

An aerial photograph of a baseball field, likely at the University of Washington. The field is covered in a dense carpet of fallen autumn leaves in shades of orange, yellow, and brown. The green grass of the infield and outfield is visible through the leaves. The base paths are marked in a light brown color. In the top right corner, a large, white, stylized letter 'W' is superimposed over the image.

THE GRADUATE SCHOOL  
UNIVERSITY *of* WASHINGTON

# CREATING NEW INTELLECTUAL SPACES

INTERDISCIPLINARITY AT THE  
UNIVERSITY OF WASHINGTON | 2019

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# INTRODUCTION

The University of Washington has been a leader in interdisciplinary research and training well before the concept of interdisciplinarity became commonplace. Our first interdisciplinary graduate programs were initiated in the mid-1960s: Quantitative Ecology and Resource Management (QERM, 1966) and Urban Development and Planning (UDP, 1967). Our first graduate from our Interdisciplinary Individual Ph.D. program was in 1970. And Museology was established in 1972.

These ground-breaking programs — all still active and vital — predate, or coincide with, the first international workshop on interdisciplinary studies. Organized by the Organization for Economic Co-operation and Development (OCED), the workshop was held in 1972. This meeting resulted in the publication of the book, “Interdisciplinarity: Problems of Teaching and Research in Universities.”

Between the mid-1960s to the mid-1990s, some aspects of interdisciplinary approaches were beginning to find a foothold in parts of the academy; however, disciplinary distinctions (and silos) tended to define the university landscape. In 1995, “The Reshaping of Graduate Education of Scientists and Engineers,” published by The National Academies of Sciences, Engineering, and Medicine, recommended that scientists be skilled to work in interdisciplinary groups to enhance their understanding of different theoretical and methodological approaches. It was around this time that we begin to see scholarly work on interdisciplinary research, teaching and learning, and funders such as NSF and NIH advocating for enhanced interdisciplinary training.

Today, interdisciplinary approaches are far more integrated into the academy with fields such as neuroscience, molecular engineering, bioengineering as well as area studies considered standard fare. Why is this? To a large extent interdisciplinary research approaches represent the necessary response to what are often referred to as those “wicked problems”: local and global challenges that simply do not come in disciplinary boxes and that demand multifaceted, problem-solving approaches. The call to educate students to work successfully across different methodologies, theoretical perspectives and to have the language to communicate effectively with each other in the research environment is more urgent than ever. Challenges of health disparities, climate change and environmental degradation, population movements and migrations, food needs and distribution, to name just a few, cannot be adequately understood and addressed through a single disciplinary lens.

Luckily, the University of Washington, with its established history of interdisciplinary commitment, is ahead of the curve. Today the Graduate School houses 11 degree programs and 8 graduate certificates. There are other interdisciplinary programs housed throughout the UW. Indeed both UW Bothell and UW Tacoma have Schools for Interdisciplinary Arts & Sciences, with faculty uniquely trained to teach and do research in an interdisciplinary context. And the Population Health Initiative is a shining example of the University’s commitment to interdisciplinarity.

This report provides key examples of success and ongoing challenges to maintaining and expanding on this commitment. Drawing from people in the humanities, social sciences, and STEM fields, the report positions the UW as a leader in the delivery of the highest level of interdisciplinary excellence.

The themes to watch for include:

- impact
- innovation
- institutional incentives and potential disincentives
- institutional culture (which for some is attributed to the Pacific Northwest more generally)

In preparing this report we met with a number of interdisciplinary champions, faculty and administrators who know first-hand the benefit of and need for interdisciplinary research and training. You will read perspectives of:

- Yan Bai, Director, Master of Cybersecurity & Leadership Program and Associate Professor, School of Engineering & Technology, Tacoma
- Bruce Burgett, Dean and Professor, School of Interdisciplinary Arts and Sciences, Bothell

- Rich Gardner, Co-director of Molecular & Cellular Biology and Associate Professor, Pharmacology
- Lisa Graumlich, Dean of the College of the Environment and Professor, School of Environmental and Forest Sciences
- Mary Lidstrom, Vice Provost for Research and Professor, Chemical Engineering
- Shwetak Patel, Interdisciplinary Group Chair, Innovation Technology and Professor, Computer Science and Engineering
- Cabeiri Robinson, Director of Near & Middle East Studies and Associate Professor, International Studies
- Michael Smith, Director of Human-Computer Interaction + Design and Senior Lecturer, School of Art + Art History + Design
- Jane Sullivan, Former Co-director of Neuroscience and Associate Professor, Physiology and Biophysics
- Thaisa Way, Director, Urban@UW and Professor, Landscape Architecture
- Kathleen Woodward, Director of the Simpson Center for the Humanities and Professor, English

Taken together, the perspectives of these contributors underscore the ongoing need to support interdisciplinary efforts at all levels. They offer advice on how to increase cross-disciplinary activities. They advocate for budget models and advancement opportunities that position interdisciplinarity as a unique and invaluable benefit to faculty and students alike. The contributors exemplify the very best of the entrepreneurial, collaborative, and creative culture that exists at the University of Washington.

