Alphabet and the Algorithm. Peggy Deamer, Building in the Future: Recasting Labor in Architecture.
	th: Sept. 5	Last day to drop/and or adjust final fees	
wk 3	w: Sept. 11	**The Modernist Pursuit of Efficiency** Society and Information Mechanical Reproduction John Taylor, Scientific Management BIM and Efficiency	Reading 2 / John May, PLAT 2. Interview.
wk 4	w: Sept. 18	**Post-orthographic Production** Technology and Technics Drawings, Images, and Photographs BIM and Project Delivery	Reading 3 / John May, Everything is Already an Image.
wk 5	w: Sept. 25	**Imaging Workshop 1**	**Due: Access to Revit**
wk 6	w: Oct. 2	**Object Modification** Relational Protocols Tool Customization *Guest Lecture*	Reading 4 / Scott Marble, Digital Workflows in Architecture
wk 7	w: Oct. 9	**Imaging Workshop 2**	**DUE: Image Series 1**
wk 8	w: Oct. 16	**Orders of Simulation** Identical Copies and Virtuality Statistical Alibis and Calculated Images	Reading 5 / Lucia Allais, Rendering and Experience
wk 9	w: Oct. 23	**Imaging Workshop 3** *Guest Lecture*	**DUE: Image Series 2**
wk 10	w: Oct. 30	Midterm Exam	
	f: Nov. 8	Last day to drop course	
wk 11	w: Nov. 6	**Imaging Workshop 4** *Guest Lecture*	**DUE: Image Series 3**
wk 12	w: Nov. 13	**Matter vs Materiality** Phenomenological Labor Precision and Material Control	Reading 5 / Francesca Hughes, An Architecture of Error: Misadventures in Precision Log 42. Disorienting Phenomenology
wk 13	w: Nov. 20	**Post-industrial Materials** Continuous Differentiation Organic Material Production Automated and Autonomous Labor	Reading 6 / Neri Oxman, Toward site-specific and self-sufficient robotic fabrication on Architectural Scales.
wk 14	w: Nov. 27	No Class: Thanksgiving	
wk 15	w: Dec. 4	Exam Preparation	
wk 16	w: Dec. 11	No Class - Dead Day	
wk 16	f: Dec. 13	Final Exam at 9:15 - 11:15am	

Tech. Requirements

Many of the technology requirements for this course correspond with the requirements for Arch 321 and 421/422 prerequisites for this course. Please reference the DoArch media policy for hardware recommendations.

Students are responsible for making sure that they have access to the specified resources.

Software:
•   Adobe Suites (Acrobat Pro, Photoshop, Illustrator, InDesign)
•   Revit 2017 or later: Free download at http://students.autodesk.com

Printing:
•   Student work will be submitted and reviewed digitally.

Reading Materials

Reading is an essential part of this course. There is no required textbook for this course. Readings will be assigned according to lectures and topics discussed in class. Readings will be uploaded or linked to the course website. Students are responsible for reading the assigned materials and coming to class prepared for discussion.

Many of the supplemental resources used throughout the semester will be digital. Many of the required readings will be pulled directly from these books, however, the majority of these texts will be considered supplemental reading, as well as necessary resources for your class research projects. Please talk and coordinate with your classmates in order to share our reading resources. Below is a list of hardcopy books available on course reserve at Briggs Library.

Bernstein, Phillip and Deamer, Peggy. Building (in) the Future: Recasting Labor in Architecture. New York, NY: Princeton Architectural Press, 2010.

Carpo, Mario. The Second Digital Turn. Cambridge, MA: MIT Press, 2017.

Carpo, Mario. The Alphabet and the Algorithm. Cambridge, MA: MIT Press, 2011.

Dunn, Nick. Digital Fabrication in Architecture. London, UK: Laurence King Publishers, 2012.

Iwamoto, Lisa. Digital Fabrications: Architectural and Material Techniques. New York, NY: Princeton Architectural Press, 2009.

Karzel, Rudiger and Hauschild, Moritz. Digital Processes (Detail Practice). New York, NY: Birkhauser, 2011.

Kedan, Elite. Provisional: Emerging Modes of Architectural Practice USA. New York, NY: Princeton Architectural Press, 2009.

Kieran, Stephen and Timberlake, James. Refabricating Architecture: How Manufacturing Methodologies are Poised to Transform Building Construction. New York, NY: McGraw Hill, 2003.

Kolarevic, Branko. Manufacturing Material Effects: Rethinking Design and Making in Architecture. New York, NY: Routledge, 2008.

Marble, Scott. Digital Workflows in Architecture. New York, NY: Birkhauser, 2012.
McMorrough, Julia. Materials, Structures, and Standards: All the Details Architects Need to Know, but Can Never Find. Beverly, MA: Rockport Publishers, 2006.

Menges, Archim and Ahlquist, Sean. Computational Design Thinking: Computation Design Thinking. West Sussex, UK: Wiley and Sons, 2011.

Meredith, Michael and Aranda-Lasch. From Control to Design: Parametric Algorithmic Architecture. London, UK: Actar, 2008

Moe, Kiel and Ryan E. Smith. Building Systems: Design Technology and Society. New York, NY: Routledge, 2012.

