

Phil Bernstein ACSA Distinguished Professor Award

Exhibits

- | | | |
|---|----------|---|
| 1 | Teaching | 1.1 Architectural Practice and Management
1.2 Exploring New Value
1.3 Slavery, Its Legacies, and the Built Environment
1.4 Other Courses |
| 2 | Writing | 2.1 Machine Learning
2.2 Architecture Design Data
2.3 Other Books Published
2.4 AIA Handbook of Professional Practice: Project Delivery Chapters |
| 3 | Research | 3.1 Supply Chain Equity and Modern Slavery
3.2 Project Delivery Trends
3.3 New Models of Integration in Project Delivery |
| 4 | Service | 4.1 YSoA Strategic Plan
4.2 YSoA COVID Operations Plan
4.3 PROPEL Professional Practice Library
4.4 Faculty Data System |
| 5 | Practice | 5.1 Autodesk AEC Headquarters Project
5.2 Autodesk Education Strategy
5.3 Professional Experience |

I began teaching at Yale in 1989 when I was a young project manager in Cesar Pelli's office, a block away from the School of Architecture. Dean Tom Beeby approved my modest proposal for an elective course in basic architectural project management. At that time, there was scant required professional practice curriculum at Yale, much to NAAB's consternation, and when Robert A.M. Stern became dean in 1999, the accreditation team recommended that my elective be converted to the required practice course, which I taught from 1999 until 2021.

final section, we explore the execution of the project, understanding scoping, contracts, risk, compensation, and schedule. The semester concludes with a speculation on the future of the profession. The course is being taught by new faculty now based on this syllabus.

The course established a grounding in basic principles and skills while simultaneously offering a critique of practice norms. It begins with the history and structure of the profession, including its evolution, ethical and legal responsibilities, and then licensing and HSW. It then transitions to platforms of practice, including firm typologies and positioning, and relationships with clients. In the

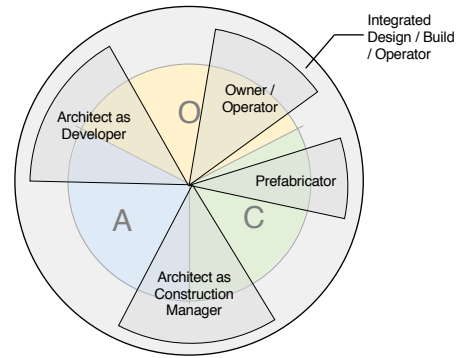
CLASS SESSIONS				ASSIGNMENTS			
	Date	Description	Format	Description	Format	Pts.	Due
PROFESSION							
		Class preparation: experience survey	Survey	A Establish demographics of class	Online survey	5	Sun 9/01
01	Tue 08/31	Introduction: History+Roles Introduction, history of practice, role of the architect in society, professional context.	Lecture	B ANALYZE your reasons for becoming an architect and CREATE future scenario (10 years)	Short essay	5	Sun 09/05
02	Tue 09/07	Legal and Ethical Contexts Practice context: legal issues and ethical obligations of the architect	Vignette workshop/group	C DESCRIBE relevant ethical constraints and ANALYZE typical situations	Online Quiz	5	Sun 09/12
03	Tue 09/14	Health, Safety and Welfare and the Architect's Responsibilities The evolution, structure and nature of building codes and the architect's relationship to their use and implementation	Lecture	NONE			
03x	Tue 09/14	SPECIAL SESSION: AXP/ARE and Licensure NCARB presentation on AXP, the ARE and licensure in Connecticut	Lecture	NONE			
PRACTICE							
	Tue 09/21	Firm Organization and Client Constituencies Client markets and practice approaches; practice structure, organization and purpose.	Watch modules online	D¹ Prior to class watch online lecture.	Canvas video	P/F	Sun 10/17
04		<i>Advanced Studio Travel Week 9/25 - 9/30</i>					
	Tue 10/05	Client - Architect Roundtable A panel discussion of local practitioners who will describe firm origins, operations and strategy.	Panel discussion	D² Demonstrate an understanding of firm structure and market by comparing and contrasting two firms.	Short essay	5	Sun 10/17
05	Tue 10/12	Starting a Firm Opportunities and challenges of starting a new firm.	Panel discussion	E Create a strategy and approach for a firm for team	Group problem set	5	Sun 10/17
		<i>Mid-term Juries 10/18-22</i>					
06	Tue 10/19	Firm Financial Management Business of practice: financial structure, approach, constraints, principles. (Guest = Brian Kenet or other)	Workshop/group	F Understand implications of changing influences of firm financial operations	Problem Set	5	Sun 10/24
PROJECT							
07	Tue 10/26	Scope of Services Project organization, management structure; tasks and services approach, definitions of basic and additional services.	Workshop/group	G Define the basic scope of service for a project by defining its characteristics and your role as the architect	Problem Set	5	Sun 11/07
08	Tue 11/02	Project Delivery Review of basic project delivery approaches and the evolution of delivery models and the architect's role	Lecture	H Unpack the key characteristics of a project and select a delivery model, defend the choice.	Problem Set	5	Sun 11/07
09	Tue 11/02	SPECIAL SESSION: Equitable Practice Equity issues in the architecture profession and the need for greater understanding of ways to improve the architecture community.	Lecture	I Reflect on structural issues in architectural practice with regards to equity, propose solutions	Writing Prompt	5	Sun 11/07
10	Tue 11/09	Contracts and Risk Management Role of contracts in project management strategy; understanding and managing professional risk.	Lecture	J Identify the key risk factors in projects and basic strategies for managing that risk.	Problem Set	5	Sun 11/14
11	Tue 11/16	Fees, Levels of Effort, Compensation How architects are paid: principles of compensation, fee strategy, analysis and typologies, financial implications of value propositions.	Workshop/group	K Define, analyze, propose and defend a fee.	Problem Set	10	Sun 11/21
		<i>Fall Recess 11/20-28</i>					
12	Tue 11/30	The Architect's Role in Construction Roles, responsibilities and risks of the architect during construction; relationship to the builder.	Workshop/group	L Practice response strategies for various challenges faced by architects during construction.	Problem Set	5	Sun 12/12
13	Tue 11/30	Future of Practice / Interim Reviews Speculations on the evolving role of architects, challenges facing the profession and its role in building and design.	Lecture	Final Presented at Lecture 11 (11/12), first review is 12/3, final review TBD.	Group Problem Set	35	TBD
		<i>Final Reviews 12/6 - 10</i>					
		<i>Exam Period 12/13 - 17</i>					
Fin	Week of 12/13	FINAL PROJECT PRESENTATIONS					TBD

ARCH 2031 / Architectural Practice and Management class and assignment schedule.

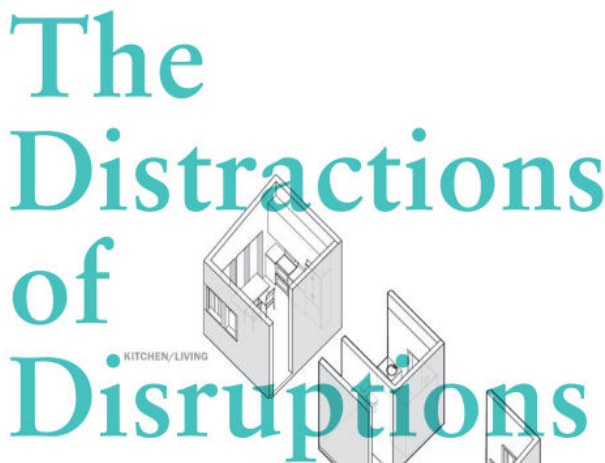
Completion Date: 1999 through 2021
 Collaborators: Lead professor with various young local practitioners as graders and discussion leaders.
 Funding: N/A
 Student Compensation: All student teaching assistant and section leaders are compensated at Yale.

Architects provide tremendous value to society, but the business mechanisms of practice—and particularly the commoditized methods of compensation—fail to convert that value into reasonable risk/reward. This course, first taught in spring of 2017, interrogates the agency of architects in the systems of delivery, and asks students to define new strategies by defining architectural businesses that do not conflate value with fixed or hourly fees.

They must evaluate the competitive position of architects within those systems, present strategies and business plans, and speculate how these proposals might improve the nature and outcomes of practice. I described this course in detail in a 2019 article in Architectural Design (AD) entitled “The Distraction of Disruptions: Technical Supply in an Era of Technical Demand.”



Verticalization Strategies
Integrating A/E/O (11 projects)



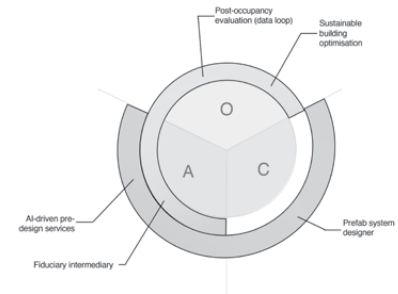
Jennifer Fontenot, Jeremy Jacinth and Brittany Olivari, A+Design, Exploring New Value Propositions for Design Practice, Yale School of Architecture, New Haven, Connecticut, 2017

The A+Design student team proposed a prefabrication strategy based on standard configurations, making the units easy to build, deliver and install.

Architect and Associate Dean at the Yale School of Architecture, **Phil Bernstein** sees a tsunami of change brewing for the architectural profession, conditioned by artificial intelligence, big data, the ubiquitous cloud and robotics. Yet the delivery and procurement of buildings is often inhibited by pre-digital structures of the construction industry. He argues that architects need to rethink their processes from first principles.