The Graduate School is proud to play a key role in ensuring that interdisciplinary contributions continue to thrive. It is our fundamental belief that part of the work of a great Graduate School is to create new intellectual spaces that are on the cutting edge of innovation and attend to the ever-more complex world in which we all live. This report offers a glimpse into the amazing work that can be achieved through an interdisciplinary approach. It is our hope that readers are inspired, encouraged, and enabled to contribute to the interdisciplinary future of the University of Washington.



Rebecca Aanerud, Interim Dean, Graduate School and Principal Lecturer, School of Interdisciplinary Arts and Sciences, Bothell

David Canfield-Budde, Assistant Dean for Academic Affairs and Planning, Graduate School

Eleanor Lee, Director of Communications, Graduate School

Elizabeth Lowry, Senior Director of Communication and Marketing, Office of the Provost, Academic & Student Affairs Advancement and the Graduate School

Tess Wroblewski, Communications Specialist, Graduate School

*All interviews have been condensed and edited for clarity. All photos courtesy of the programs, except for MCB group selfie, courtesy of Ricky Padilla-Del Valle.*

# SHWETAK PATEL

## TRAINING THE NEXT GENERATION OF TRAILBLAZERS

When Shwetak Patel was interviewing for faculty positions a decade ago, he wasn't interested in conversations about tenure.

Even early in his career, Patel was only interested in working at an institution that would allow him the freedom to produce ground-breaking, interdisciplinary work — in his own way.

Interviewing at the UW, "it was clear that faculty are encouraged to define impact in their own way and pursue the kind of impact they want to have," Patel, now the Washington Research Foundation Entrepreneurship Endowed Professor of Computer Science & Engineering and Electrical & Computer Engineering, says. "Whether you aim to publish a book, spin-off a company, or something else, you define your impact here — and that was one of the things that drew me to the UW," he says.



Patel, director of the research group Ubicomp Lab and chief technology officer of the Global Innovation Exchange, defines his impact by tracking job growth in the PNW and medical devices created as a result of his research, in addition to the scholarly work of being a professor. He describes a moment he realized the profound impact of his research: When a grad student returned from Bangladesh after deploying a new app called SpiroSmart.

Using this technology, the researchers tested the lung function of roughly 10,000 people for asthma and other diseases — all in just a couple weeks. "The server crashed because there were so many people who used the app," Patel said. "In that moment, I knew the scale was ridiculous."

This life-saving research has been possible due to opportunities for cross-disciplinary work at the UW.

"It's clear there are no boundaries to collaboration at the UW," Patel says, pointing to his own freedom early in his career to take a joint appointment and advise students in different departments, without these decisions jeopardizing his chances of securing tenure.

He also points to his relationships with students and faculty from the School of Medicine. Occasionally, Medicine faculty will attend his lab meetings and hang out in his lab. His graduate students are also trained to pull medical records and have access to Medicine resources. "Where else (besides the UW) is that kind of structure possible?" he asks.

Patel is widely recognized as an important contributor to the areas of computing and electrical engineering. His research, which rests at the intersections of these fields with healthcare and environmental studies, has earned him recognition by the MacArthur Foundation, the World Economic Forum, the Sloan Fellowship and most recently, the Association for Computing Machinery, among others.

Yet 10 years ago, Patels' work was so novel that his department was unsure of where to put him. It wasn't easy to find collaborators in the School of Medicine, either. Patel started by sending cold emails to Medicine faculty. "Initially it was tough because I didn't know anyone and they didn't know my work," Patel says.

After publishing a couple papers, however, Patel found it easier to introduce himself to faculty outside his department. He soon made connections with like-minded researchers.

Since then, Patel's connections and collaborations have taken off. In his department, his research has provided a scaffold for new hires. And beyond the UW, computer science departments across the country have followed the UW's lead in establishing this area of expertise.