Picon, Antoine. Digital Culture in Architecture : An Introduction for the Design Professions. New York, NY: Birkhauser, 2010.

Attendance

Attendance is required for all sessions. More than two (2) unexcused absences will result in a lowered final grade. Attendance is required at the beginning of each class meeting and a sign-in sheet will circulate during each class session. Attendance is extremely important for this class. In-class discussion about the topic at hand is essential to understanding the course material. After four (4) unexcused absences, the student may fail the course. Late arrivals (15 minutes or more) and early departures will be treated as absences.

"Excused" absences include the following:

1- Absence due to religious observance - The University Catalog states that a student may be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused for this purpose may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused.

2- Absence due to officially approved trips – Absence due to approved university sponsored/ recognized trips: Faculty and administration will honor officially approved absences where individuals are absent in the interest of officially representing the University. Sanctioned activities include:

- Collegiate club sports and competitions
- Conferences and workshops recognized by the University not related to academics
- Commitments on behalf of the University (Students' Association, Band, Choir, etc.)
- Intercollegiate athletics
- Professional activities recognized by the University related to academics
- Requests for excused absences must be submitted one week prior to the trip or event. Students must present the completed approved trip absence card to the instructor prior to the trip or event in order to receive an official excused absence. Faculty members are not required to honor incomplete or late cards.

Academic Honesty Policy

In written papers and other class projects (electronic format, hard copy, or otherwise) it is unethical and unprofessional to present the work done by others in a manner that indicates that the student is presenting the material as his/her original ideas or work.

Cheating, assisting others, or plagiarizing on tests, quizzes, problems, research papers, or other assignments will result in written notification to the student involved, the academic advisor, the department that offers the course, the appropriate college or administrative dean, and parent/guardian (when student is dependent for financial aid purposes). Plagiarizing is submitting uncited materials as your own work, which was in fact produced by others. Examples include uncited work from journals, books, work of other students, or electronic sources (i.e. world wide web (www), CD Rom, video and audio, graphic materials, etc.). In addition, the penalty for academic dishonesty may be one or more of the following, at the discretion of the instructor, and based on the situation:

- A grade of zero on the test, quiz, homework, problem, or other assignment for the student(s) involved.
- A grade of F for the course.
- Referral of the matter to the student conduct committee or the graduate school for disciplinary action.
- Students have the right to appeal an academic dishonesty charge. Procedures for this process are available in department offices and the dean's office. No final course grades will be given until all avenues of appeal have been completed or the case resolved. If repeated offenses occur in either a specific class or in 2 more different classes, the matter will be automatically referred to the student conduct committee/graduate school.

Freedom in Learning Statement

Freedom in Learning. Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any courses of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should first contact the instructor of the course. If the student remains unsatisfied, the student may contact the department head and/or dean of the college which offers the class to initiate a review of the evaluation.

ADA Statement

Any student who feels s/he may need an accommodation based on the impact of a disability should contact Nancy Hartenhoff-Crooks, Coordinator of Disability Services (605-688-4504 or Fax, 605-688-4987) to privately discuss your specific needs. The Office of Disability Services is located in room 065, the Student Union.

Student Conduct

Students will conduct themselves in a manner that promotes learning. Disruptive behavior and disrespectful attitudes will not be tolerated. Disruptive behavior includes - but is not limited to - eating in class, use of cel. phones, speaking or interrupting during lecture, abusive verbal or physical acts towards classmates or faculty.

NAAB Criteria

The 2014 NAAB Conditions for Accreditation, including a full description of Student Performance Criteria, can be found at http://www.naab.org/

The Department of Architecture (DoArch) must demonstrate that each graduate possesses the knowledge and skills defined by the criteria set out below. The knowledge and skills are the minimum for meeting the demands of an internship leading to registration for practice. The school must provide evidence that its graduates have satisfied each criterion through required coursework.

The criteria encompass two levels of accomplishment:

• **Understanding:** The capacity to classify, compare, summarize, explain and/or interpret information.
• **Ability:** Proficiency in using specific information to accomplish a task, correctly selecting the appropriate information, and accurately applying it to the solution of a specific problem, while also distinguishing the effects of its implementation.

NAAB Student Performance Criteria

Student Performance Criteria are organized into realms to more easily understand the relationships between individual criteria.

Realm A: Critical Thinking and Representation
Graduates from NAAB-accredited programs must be able to build abstract relationships and understand the impact of ideas based on the study and analysis of multiple theoretical, social, political, economic, cultural, and environmental contexts. Graduates must also be able to use a diverse range of skills to think about and convey architectural ideas, including writing, investigating, speaking, drawing, and modeling.

Realm B: Building Practices, Technical Skills, and Knowledge
Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of design, systems, and materials and be able to apply that comprehension to architectural solutions. In addition, the impact of such decisions on the environment must be well considered.

Realm C: Integrated Architectural Solutions
Graduates from NAAB-accredited programs must be able to demonstrate that they have the ability to synthesize a wide range of variables into an integrated design solution.

Realm D: Professional Practice
Graduates from NAAB-accredited programs must understand business principles for the practice of architecture, including management, advocacy, and the need to act legally, ethically, and critically for the good of the client, society, and the public.

Arch 521 does not meet any SPC