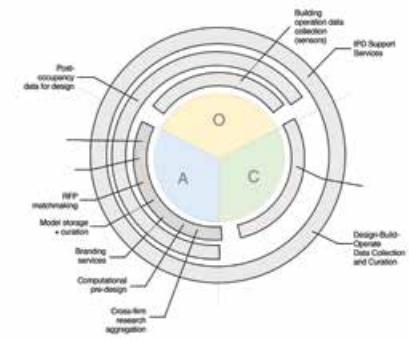
Phil Bernstein, Spanning strategies, Exploring New Value Propositions for Design Practice, Yale School of Architecture, New Haven, Connecticut, 2019

A few ambitious teams took on ideas that connected any two adjacent components of the delivery chain to provide services not usually undertaken in pure design, such as artificial intelligence support for design to construction, or post-occupancy evaluation datasets then sold to architects for reference on subsequent projects.



Phil Bernstein, Augmenting the Delivery Chain, Exploring New Value Propositions for Design Practice, Yale School of Architecture, New Haven, Connecticut, 2019

The majority of projects focused on specific ‘value added’ services to augment the core service provided by architects. Several proposals included multidisciplinary services to provide alternative delivery consulting or data management and coordination.



First page of the Architectural Design article about the course.
Source: Architectural Design (AD): The Disruptors. Sheldon D., Editor. Hoboken, NJ: John S. Wiley & Sons.

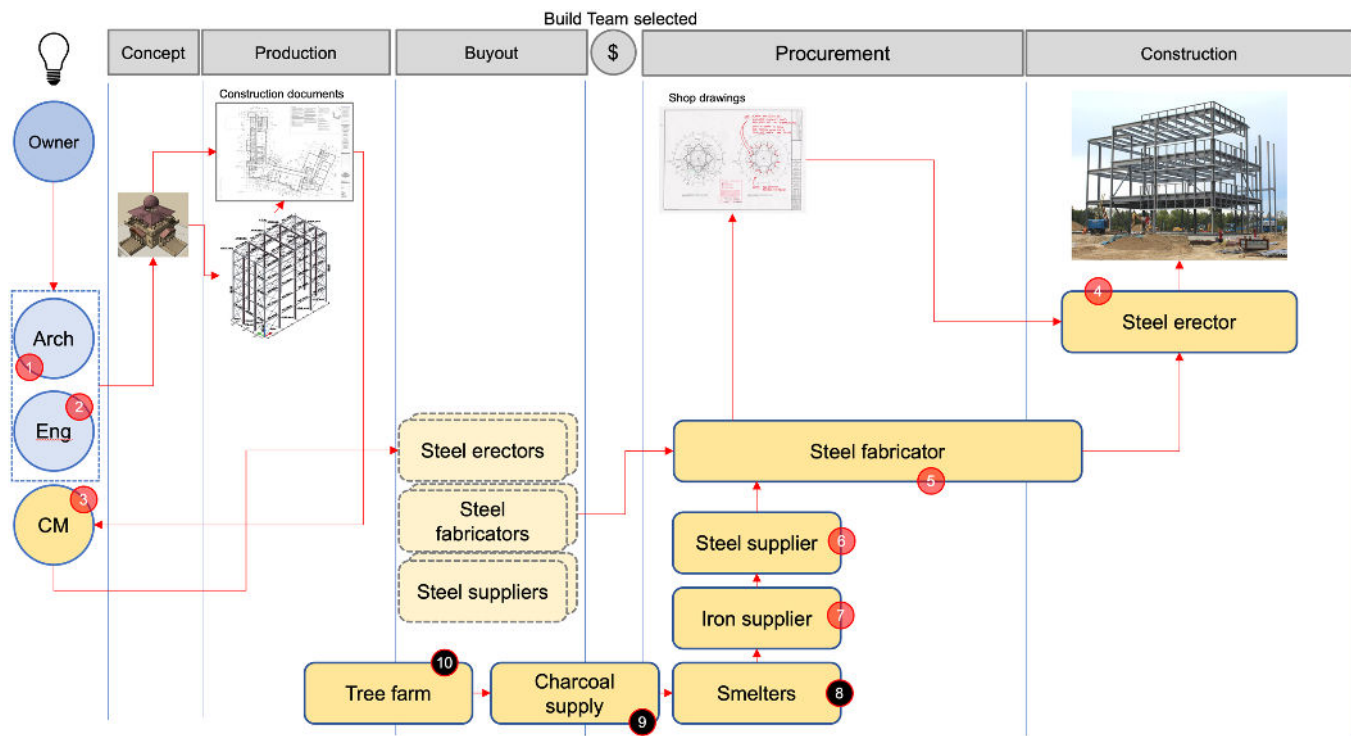
Completion Date:
Collaborators:
Funding:
Student Compensation:

Ongoing
Taught from 2016 - 2018 with Brittany Olivari
N/A
All student teaching assistants and section leaders are compensated at Yale.

In collaboration with Ambassador (Ret.) Luis C. deBaca of the University of Michigan School of Law, taught jointly with Yale Law School and Michigan Law, this course was first taught in fall of 2020 through fall of 2023. Students from both Yale and Michigan in a variety of disciplines (including architecture, planning, law, public policy, management, environment, social work, and art) learn in a conjoined classroom and examine the historical implications of chattel slavery in the United States, design issues of monuments and memorialization, and the presence of slavery in modern construction, on the job site and in the supply chain.

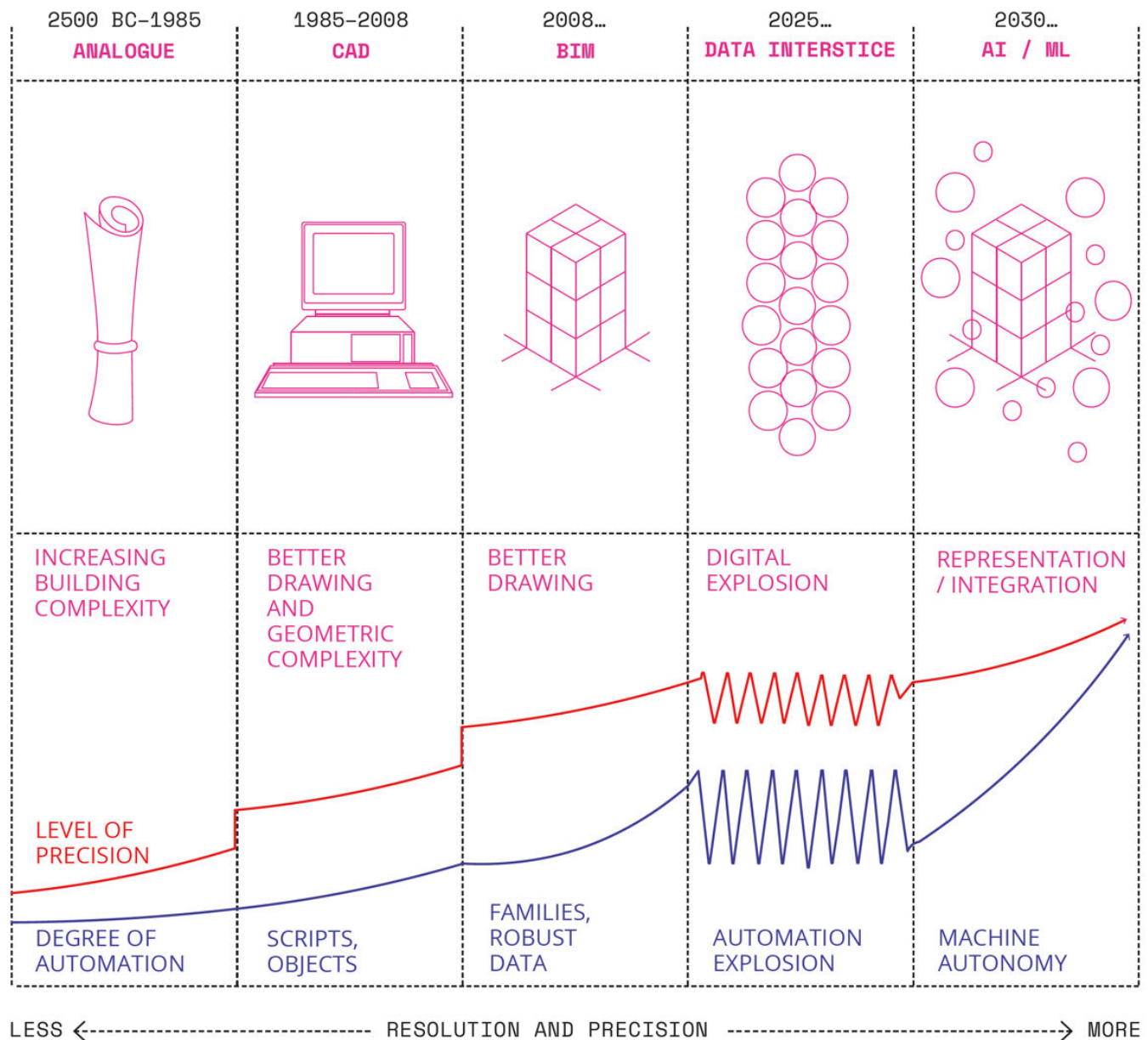
studio examined plantation logics and was taught by Professor Mabel Wilson of Columbia GSAPP. In 2023, the course topic was worker voice, and the subsequent advanced studio was taught by Professors Sara Caples and Everardo Jefferson. The classes were supported by the Law School's Niarchos Foundation, which funds courses for professional students at Yale that focus on social issues, as well as the Problem-Solving Initiative at Michigan Law, designed to apply professional learning to complex problems in a collaborative environment.