The graduate students who enter Patel's lab are like him, seeking a space where trailblazing and interdisciplinarity are encouraged. They are drawn to the Ubicomp Lab by Patel's reputation — and the reputation of the UW — for fostering interdisciplinary work. Patel is deliberate in fostering a safe and welcoming environment in his lab, where

students are not afraid to take risks.

Once graduate students enter his lab, Patel has a unique approach to developing broad-based scholars. Rather than looking at the dissertation as solely a vehicle for their expertise, Patel encourages his students to consider the dissertation as validation of their ability to do independent research.

"I'm not known for the research I did for my dissertation, I'm known for other "random," risky projects I did as a grad student," he says. "So I tell my students, you don't need to have a perfect thesis — just prove you can do independent research. Then take on projects where you think will have the most impact and that excite you the most."

This approach "produces grad students who can have a broad impact on society," Patel says. These are students who have been trained not just in a niche subject, but in collaborating with domain experts and deploying their research so it can be used in industry.

As a result, Patel's students are pushing the boundaries of computer science and engineering. "They're leading the research at this point in my career," he says. And across the university, graduate students are "pushing professors to explore new avenues for research," he adds.

His advice to students is to be bold in reaching out to faculty and asking for their advice or help around a new project.

"I tell them, don't be afraid to go into that meeting because 99 percent of the time, this person hasn't thought about that intersection," Patel says. "You probably know more than them about this area."



And if all else fails, be entrepreneurial.

"I encourage students to push concepts forward themselves, if they can't get faculty interest," Patel says. He recounts how when one of his students wanted to use a 3D printer to make prosthetics, but couldn't find anyone to take on the project, he encouraged the student to create a club around these interests and get their peers excited about the work. If you create interest, "then you'll be able to point to what you've done when you're asking



for support again later,” Patel told this student.

Though Patel considers the UW a haven for interdisciplinary work, he still has ideas for how to foster even more collaboration.

Between the disciplines, “we are still siloed to some extent,” Patel says. “We have folks doing amazing work, but we don’t work together.”

To overcome these barriers, Patel suggests the UW establish centers for collaboration.

“When we say we’re for collaboration, but don’t have collaborative centers — there’s a mismatch there,” he says. “We need to do that at UW at the leadership level.”

A way to drive these centers is to follow students’ interests, he says. “They know where the field is going, so follow where the students want to go.”



Ultimately, Patel says the UW benefits from its location in Seattle and the Pacific Northwest.

“With the entire tech community in Seattle, there’s something different culturally,” he says. “Collaboration isn’t just at the UW. There’s something about the PNW that fosters collaboration. Something in the air.”

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## UBICOMP LAB

THE UBIQUITOUS COMPUTING LAB, LED BY DR. SHWETAK PATEL, DEVELOPS INNOVATIVE SENSING SYSTEMS FOR REAL WORLD APPLICATIONS IN HEALTH, SUSTAINABILITY AND NOVEL INTERACTIONS. THE LAB CONSISTS OF AN INTERDISCIPLINARY TEAM OF STUDENTS FROM CSE, EE, ME, MEDICINE AND BEYOND. THE LAB ALSO COLLABORATES WITH UW PROFESSORS FROM A RANGE OF DISCIPLINES AS WELL AS WITH INDUSTRY.

THE UBICOMP LAB TACKLES CHALLENGING RESEARCH PROBLEMS BY BUILDING THE ENABLING HARDWARE AND SOFTWARE SYSTEMS AND BY DEPLOYING AND EVALUATING THESE TECHNOLOGIES IN REAL-WORLD SETTINGS. INVENTIONS IN THE AREA OF HEALTH TECHNOLOGY INCLUDE BILICAM, WHICH USES A SMARTPHONE TO SCREEN NEWBORNS FOR JAUNDICE, AND HEMAAPP, WHICH SCREENS FOR AMENIA AND OTHER BLOOD CONDITIONS USING THE CAMERA ON A SMARTPHONE.

STUDIES OUT OF THE UBICOMP LAB ARE REGULARLY PUBLISHED IN PRESTIGIOUS JOURNALS, AND THEIR INVENTIONS ARE DISCUSSED WIDELY IN NATIONAL NEWSPAPERS. THE LAB IS FREQUENTLY INVITED TO PRESENT THEIR FINDINGS AT NATIONAL AND INTERNATIONAL CONFERENCES. GRADUATE STUDENTS IN THE UBICOMP LAB ARE FREQUENTLY RECOGNIZED AS INNOVATORS AT THE UW AND NATIONALLY.

