

Closing Loops
Cross-Discipline Research:
Wicked Problems and Valued Futures

DesignIntelligence®
Quarterly



RENEE CHENG

Dean of the College of Built Environments at the University of Washington

Renée Cheng was recently named dean of the College of Built Environments at the University of Washington. She spoke with DesignIntelligence about AEC industry challenges, research adoption, knowledge loops, transdisciplinary work, and possible dystopian and utopian futures facing professionals.

DesignIntelligence (DI): What differences have you seen from a cultural, resource, institutional, or regional perspective compared to your former life?

Renée Cheng (RC): Great things were happening at the University of Minnesota — in particular, the research efforts through the Master of Science and Research Practice program but I saw an opportunity to expand that at University of Washington's College of Built Environments. I'm in position now to be working across disciplines focused around the built environments.

It's rare in our world to have these disciplines — architecture, landscape architecture, urban design planning, real estate and construction management — in one college. Often, construction management is found in the engineering school, real estate might be in the business school. That's not to say you can't collaborate across boundaries. But having all the disciplines in one college about the built environments helps.

One lens I'm using as I transition here is understanding how a research-based set of degree programs working with a



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multi-disciplinary set of firms in the Puget Sound, or the Pacific Northwest region, differs from my previous setting, which was predominantly architecture-focused. Here, we can tap students from a wider range of disciplines and cross over to have a construction management student working for an architecture firm, or a landscape architecture student working for a planning firm, et cetera. You can cross-link students and firms to create different opportunities.

Working with the other UW deans has been fantastic. We have a group of 21 deans and chancellors at the university. Quite a number of us are new, and the culture is actively trying to explore and collaborate. We are all sharing ideas and asking questions around higher education and the wicked problems that face our region and planet. Seattle, in particular, has urgent challenges due to the speed of the growth and eco-

nommic activity here. It's a great laboratory.

DI: What are architects and designers missing by continuing to practice traditionally, without research as an integral part of their process? What limits and roadblocks constrain that evolution? And what is the cost of not moving in that direction?

RC: It's broader than just designers, it's the whole AEC industry. I use the CIFE/Paul Teicholz industry productivity graph from the Bureau of Labor Statistics that shows industry productivity. On a global scale, all industries since 1964 have more than doubled in productivity, but the AEC industry is flat or declining. The industry has, for a very long time, not been able to take advantage of innovation, globalization or the different goals other industries have used to increase effectiveness. There has long been a sense that



architects are willing to work for low fees because they love design — that, for them, it's not about the money. I don't disagree with that, but as we increasingly rely on our ability to advise clients based on our own proprietary knowledge and experience, we are trading only on our reputations — asking them to trust that we have the expertise simply based on past projects. We are missing the opportunity to explain or expand our value, and so we end up competing on fees alone.

DI: Our historic aversion to talk about these issues has, as an unintended consequence, put us precisely in the place where fees have been commoditized. That strategy has had unintended consequences.

RC: We have self-created this low value proposition for our work as designers

in an industry that is not highly functional. When an owner sees projects chronically not meeting budget and schedule goals, not having clear design outcomes met relative to their business goals, they are skeptical about designers. Contractors can point to errors and omissions in the drawings to show why costs are rising. We end up with an antagonistic set of circumstances and relationships, and designers' credibility — the value we provide — are largely going to be based on our fees and the type of service.

What if we could start to promote our ability to provide services that have specific value maybe its saving on the energy bill or the functioning of the buildings we produce? What if architects could become willing and confident enough to base their services and fees on performance — not just energy performance, but potentially the

success of the business outcomes relative to the owner's goals when they build the building? In that case, architects can potentially take a small percentage of the personnel savings or the productivity gains, or other kinds of business outcomes the building design has ties to.

This is a completely different value proposition — and it takes research. No architect or designer would feel confident tying fees to client outcomes unless they have reliable research. The Landscape Architecture Foundation has great case studies on landscape performance that includes health and business objectives. It talks about storm water savings to infrastructure and tree cover related to school test scores.

DI: Can you characterize research penetration in the built environment? On a scale of one to 100, where do you

VALUE PROPOSITION

think we are?

RC: I would hope to be at 100, yet I think we're probably at an eight. In healthcare, we're maybe at 15. In sustainable aspects, we're maybe at a 20. In the productivity and human factors, we're at a two.

We can get better incrementally, but more than that I hope we are able to make leaps through partnering with other disciplines, finding funding beyond current margins. The National Science Foundation really moved the needle with its funding for Smart and Connected Communities programs. Once you get larger federal programs and international work, we start to see noticeable differences. Otherwise, at the current pace, if we rely only on private funding by firms, we won't get there.