The course also preceded a design project that is designed by advanced studio students at Yale in the adjoining spring term; in 2021, this studio was led by Professor Rodney Leon and created a National Slavery Memorial in Washington, DC; in 2022, the



Ten levels of separation between the architect and an enslaved Brazilian worker in the steel supply chain. The students examine this diagram to understand the distance within the supply chain between the architect and design team and an enslaved worker on an iron smelting charcoal farm in Brazil.

In addition to the original **Project Management with Computers** course that was the core of my subsequent required professional practice class, I have offered **Topics in Professional Practice**, a class originally taught by Paul Rudolph in the 1960s that brings experts to campus to discuss aspects of the profession, as well as a history/theory seminar entitled **Artificial Intelligence in Theory and Practice** based on my recent book. That course, taught in collaboration with Samuel Omans, PhD, looks at the history of computation and knowledge and asks students to interrogate the opportunities of next-generation machine learning technologies to augment the capabilities of architects beyond the aesthetics of design.

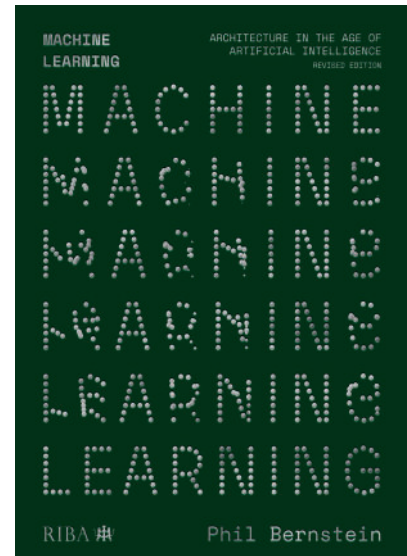


History of technologies, 2500 BC to the future, from *Machine Learning: Architecture in the Age of Artificial Intelligence*, RIBA Publishing, 2025

— DESIGN REPRESENTATION
— DEGREES OF AUTOMATION

Completion Date: Varies
 Collaborators: Current, Sam Omans
 Funding: N/A
 Student Compensation: All student teaching assistant and section leaders are compensated at Yale.

This book investigates the implications for architectural practice of the emergence of intelligent machines and posits that the procedures and processes of architecture will change far more than design or style. It details the evolution of knowledge technologies and their relationship to architecture, speculates on the capabilities of those technologies to replace designers, and offers strategies to help guide the development of artificial intelligence platforms so they can best serve architects and architecture. Published by RIBA Publishing in 2021, it was re-released in a second edition in 2025.



		TECHNOLOGY	AGENCY	DELIVERY	VALUE
FRONT MATERIALS	ACKNOWLEDGEMENTS III				
	FOREWORD V				
	INTRODUCTION FROM 1ST EDITION VI				
PROCESS	INTRODUCTION XII				
	1.1 TOOLS AND TECHNOLOGIES 2	●			
	1.2 WHAT IS ARTIFICIAL INTELLIGENCE (AI)? 15	●		●	
	1.3 PROFESSIONAL INFORMATION AND KNOWLEDGE 25		●	●	●
	1.4 AI AND PROCESS TRANSFORMATION IN DESIGN AND BEYOND 38	●			●
	1.5 SCOPES OF SERVICE 53		●	●	
	1.6 DELIVERY, MEANS AND METHODS 68		●	●	
RELATIONSHIPS	2.1 ECONOMICS, COMPENSATION AND VALUE 84		●		●
	2.2 LAWS, POLICY AND RISK 96		●	●	
	2.3 THE DEMAND FOR PROFESSIONALS 108		●	●	
	2.4 EDUCATION, CERTIFICATION AND TRAINING 120		●	●	
RESULTS	3.1 THE OBJECTIVES OF DESIGN 136		●		●
	3.2 CREATING, CONSUMING AND CURATING DATA 148	●	●	●	
	3.3 TASKS, AUTOMATED 160	●	●	●	
	3.4 LABOUR OF DESIGN 174	●	●	●	
	3.5 VALUE PROPOSITIONS AND BUSINESS MODELS 183	●	●	●	●
CONCLUSION	4.1 EPILOGUE 203	●	●	●	●
END MATERIALS	BIBLIOGRAPHY 207				
	REFERENCES 211				
	INDEX 221				
	IMAGE CREDITS 223				

Table of contents.

Completion Date: 2021
 Collaborators: N/A
 Funding: N/A
 Student Compensation: All student teaching assistant and section leaders are compensated at Yale.

This book, published by Birkhauser in 2019, explores the role of information and analytics in the practice of architecture in the era of Building Information Modeling and suggests that digital tools can change the propositions of practice from commoditized fees to outcome-based results. Written as both a reference guide to practice and a speculation about the ways that technology might shift professional principles, the book attempts to both define the fundamentals of the profession and critique its weaknesses, offering strategies for how digital technologies might fill this gap.



Phases of service

	Feasibility		Concept		Detailed Design		Production Design	Procure	Construction	Close-out	Occupancy	
United States (AIA Standard)	Predesign (PD)		Schematic Design (SD)		Design Development (DD)		Construction Documents (CD)	Bid (PR)	Construction Administration (CA)	Commission (CO)		
United Kingdom (RIBA plan of work)	Strat Def (0)	Brief (1)	Concept (2)		Developed Design (3)		Technical Design (4)	Construction (5)		Hand-over (6)	In Use (7)	
Germany (HAOI)	First Consultation (1)		Preliminary Design (2)		Construct Dwgs (3)	Building Warrant Dwgs (4)	Detailed Building Design (5)		Prep (6)	Tender (7)	Site Inspection (8)	Document (9)
Japan (Japanese Institute of Architects)	<i>Kikaku</i> (Planning)		<i>Kihon Sekkei</i> (Schematic Design)				<i>Jissei Sekkei</i> (Detail Design)		(Reconcile)	<i>Gemba</i> (Construction)		

Comparison of the architect's phases of work across various geographies.

Completion Date:
Collaborators:
Funding:
Student Compensation:

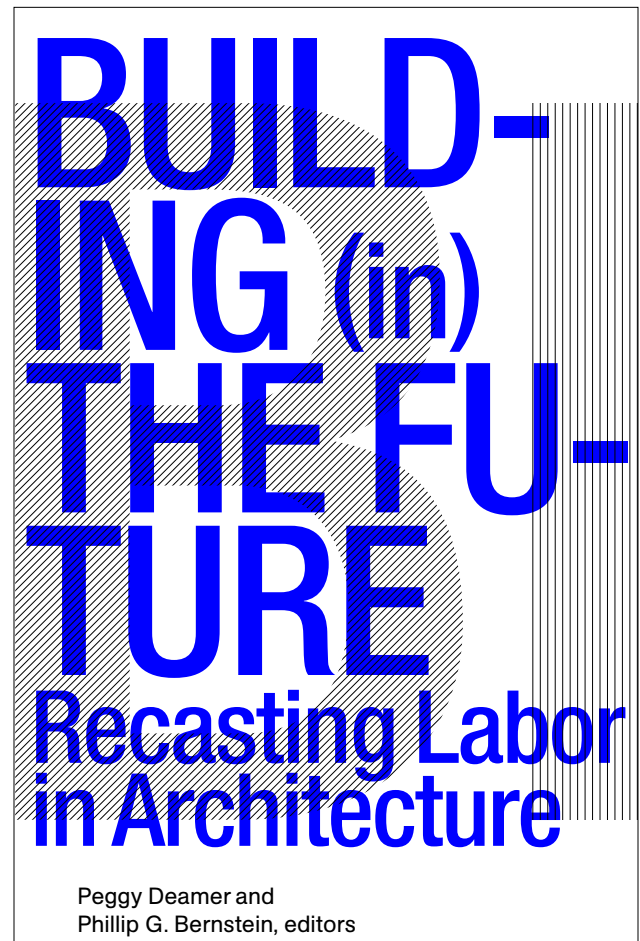
2018
N/A
Supporting subvention from Autodesk, Inc.
All student teaching assistant and section leaders are compensated at Yale.

I have collaborated with other faculty from Yale and other universities on various edited editions, including:

Building (In) the Future: Recasting Labor in Architecture (with Peggy Deamer, Princeton, 2010), a set of essays by architects, historians, and theoreticians exploring the early implications on the work of architects of new representation technologies, particularly building information modeling.

BIM in Academia (with Peggy Deamer, Yale School of Architecture, 2011), based on a Yale symposium that proposed new pedagogical strategies for teaching design and practice in the emergent era of BIM during a time when the profession was just getting its arms around the possibilities of moving from 2D drafting to 3D, data-rich representation.

Goat Rodeo: Practicing Built Environments (Daniel Friedman, editor, Fried Fish Publishing, 2014), with contributed essays by Carol Burns (now at Wentworth), Joe Burns (architect and structural engineer), Renee Cheng (now at Arizona State), Carrie Dossick (University of Washington), Billie Faircloth (now at Cornell), Kiel Moe (now at McGill), Michael Monti (ACSA), and me. In a series of interwoven essays by the contributors on topics ranging from equity, research, and information to technology and collaboration, the book asks the question, “Will there be architects in the next 30 years?”