## LISA GRAUMLICH

### ON A DIFFERENT PATH

"I was a graduate student here at the University of Washington in what was then called the College of Forest Resources.

I took classes in geology, geophysics, botany, hydrology, econometrics. I was all over this campus, and I was always welcomed. I thought it was normal that as a Ph.D. student, I could walk into the office of a professor who didn't know me, who didn't know my advisor, and I would be welcomed!

I've spent my career trying to recreate the interdisciplinary freedom I had as a Ph.D. student here. This is the university that gave me my start in interdisciplinarity and to be welcomed back as the dean of a highly interdisciplinary college has made me incredibly happy.

To me, interdisciplinarity is about discovering transformative intellectual spaces between traditional disciplines.

It's not just that you're an engineer and you're a scientist, and your work is never done because you're trying to walk down these two parallel paths. No, you are on a different path, and it looks different. And the leadership in the two academic units need to recognize and celebrate that!

A key piece is the deans looking each other in the eye and saying, this person might not look like the standard professor from this college, or the standard person from this school. And we agree that it's something new.

As scientists we collaborate well with engineers; we both use Python, we both use R. There's already a shared culture around language, values and tools. To me, the really important frontiers are in environmental humanities and in innovative environmental policy making. That's part of where EarthLab comes in because EarthLab brings together scholars from across the UW campus. The challenge is that deep interdisciplinarity, which needs time and dedicated effort at curation.

There's some great examples on this campus. We look to the Simpson Center as a place where they do such a marvelous job of bringing people together around compelling problems. As a dean I remind myself to be patient, and realize this is a long-term investment.

Here's one of the things I'm most proud of: We discovered here in Washington state, much to our dismay, that shellfish production was being threatened, initially by some unknown factor that was causing the failure of oyster larvae. There was a widespread failure of shellfish regeneration — massive shellfish die offs. Oyster growers were concerned, and given the importance of the shellfish industry in our state, former Governor Gregoire was concerned as well.



Scientists working with shellfish growers discovered the minute changes in the acidity of the waters of Puget Sound was slowing the rate at which the baby oysters build their shells, so they could never make the strong shells that would allow them to mature into adults. On some level, it was hard to fathom because the change in the pH of the ocean was so subtle. The changes in ocean chemistry were caused by excess carbon dioxide entering the ocean from the atmosphere causing acidification of the ocean.



Governor Gregoire convened a blue ribbon panel to address the issues. UW scientists Terry Klinger and Jan Newton were part of the panel that met for two years with a range of stakeholders from the shellfish industry, tribes, government, and nonprofits. Together they crafted a plan to address ocean acidification, and its implications for marine food webs of Puget Sound.

This plan is now an international model for how scientists work with stakeholders to identify solutions to vexing complex problems.

At the College of the Environment, we do fantastic fundamental science. Our researchers work on issues like ocean acidification on genetic and cellular levels as well as on the scale of entire ecosystems and food webs. We work to increase our understanding of how the entire system works.

But the next steps are important. It's not just a passing, "Here, I wrote this paper on ocean acidification. It's peer-reviewed. Here you go." No, we work hand in hand with stakeholders to figure out how this new knowledge will be used.

Our success is based on the combination of strong disciplinary science and interdisciplinary bridges.

Even when doing interdisciplinary work, the work of the disciplines needs to be understood and respected. What does it mean for our colleagues who do cultural studies and do deep engagement with communities? What does it mean for our biomedical colleagues to work through the night to get a single piece of critical data?

As a culture, we share the Pacific Northwest ethos of being overly humble. We are open to having dialogues about ideas and treating each other with respect. There are a lot of technical pieces about the science of how people collaborate. But there is a whole set of soft skills we tend to select for and cultivate as a culture here.

Doing interdisciplinary work is incredibly satisfying, but it's work. It's work. I recall my own travel to conferences when I was early in my career. I felt like I had to keep two different professional identities going. It's work thinking about how you communicate, how you develop a language that is accessible to the multiple disciplines you're working with.



## COLLEGE OF THE ENVIRONMENT

FOR DECADES THE UW HAS BEEN  
RECOGNIZED AS HOME TO ONE OF THE  
STRONGEST CONSTELLATIONS OF  
ENVIRONMENTAL AND INTELLECTUAL  
TALENT IN THE WORLD.