DI: How do we get this to stick? How

do we get traditional practitioners motivated – those who don't have a top-down directive to adopt a research mindset?

RC: I don't think it's a motivation problem. I think there are a ton of firms that would love to do research, but they just don't have the financial model to do it. It's a struggle to figure out where research fits in the current business model, because it's not purely marketing, and it's often not directly billable. Some firms might be aware of the R&D tax credit, but that depends on whether they are set up to take advantage of that, where they can do a direct write-off of the hours that go into sustainable design research. Moreover, not every firm qualifies based on their business structure. We need funding to be able to support and recruit students, get the faculty involved, do the matching process. Some firms are more able to figure out

how to do that, and it tends to be the larger firms that have the margins or have traditionally set aside money for different types of things this could fall under.

DI: Is it a chicken and egg question? Fixing the value proposition or getting paid in a different way to fund it versus activating research first?

RC: It's definitely chicken and egg. You have to be able to say research works, and to have the expertise and methodology to do it. You have to show the value not just of the research in general, but also say, "We have found that pre- and post-occupancy comparisons yield much better satisfaction and allows different effectiveness. Here's the story of how we picked up on some things we wouldn't have noticed if we hadn't done this methodology. We build this cost into our pre-programming services, and you'll get a report

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that measures these things.” I’m working with students to structure their research in such a way to show the value in ways that are applicable to other projects in the future. Then, they can start to build in research aspects of the work into the fee because it’s increasing overall value.

Moreover, the approach needs to be cross-disciplinary. Start to fold in the planners who are a part of earlier pre-design decisions. Look at the contractors, the developers and landscape architects to draw a larger boundary around possible benefits and values.

Serial owners are likely to see more benefit because if you do research on Project One, you likely won’t see the benefit on Project One. The benefit might accrue to Project Two, Three, or Four. KieranTimberlake is a great example, particularly their green roofs

or smart facades, which took place over a series of projects. They used a series of projects to understand the micro-climates within a green roof or the potential for the printed circuitry for smart skins.

DI: What’s your stance on incremental change for firms and organizations? Since we’re facing wicked problems, does it have to be radical, transformative, on a bigger scale, or is it okay to chip away at it?

RC: James Timberlake said, “Massive change is only accomplished through small incremental steps.” We can’t always take the long shots. We also have to have some low-hanging fruit that provides success, not only because it gets discouraging to try to solve enormous problems where it’s hard to measure any progress, but also because you need some incremental sub-goals within a large framework. Incremental

change is needed, especially if it has intentionally built in structural and cultural change. Yet if you focus only on incremental change, you feel like you're making progress, but you might be taking one step forward, two steps back. You won't know unless you have clear, transformative goals to track against.

DI: As you look to your transdisciplinary work on bigger issues, what does the profession look like in 10 years?

RC: When I imagine the future, there are dystopian and utopian versions. The dystopic future scenario came from the "Change or Perish" speech Thom Mayne gave years ago. He envisioned a future where architects become exterior designers — cake decorators. They create the composition of the façade, and everything else is handled by contractors or building-owner representatives. Now, in

2020, we could imagine algorithms or robots that do everything, and there's some artistic role for architects to play. If that's the only way in which we are seen to provide value, then architecture as a field is going to come to an end. That's the dystopic future.

In addition, if architects and designers are not involved in the process of building, you get structures that might have beautiful skins, but the way that they work together to create environments becomes limited because there's nothing in the building code or the owner's motivations that requires them to work with others. Societal disparities that come from built environments would get worse - and being born in the wrong zip codes could doom a person to poor health and social outcomes.

In the utopian future, we know more about the ways we design, build and operate buildings and environments.

ARCHITECTS, ENGINEERS & DESIGN PROFESSIONALS WILL BE?