Completion Date:

Varies

Collaborators:

Co-Authors / Editors as indicated

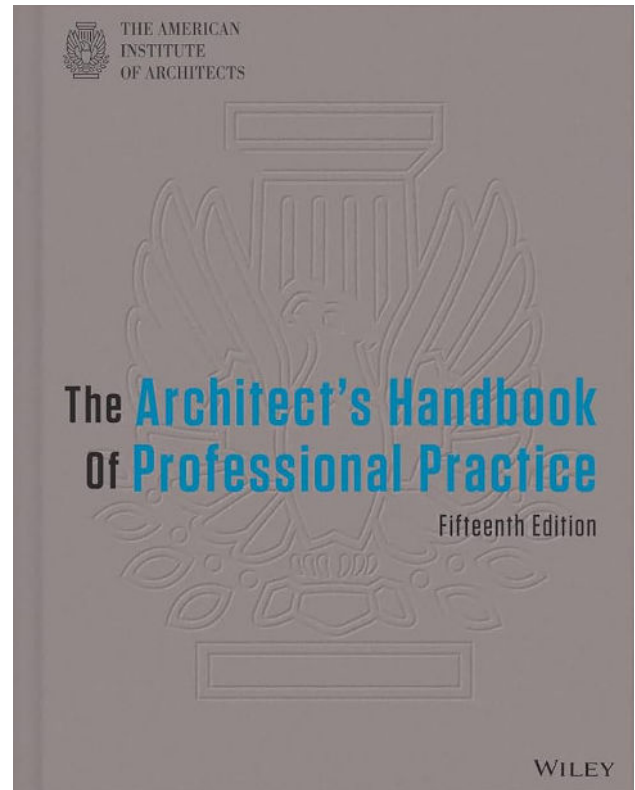
Funding:

N/A

Student Compensation:

All student teaching assistant and section leaders are compensated at Yale.

I wrote the chapters on project delivery for the last three issues of the Handbook and edited the Delivery chapter of the 15th edition. Based on work I began with AIA in 1994, these chapters as a set describe the history of the evolution of project delivery strategies since the turn of the century, standardize terminology, and define the roles and responsibilities of the key players who must work together to deliver projects to clients.



Delivery type	Option	Project delivery phases												
Traditional	Design-bid-build	PD	SD	DD	CD				PR	C	SC	\$	CA	
	Negotiated select team	PD	SD	C	DD	CD			PR	SC	\$	CA		
	Cost plus fixed fee	PD	SD	C	DD	CD			PR	SC	CA			
Construction Management	CM-adviser	CM	PD	SD	DD	CD			PR	SC	\$	CA		
	CM-agent	CM	PD	SD	DD	CD			PR	SC	\$	CA		
	CM-constructor *		CM	PD	SD	DD		\$	CD-Pkg 1	SC	\$	CA		
								GMP		CD-Pkg 2	SC	\$	CA	
									CD-Pkg 3	SC	\$	CA		
Design-Build	Standard	C	SC	\$	PD	SD	DD	CD				CA		
	Bridging	PD	SD	DD			\$	C	SC	CD		CA		

* Delivery shown with fast-track scheduling

Ⓢ Cost of construction determined

ⓐ Constructor contract determined

Ⓢⓐ Subcontractors selected

ⓐⓈ CM selected

PD Predesign

SD Schematic design

DD Design development

CD Contract documentation

BN Bidding/negotiation

CA Construction contract administration

FIGURE 9.3 Sequences and Key Decisions by Project Delivery Method

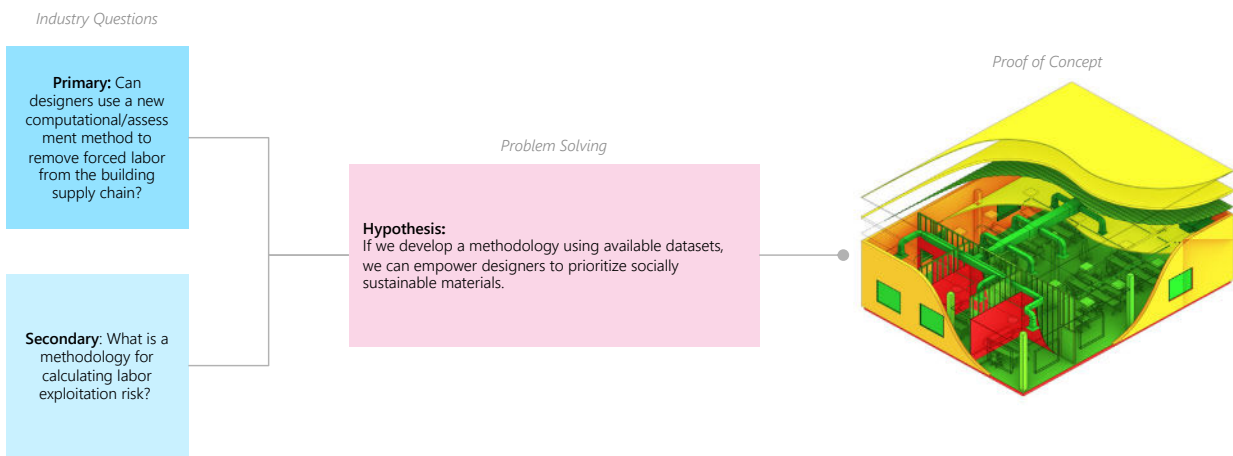
In parallel with the coursework described in Exhibit 13 and supported in part by a research grant from Yale Law School, I am part of a cross-disciplinary collaborative team comprised of researchers from Yale, Michigan Law, Kieran Timberlake Architects, Buro Happold Engineering, and Clemson University that is investigating how designers can evaluate the potential for forced labor in a project during its design. Based on an analysis of sources and uses of primary materials deployed in typical projects, our team has created an analytic engine that examines a bill of materials extracted from a building information model and evaluates the statistical likelihood of forced labor, given the potential origins of those materials at their extraction or manufacturing sites.

originally developed to understand embodied carbon in a building design. We have completed the first phase of our prototype as a proof of concept and are now hoping to expand this research by combining the effort with examinations of economic and delivery systems, legal and policy constraints, supply chain ecology, and worker empowerment strategies.

In 2025, we held the symposium “Supply Chain Equity: Modern Slavery, Architecture and Construction” as a culmination of the first phase of this work.

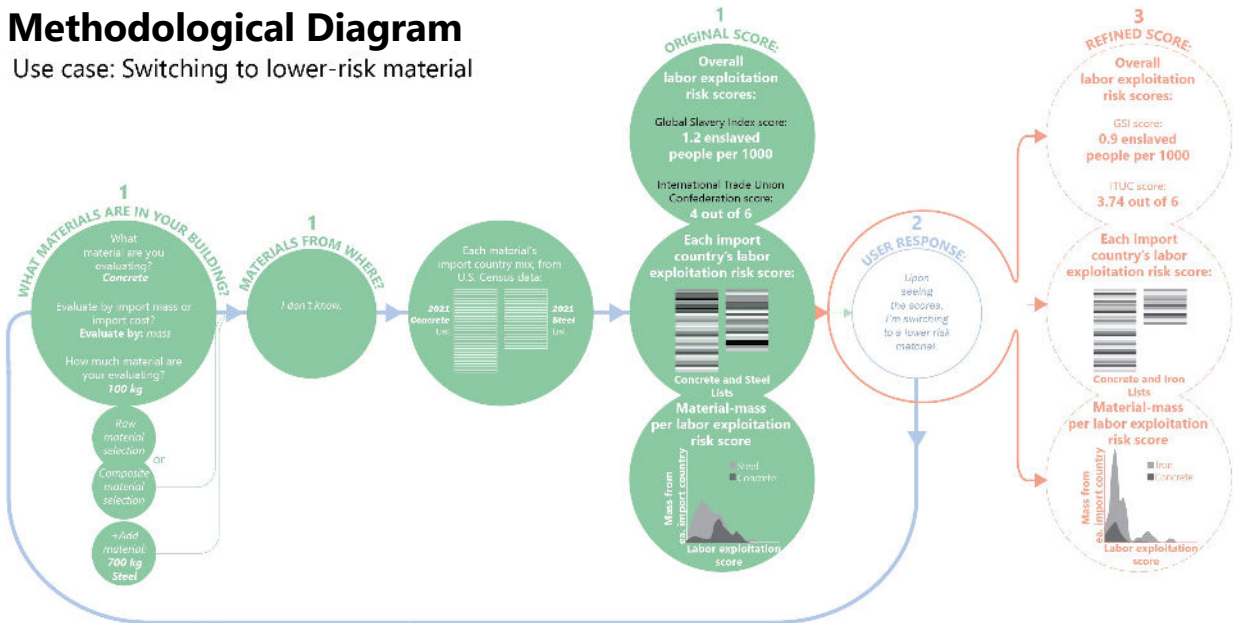
The prototype is built on Buro Happold’s BHOM object modeling and analysis platform and deploys methodologies

Research Study Questions



Methodological Diagram

Use case: Switching to lower-risk material



Completion Date:

Ongoing

Collaborators:

Billie Faircloth, Ryan Welch, Brandon Cuffy, Leslie Louie (Kieran Timberlake); Kayleigh Houde (Buro Happold Engineers), Janelle Schmidt (Yale/Clemson) Niarchos Foundation Grant and pro-bono work by industry partners

Funding:

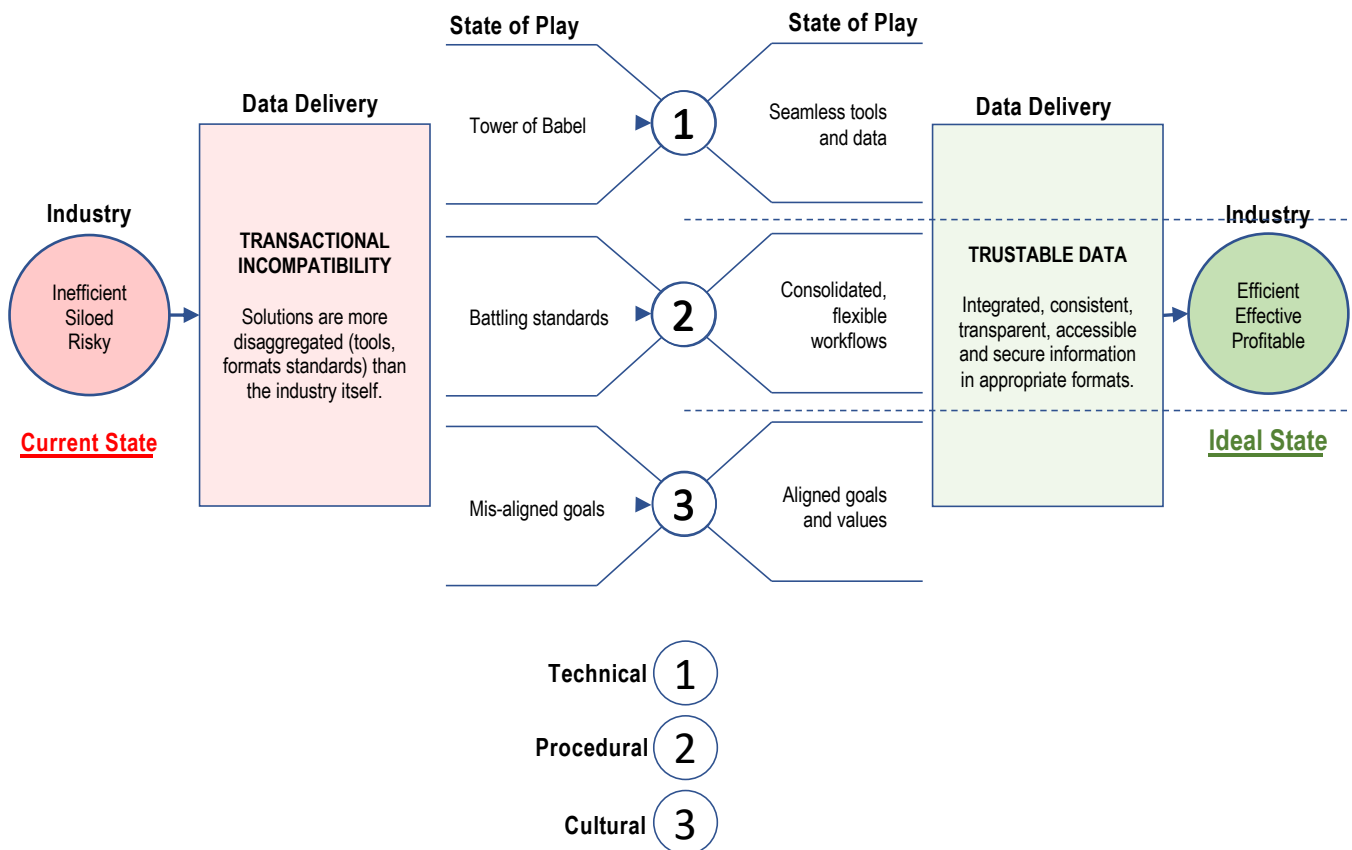
Janelle Schmidt was compensated as our research assistant while a student at Yale and subsequently when teaching at Clemson after graduation.

Student Compensation:

In 2019 and 2020, working with Autodesk and strategic planning consultant Nancy Alexander, I helped coordinate a series of workshops in the U.S. and Europe attended by architects, engineers, builders, and clients intended to understand how digital tools either degrade or enhance the project delivery process.

During these facilitated workshops, attendees explored how their individual work processes and the interrelationships among those processes across the delivery chain have evolved with their use of digital representational, analytic, and collaboration tools, and what strategies might improve these fraught relationships. The work concluded that the ability to locate and trust information was the key inhibitor to improving processes, but that this improvement had to be a product of a combination of technical, procedural, and cultural efforts across the building industry.

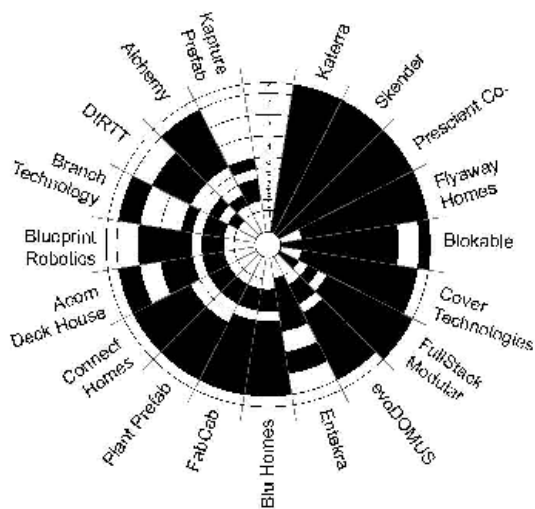
CONCLUSION: Information is a vector for trust. It is necessary to align goals, risk objectives and, ultimately value delivered to projects. Therefore, information systems that support project delivery must achieve these ends to engender team, firm, project and industry success.



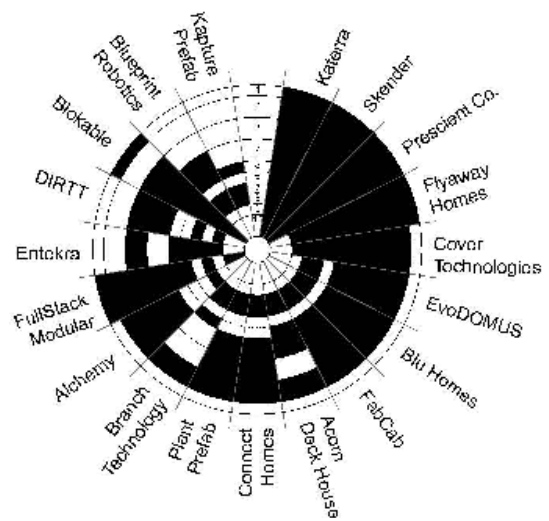
Delivery model transformation.

Over the past fifteen years, innovations in project delivery have largely been considered “top down,” as new typologies based on integrated project delivery (IPD) evolve. Working with Dean Renée Cheng, FAIA, then at the University of Washington, and Markku Allison, AIA, then at Chandos Construction in Canada, this project hypothesized that there was a similar “bottom up” innovation strategy embraced by individual contributors to the supply chain who choose to cross one or more of the traditional siloed boundaries that separate capital investment through operation. We developed a taxonomy of such activities and examined the public records of twenty companies to discern patterns in their business strategies and models that might indicate a trend. We analyzed firms ranging from the ambitious Katerra to much smaller start-ups like Acorn Deck House, concluding that most operate at the intersection of design and construction and are heavily focused on various aspects of residential construction.

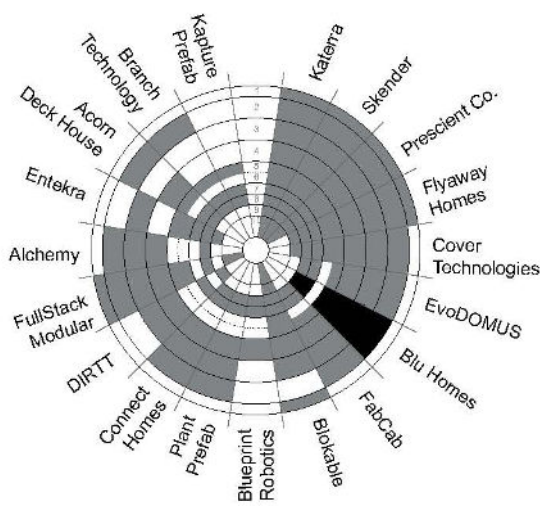
- RING TYPE WIDTH
- 1 - Capital (1)
 - 2 - Design (2)
 - 3 - Construction Management (2)
 - 4 - Component Fabrication (2)
 - 5 - Supply Chain x1 (1)
(dotted line)
 - 6 - Supply Chain x2 (1)
 - 7- Procurement (1)
 - 8 - Transportation (1)
 - 9 - Inspection (1)
 - 10 - Facilities Management (2)



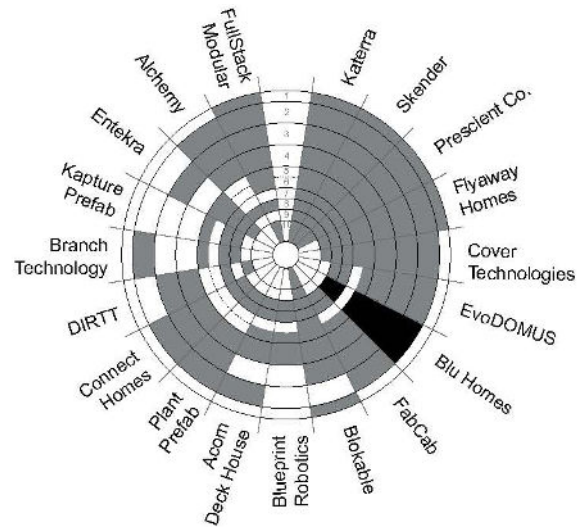
All companies: Greatest Degree of Full Integration



All companies: Greatest Degree of Design Involvement



Blu Homes: Degree of CM and Fabrication



Blu Homes: Degree of Procurement

Completion Date: N/A
 Collaborators: Renee Cheng, University of Washington
 Funding: N/A
 Student Compensation: Janelle Schmidt was compensated as our research assistant while a student at Yale.