IN FULFILLMENT OF A VISION FOR A  
BOLD, RESOURCED, ENDURING, AND  
EFFECTIVE ENVIRONMENTAL HUB, THE  
UW LAUNCHED THE COLLEGE OF THE  
ENVIRONMENT IN JULY 2009.

THE COLLEGE FOSTERS EXISTING AND  
NEW COLLABORATIONS BETWEEN  
FACULTY, STAFF, AND STUDENTS WHO  
ARE ENGAGED IN THE STUDY OF THE  
EARTH'S DYNAMIC LAND, WATER,  
AND ATMOSPHERE SYSTEMS; THE  
DEVELOPMENT AND APPLICATION OF  
ENGINEERING AND TECHNOLOGICAL  
ADVANCES; AND THE IMPACT OF POLICY  
AND HUMAN DIMENSIONS ON THE  
ENVIRONMENT AND THE MANAGEMENT  
OF NATURAL RESOURCES.

One my graduate students gave a particularly beautiful dissertation talk navigating between geology and ecology. She made sure that every other sentence reached out to different communities. She didn't do this paragraph by paragraph, she did this almost sentence by sentence.

It was a crafting of language that would be the doorway for both audiences.

It's a craft. And it's more work."

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## DEFINING INTERDISCIPLINARITY

"To me, interdisciplinarity is about discovering transformative intellectual spaces between traditional disciplines."

—Lisa Graumlich

"There will be a day when someone asks what you do, and you won't name the department that pays your salary, you'll talk about the questions you're addressing."

"If we can bring people together and learn how to reframe the questions, and reframe them in a way that acknowledges there are many bodies of knowledge that can contribute to that question, we can get to a more robust question which can then lead to collective knowledge, and can then lead to collective change, and not only the will to experiment but the insight to think of which way to go."

—Thaisa Way

"Sometimes interdisciplinarity means 'no discipline' — this is something we should be careful with. We need to have respect for core disciplinary knowledge and traditions. The disciplines have important contributions, it shouldn't just be breaking down the disciplines. A discipline represents a core canon of debates and subfields, and being interdisciplinary means opening one's work to other perspectives and methodologies."

—Cabeiri Robinson

"Neuroscience, like many contemporary disciplines, is not captured by any single group of scientists. There is no way that I could fully experience my passion for neuroscience if I was only able to interact with members of a single department."

—Jane Sullivan



## KATHY WOODWARD

### SUBSTANTIAL INQUIRY, SUBSTANTIAL FREEDOM

"The Simpson Center has, since its inception, strategically supported teams of people to do collaborative work in cross-disciplinary contexts.

A wonderful example that drew together faculty from six departments was "The Modern Girl Around the World." Those faculty members, working together on a multiyear project — that's crucial, that it was multi-year — integrated this work with teaching. That led to an evolution of curriculum at the graduate and undergraduate level.

So many graduate students and faculty were involved. I still remember the different presentations of the research on our campus. In addition, the entire team of six faculty members was asked to present at two annual meetings of major professional organizations — the Modern Language Association and the American Historical Association. This is another form of dissemination, one that is inspiring and really works. It's not just say, two graduate students who were influenced by this work, there were scores of students, both on this campus and in other sites.

There was a group of scholars across the U.S. who contributed to the project. There was also a twinning of this project with research at the international level with a major conference in Tokyo. A fantastic prize-winning book, "The Modern Girl Around the World," was the final product, representing multiple commodity flows among countries around the globe as well as multiple disciplines and methodologies. I would point to this as one of the prime examples of spectacular crossdisciplinary and interdisciplinary work, but also one where scholars were still working in their disciplines. It's not that one person embodied all the disciplines.

This is an absolutely inspiring project. People are still talking about it. And what kind of support did they need? Because it requires support. We offered course buyouts, we offered research assistance in the form of RAs, we offered travel funds to our faculty here. And we also offered funds to bring in visiting speakers. The latter is exceedingly important. In the humanities we find that on-the-ground dialogue between scholars is crucial to deepening intellectual insight and developing new and persuasive interpretations of the phenomena we are studying.

The Simpson Center has mechanisms to support and seed crossdisciplinary work. For instance, we have a category of support we call Collaboration Studios. The studio is meant to evoke an artist's studio; it is similar to a lab, but a lab is typically led by one person. Our studios are understood to be, on the other hand, deeply collaborative. Two to four faculty members apply, with each receiving a course release. Time is the most valuable resource for faculty and graduate students in the humanities and humanistic social sciences. Additional funds are also available, including hourly support, travel, and funds for speakers.