DYSTOPIA

"EXTERIOR DECORATORS"

"FACADISTS"

BROUGHT IN LATE

LIMITED, CONTAINED WORK SCOPE

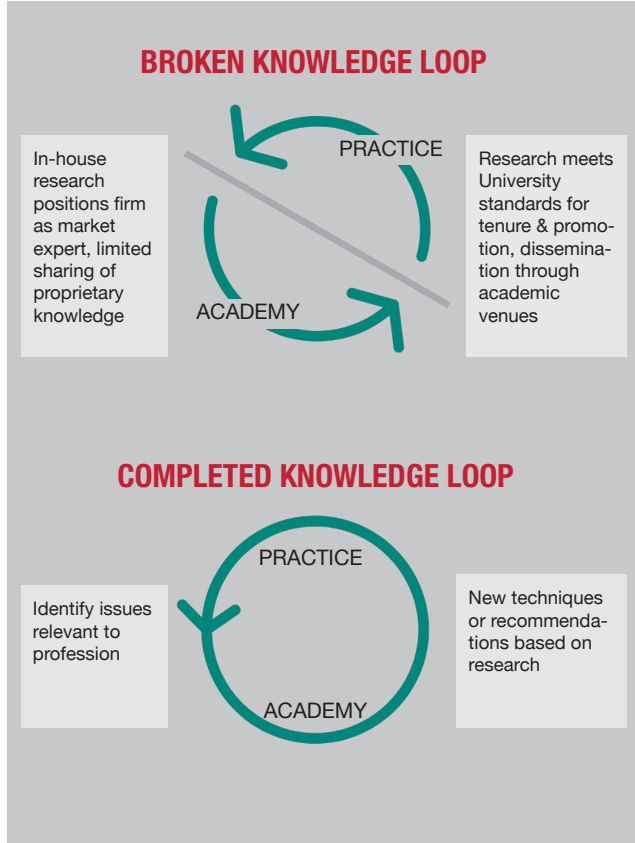
UTOPIA

SERVE COMPREHENSIVE OVER FACILITY LIFE-CYCLE

DEFINE & SOLVE HOLISTIC, SYNERGISTIC PROBLEMS

AT THE TABLE FOR EARLIEST DISCUSSIONS

COLLABORATORS BRIDGING MULTIPLE DISCIPLINES



We know more about how they affect people, how they can benefit people and we invest. Architects become part of a broader set of decisions, such as how building materials are developed, how those building materials get specified, used and installed, and how they get disassembled. Designers imagine multiple potential futures simultaneously, even ones that seem contradictory, and they can resolve things synergistically. They are seen as valuable at every stage of consideration in the built environment. That's the utopic future.

DI: Where is the academy leading? Where is it behind? How can the academic world better connect to the rest of the industry and vice versa?

RC: Tom Fisher, Director of the Minnesota Design Center, talks often about the knowledge loop. It's a bit like the utopic vision of the future, in which

you have a problem or a solution that could originate from or be solved by either academia or practice - they work together. In medicine, which is an example Fisher often uses, a clinician might see a series of patients having similar issues and ask their academic counterparts to study the trend. Or, on the other hand, someone in academia might develop a novel treatment and say, "I think this will probably work based on our trials, but we need to look at it in the field." Either academia or practice could start the query, and the other serves a key complementary role. It's a virtuous cycle.

Currently we have a broken knowledge loop for AEC. Academia has its own motivations for doing the work we do, and it's largely based on promotion and tenure standards, which usually have to do with publication. Publications are usually easier, faster and more predictable to do without balancing an agenda



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from a firm or doing applied field work.

From the firm side, firms doing research are completely motivated to market it as proprietary knowledge. They're not needing to publish in such a way that someone else can replicate the findings. Firms don't need to testing results in a way that uses rigorous research methods.

Its hard for firms to do rigorous applied research without academia. Yet aca-

demia can't do it on its own. There is value in academics that write books that have nothing to do with firms. There is value in firms that are doing work that has no relation to academia. Yet some of the most difficult problems lie at this critical intersection, these are the ones that can change the value proposition. These are important. They may not even represent most of the work we need to be doing but will catalyze change.

DI: Maybe all this converges to usher us into a new era of cooperation?

RC: *That's what we're hoping.*

Renée Cheng serves as the dean of the College of Built Environments at the University of Washington. Prior to UW, Dean Cheng was a professor, associate dean of research, head of the school of architecture, and directed an innovative graduate program linking research with practice and licensure at the University of Minnesota. She is a graduate of Harvard's Graduate School of Design and Harvard College.

A licensed architect, Dean Cheng's professional experience includes work for Pei, Cobb, Freed and Partners and Richard Meier and Partners before founding Cheng-Olson Design. She has received numerous honors and awards including Designintelligence's top 25 most admired design educators in the United States, the 2017 Lean Construction Institute Faculty Award, and was named to the American Institute of Architecture's College of Fellows in 2017.

Cheng is a leader in the American Institute of Architects (AIA) and advocates for equity in the field of architecture and in the practices related to the built environment. She has pioneered research surrounding the intersection of design and emerging technologies, including work on industry adoption of Integrated Project Delivery, Building Information Modeling and Lean.