I joined Dean Deborah Berke as Associate Dean at Yale in 2017, after the eighteen-year administration of Robert Stern. His team left our school in excellent financial and curricular shape but in need of streamlining and organizational optimization. I've undertaken a series of projects designed to make school operations more efficient and automated, our budget priorities clear for the University administration, and our staff responsibilities more collaborative and distributed.

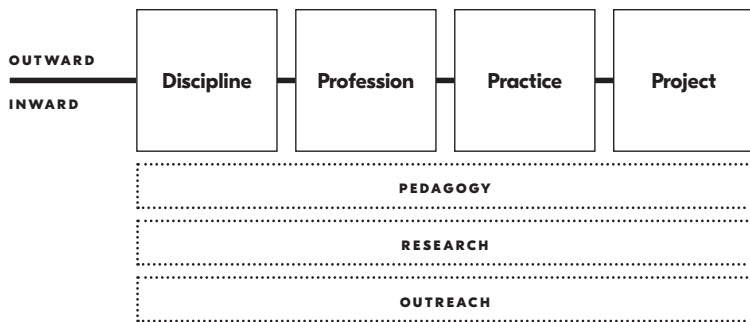
In 2018, with the help of a consultant, we evaluated the School's priorities and set a template for planning and budgeting both internally and with the larger University. As far as we know, this was the first such plan prepared in the history of the School and represented the first time the faculty had worked collectively on a single project beyond normal operations in decades. The resulting nine-page document has guided our work and focused our priorities;

it was updated in both 2021 and 2024 to reflect our progress and refocus our remaining goals.

Guiding Frameworks

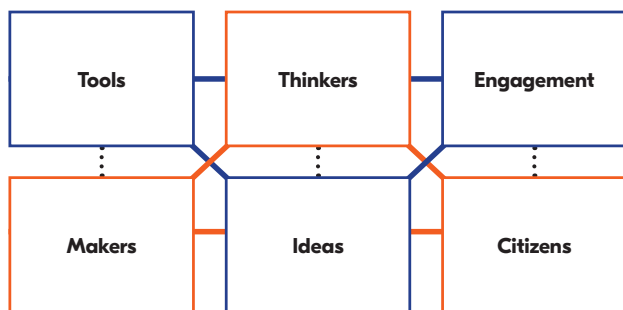
I.

The work of the Yale School of Architecture ranges across the entire spectrum of architecture, from the broadest questions of the discipline to the particulars of project design, founded on pedagogy, research, and outreach.



II.

We encourage each student to undertake the essential roles that comprise the architect's identity.



Goals

Pedagogy and Program

Curriculum, research, diversity, technology, coordination, lectures, exhibitions, publications

Offer an integrated curriculum and programming that respond to the needs and conditions of building in the 21st century.

Students

Funding, diversity, research, recruitment, experience, quality, admissions, success, employment

Attract and support a diverse community of creative intellectuals who will be prepared to lead and influence the future of the discipline.

Faculty

Structure, recruitment, hiring, assessment, contracts, retention, development, research, promotion & tenure

Attract, support, and develop a diverse body of leading architectural educators.

External Engagement

Positioning, leadership, influence, community involvement, service, alumni relations

Engage fully with and lead in communities and issues beyond the school, in the field, the university, and the wider world.

Institutional Resources

Staffing, technology, facilities, administration, funding, donor cultivation and stewardship, funding sources, case statement/ reasons to give

Provide the operational infrastructure and funding necessary to support the school's mission.

Culture

Climate, workload, diversity, engagement, leadership & collaboration, assessment, evaluations, discourse

Model a culture that sets the standard for contemporary architectural education, practice, and research.

By early summer of 2020, with our building closed entirely to student activity for the last half of the previous semester, I joined a Provostial committee tasked with determining how teaching could proceed in the fall in the Schools of Architecture, Art, Drama, and Music. Our Provost, an accomplished molecular biologist, insisted that labs on campus remain open during the pandemic, and we convinced him that studios, stages, and practice rooms were the equivalent laboratories of the schools of the arts.

approach that allowed us to keep studios and at least one hybrid classroom, which we constructed in our Exhibition Gallery, open during the 2020/2021 academic year. We then provided similar space planning services to other schools at Yale. To our knowledge, we were the only school (among our peers Harvard, Princeton, MIT, and Columbia) to give students studio access during the height of the pandemic. To our knowledge, there were only two confirmed COVID cases among students using our facilities.

I formed a team with Apicella + Bunton Architects (a local firm with principals who attended Yale and knew the building well) and Altieri Engineers (the MEP engineers of record on the extensive renovations and addition to Rudolph Hall in 2008) to create an operational plan with extensive spatial and mechanical evaluation of our challenging, all-concrete, multi-level building. It proposed an

SPACE PLANNING FOR REOPENING

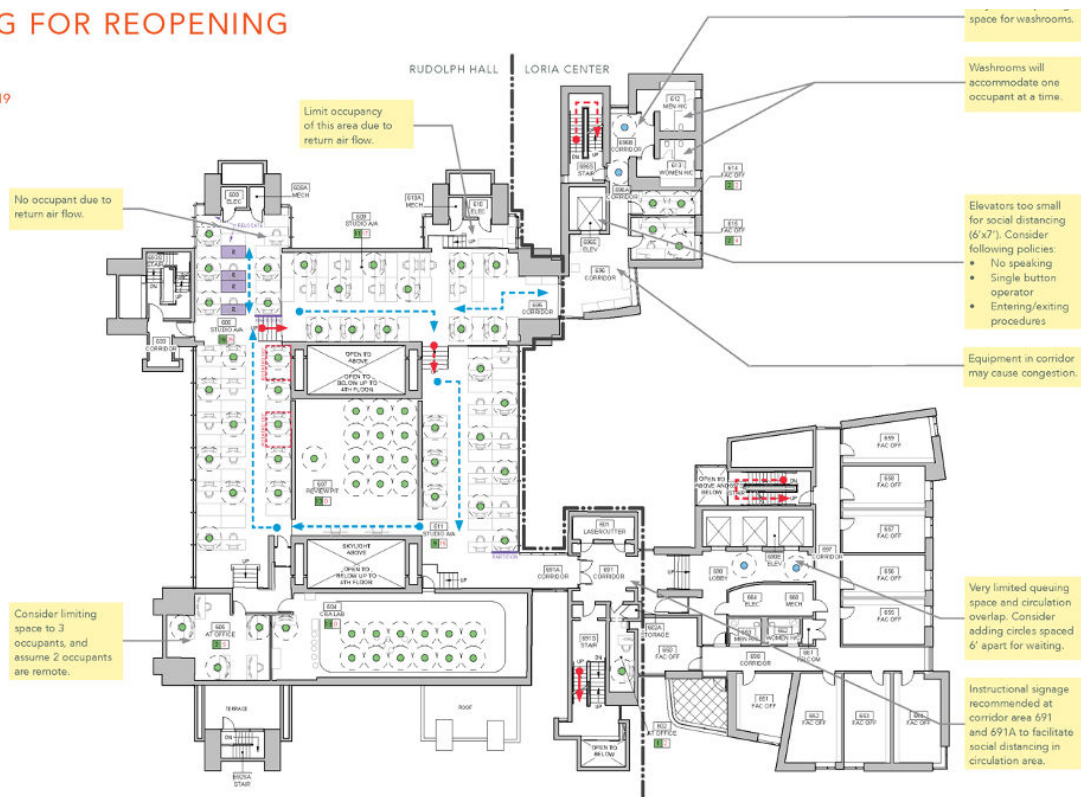
LEVEL 6

Occupancy	(Pre)	Post-COVID-19
Studio*	(57)	36
Seminar	(0)	13

* Includes studio desks only

DRAWING LEGEND

- Up only (primary circulation)
- Down only (primary circulation)
- Bi-directional (Secondary circulation)
- One way (Secondary circulation)
- Proposed partition (face level)
- Remove furniture
- Furniture rotated 180°
- Stationary occupant with 6' social distancing (included in occupancy counts)
- Transitory occupant with 6' social distancing (not included in occupancy counts)
- Room tag with post & pre occupancy

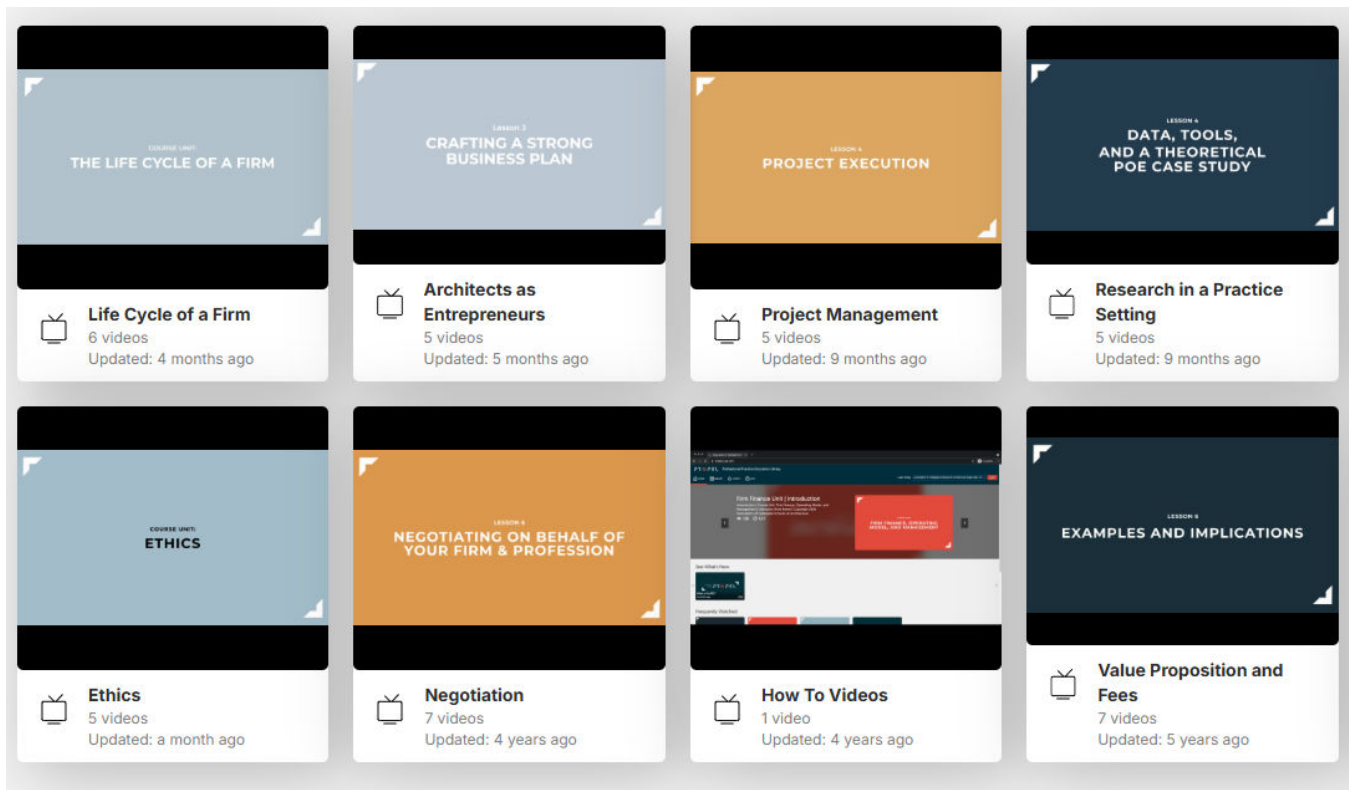


Space analysis and planning of a typical studio floor. (Source: Apicella + Bunton Architects)

In collaboration with Dean Cheng and Beth Lundell Garver of the Boston Architectural College, and with financial and advisory support from both ACSA and NCARB, I helped formulate the PROPEL professional practice teaching library designed to provide extensive, high-quality content on issues of professional practice to architecture schools in the United States.

Observing that it is often difficult for professional practice instructors to access current knowledge about topics as wide-ranging as strategic planning, fee analysis, or financial management, we enlisted experts to create a series of short video modules. ACSA and NCARB provided critical start-up financing, project management, and invaluable advice as we have built the library, which we hope ultimately will contain content on as many as sixty topics. Current topics also include Ethics, Negotiation, Value Propositions, and Fees, with many others planned.

ProPEL is a growing library of educational video resources covering foundational and emerging topics in architecture. Developed in partnership between ACSA and NCARB, the goal of ProPEL is to expand your teaching resources to help you better equip your students for the future of architectural practice.



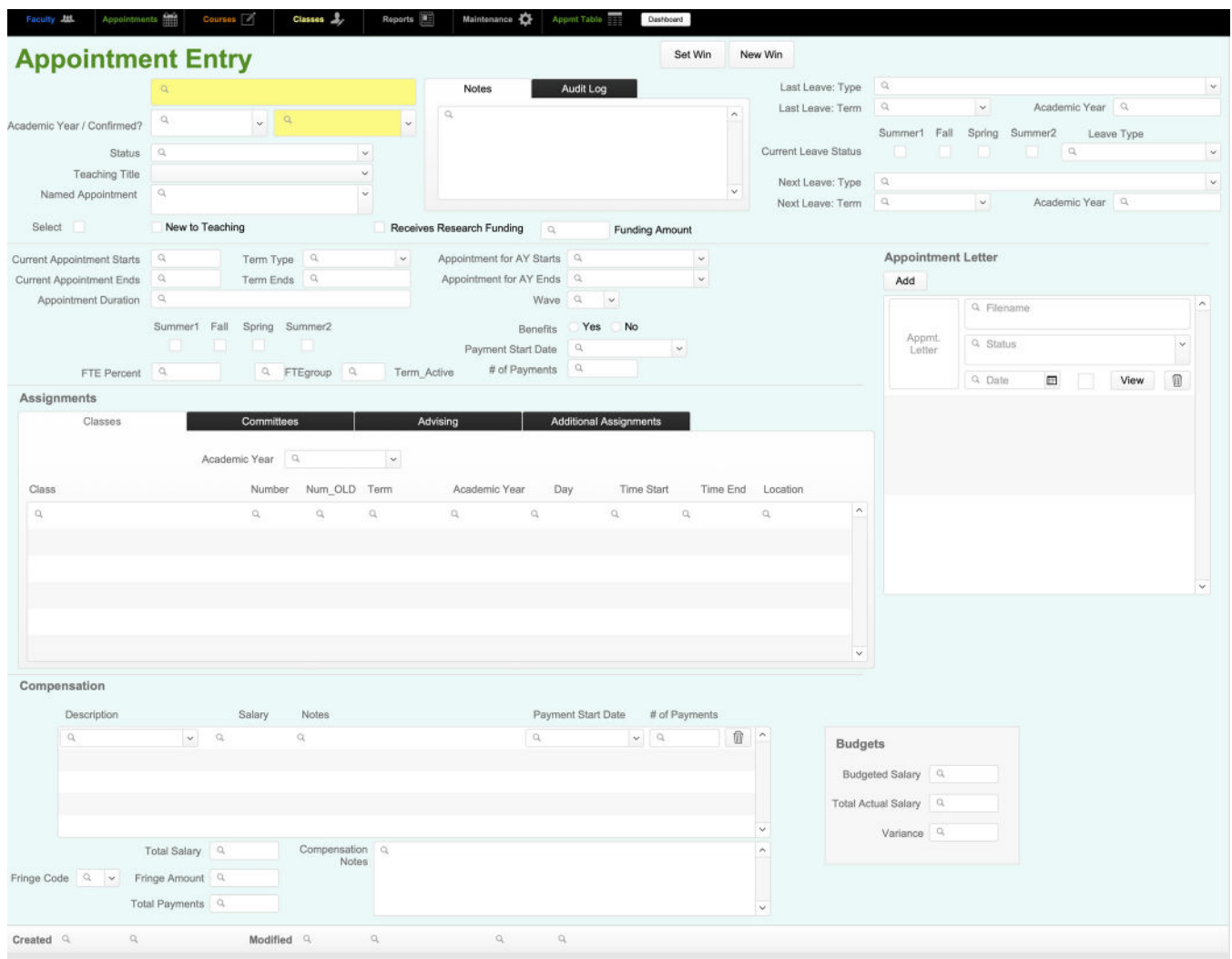
Selection of the modules in the PROPEL.

Completion Date:	Ongoing
Collaborators:	N/A
Funding:	Original work was by Renee Cheng, Beth and me; subsequent funding by ASCA and NCARB
Student Compensation:	Student interns / graphic designers were paid by Yale, UW, and BAC

One of the most important changes we have implemented since 2018 is the automation of various recurring functions here at YSoA that in the past were managed either manually or, at best, via spreadsheets. Yale operates as a series of mostly autonomous silos in both curriculum and administration, so there were no platforms offered for critical functions like course registration, assignment of teaching assistants, or even coordinated faculty data. I was able to use my previous experience in the software industry to manage projects that automated all of these systems and eliminated their Excel-based counterparts.

provide support to class sections to fully tenured professors. Our system collects information about the curriculum, the faculty, and the connection between the two—their yearly appointments—in a coordinated fashion, allowing us to efficiently generate appointment contracts, assign courses, produce accreditation reporting, and manage the faculty budget. During the pandemic, we hired a group of students who input the faculty and curriculum data back to the 1940s, giving us a fairly complete history of all teaching in the School since that time.

The most critical (and complex) of these projects is our faculty data system. Even though we are a relatively small school, we manage four degree programs, two undergraduate majors, and more than 150 faculty each year whose appointments range from instructors who



Faculty appointment data screen for a given academic year.

Completion Date: Ongoing
 Collaborators: N/A
 Funding: N/A
 Student Compensation: N/A

5.1 Autodesk AEC Headquarters Project

In 2007, during my time at Autodesk, the headquarters of the Architecture/Engineering/Construction (AEC) business unit was being evicted from space we leased in Waltham, Massachusetts. At that time, there was much discussion in the industry about the possibilities of a new project delivery typology, Integrated Project Delivery (IPD), made possible by the information transparency offered to a team by BIM. We decided that our new headquarters project, comprised of approximately 55,000 square feet of leased space in a new office building in Waltham, would be a perfect opportunity to demonstrate the possibilities of this combination and experiment with IPD directly. An IPD team comprised of Kling/Stubbins Architects (now part of Jacobs) and Tocci Builders was hired under an IPD arrangement to deliver the project, and I acted as executive sponsor and key client contact. The project was completed in approximately eight months from contract signing to

occupancy, on budget, and LEED certified, and was one of the first “pure IPD” projects in the United States. It won a variety of awards, including Architectural Record’s “Better Business by Design” and Interior Design’s “Best of Year” award in the sustainability category.

In 2009, Amy Edmondson, Harvard Business School’s Novartis Professor of Leadership and Management, led a team that documented the project and explored the implications of the IPD model and BIM. The first page of this case appears on the following page.



Trapelo Road AEC Headquarters (ESTO photos)

Completion Date:
Collaborators:
Funding:
Student Compensation:

April 2007
Autodesk leadership staff, Kling Stubbins Architects, and Tocci Builders
Project funded by Autodesk
N/A



AMY C. EDMONDSON

FAAIZA RASHID

Integrated Project Delivery at Autodesk, Inc. (A)

In May 2008, Phil Bernstein, VP of building industry strategy and relations at Autodesk, reviewed the design progress of Autodesk's future Architecture, Engineering, and Construction (AEC) Solutions Group headquarters. Bernstein, an architect himself, was not entirely satisfied. Concerned that "the AEC headquarters of the world's largest design software company would look like an insurance company," Bernstein thought the design needed a unique architectural feature to reflect the mission of AEC Solutions Group—creating technology solutions and design tools for the building industry. He proposed to the project team a three-story atrium¹ to create a spectacular entry space.

Logistically, however, this was not a good time to make changes to the design. After working together for weeks, the project team had developed the design concept and strategy and was anxious to move on to developing specific design details. Inserting an atrium into the design meant a change in work sequencing, cost, and schedule for a project on an aggressive delivery timeline of eight months, a tight budget of \$10.2 million and using an unconventional delivery process called Integrated Project Delivery (IPD). Under IPD, the project's architect, builder, and client/owner (Autodesk) had entered a contractual agreement to share all project risks and profits.

The question everyone had to answer was whether it made sense to include an atrium at this stage of the project. Bernstein recognized that the headquarters would be AEC Solutions Group's home—a place where Autodesk would create design software for the building industry and host its design-savvy customers. The project's architect and builder had to decide whether accommodating the atrium into the current schedule and work sequencing was an acceptable risk.

Autodesk, Inc.

In 2008, Autodesk was the world's largest design software company. With nine million licensed users and annual revenues of roughly \$2 billion,² Autodesk offered about one hundred 2-D and 3-D design software products enabling users to simulate, visualize, and analyze during design. Accompanied by the phrase, "Experience it before it's real," Autodesk's products spanned 106 countries, 18 languages, and a wide range of industries including building design and construction,

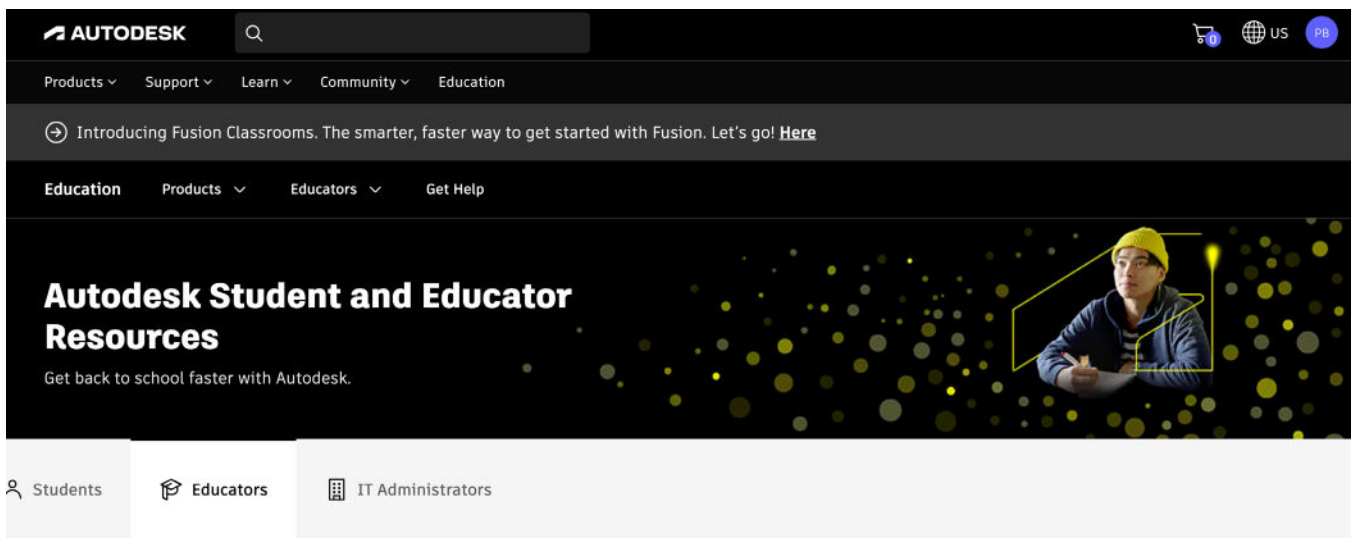
¹ An atrium, usually located at building entrance, is a vertical open space connecting various floors within a building.

² Revenues, via Hoover's, Inc., www.hoovers.com, accessed June 2009.

Professor Amy C. Edmondson and Doctoral Student Faaiza Rashid prepared this case. Thanks to Research Associate Susan G. Thyne for her insights and assistance. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Copyright © 2009 President and Fellows of Harvard College. To order copies or request permission to reproduce materials, call 1-800-545-7685, write Harvard Business School Publishing, Boston, MA 02163, or go to www.hbsp.harvard.edu/educators. This publication may not be digitized, photocopied, or otherwise reproduced, posted, or transmitted, without the permission of Harvard Business School.

As the senior architect on the Autodesk leadership team, I was deeply involved in the development of the company’s education strategy, which included research partnerships with various universities, including Stanford, Yale, and Carnegie Mellon, as well as the business strategy for the education business. The plan included components for setting up an online community of students and generating teaching and learning support for instructors. Most critically, it provided students with Autodesk software, including key tools like Revit, AutoCAD, 3D Studio Max, Inventor, and Fusion 360—core tools used by the AEC, manufacturing, and media and entertainment industries—at no cost. Autodesk software continues to be offered to architecture schools worldwide for free, a decision that reduced the company’s revenue in the years following by over \$100 million but was seen as a key contributor to the use and understanding of technology in the world’s schools.



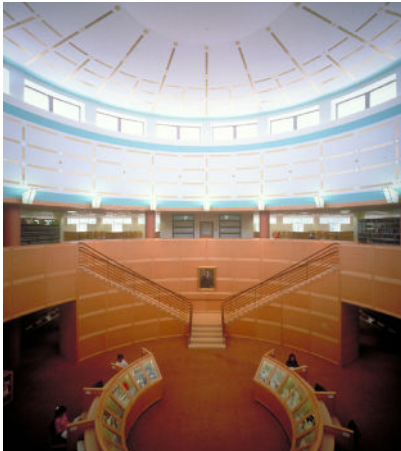
Free Autodesk education access for educators

It’s now easier than ever to get started with Autodesk. Our step-by-step guides save you time and minimize complexity – so you can spend less time setting up and more time teaching.

<p>OPTION ONE</p> <p>Request or renew access</p> <p>Sign up by choosing the product and plan you need, and providing a school-issued email address for verification.</p> <p>Select product</p>	<p>OPTION TWO</p> <p>Access existing account</p> <p>Check your school-provided email inbox for an invitation from Autodesk. Or try signing in with your school-provided email address.</p> <p>Sign in</p>	<p>RESOURCES</p> <p>Classroom management guide</p> <p>Learn more about how to assign products and seats to your students.</p> <p>View guide</p>
---	--	--

5.3 Professional Experience

I have almost twenty years of full-time practice experience, including work as Design Manager and Associate Principal in the office of Cesar Pelli & Associates (now Pelli Clarke + Partners) on the following projects.



Project Title: Worrell Center for Law and Business
Location: Wake Forest University Winston-Salem, North Carolina
Completion Date: 1992
Collaborators: Robert Taylor, Design Team Leader
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects



Project Title: North Terminal, Reagan National Airport
Location: Washington, DC
Completion Date: 1997
Collaborators: Mark Shoemaker and Tony Markese, Design Team Leaders
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects



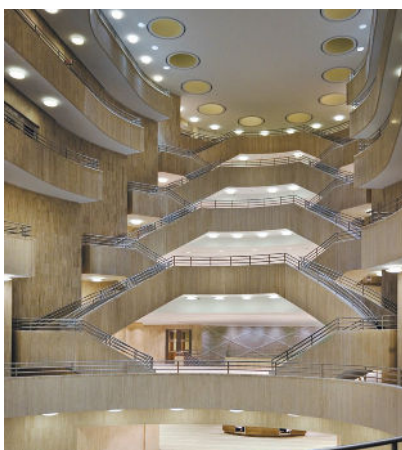
Project Title: William Lanman Jr. Center and Payne Whitney Gymnasium
Location: Yale University, New Haven, CT
Completion Date: 1999
Collaborators: Rafael Pelli and David Chen, Design Team Leaders
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects



Project Title: Gonda Practice Integration Building at the Mayo Clinic
Location: Rochester, Minnesota
Completion Date: 2001
Collaborators: Mark Shoemaker, Design Team Leader
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects
Image Source: Wolterke at <https://depositphotos.com/63835385/stock-photo-the-mayo-clinic-entrance-and.html>



Project Title: 30 Hudson Street, Goldman Sachs Tower
Location: Jersey City, New Jersey
Completion Date: 2003
Collaborators: Gregg Jones and Keith Krolak, Design Team Leaders
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects



Project Title: Theodore Roosevelt Federal Courthouse
Location: Brooklyn, NY
Completion Date: 2006
Collaborators: Rafael Pelli, Mariko Masuoka, and Mihaly Turbucz, Design Team Leaders
Funding: N/A
Student Compensation: All Student Interns at Pelli's office paid hourly (including overtime) on all projects
Image Source: Beyond My Ken at https://commons.wikimedia.org/wiki/File:Federal_Courthouse_Brooklyn.