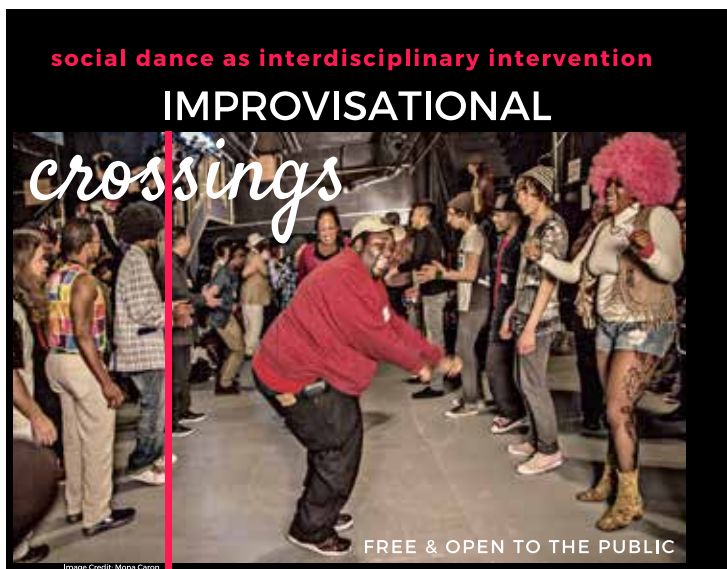


One example of a Collaboration Studio is The Past, Present, and Future of US Global Health Partnerships in Africa, led by three researchers: Lynn Thomas (History), Johanna Crane (Interdisciplinary Arts & Sciences, UW Bothell), and Nora Kenworthy (Nursing & Health Studies, UW Bothell). We got support from Population Health to bring 20 faculty together around this issue of past, present and future of global public health in Africa, and they wrote short reports, destined for public access journals. I'm seeing more groups working together, collaboratively, to produce this type of more public-facing work. People are charged by it. Often for faculty, when you're around other people, it's most often with your department or your students. So to be with people in intellectual spaces with those from other disciplines is invigorating.

A faculty member in one of the research clusters the Simpson Center sponsored last







year sent, unprompted, this message: “This has been so important for me, as a scholar, researcher and teacher.” That’s the role of a public university, to create the foundation for substantial inquiry, with inquiry fostering a substantial freedom.

We offer about 10 one-credit graduate seminars a year. To describe one: American Studies scholar Robin Kelley, a faculty member at UCLA, was invited as a Katz Distinguished Lecturer for a series on race and capitalism. His presence on campus is amplified by reading his work beforehand and talking about it with other graduate students. These one-credit courses both introduce our graduate students to compelling scholarly research and deepen it and introduce them to graduate students from other disciplines and departments. The result is that students come to feel not only that they are in a scholarly community and intellectual space, but that

they’re making one. They’re breaking scholarly isolation.

We also support Graduate Research Clusters, which are funded by budgets of only \$1,000 per group. One is a genomics salon, organized by Ph.D. students in Genome Sciences in conversation with the UW Graduate Certificate in Science, Technology, & Society Studies. That cluster has been running for three years, and some graduate students from other institutions are now saying that they are choosing to come to the UW because in this domain, UW has expanded its orbit to include, for example, ethics. These students have successfully created a space for researchers in the sciences and the humanities to come together: their discussion-based events on science and society have drawn over 220 unique participants representing nearly 50 departments.

In a way, these are inexpensive things, but they have a phenomenal impact.

Graduate certificates are exceedingly important — not just for students but also for faculty. I see the model as being hugely successful in encouraging and making possible research across disciplines and departments. But we need tangible support for them. I’d very much like to see our Office of Research support our certificates with dollars on the ground — say \$10,000 annually for each certificate that is active.

Fundraising in the humanities, broadly construed, at the University of Washington tends to center on a professorship or a chair, that is to say, on a single person who holds that professorship or chair for a relatively long stretch of time. I would like to see a more distributed model. That’s the way the Simpson Center endowment works; we can support a vast range of collaborative work that enriches not just an individual but our campus, creating vibrant intellectual communities.

In addition, we have the added advantage of being supremely flexible. The Executive Board of the Simpson Center is composed of faculty members who have staggered terms, which means that the proclivities of what is regarded as crucial for funding changes with the composition of the board. That is crucial. We’re not wedded to particular topics.

There is a sheer joy in approaching not just a problem, but in following creativity. The magic word for me is creativity.”

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## THE SIMPSON CENTER

AS ONE OF THE LARGEST AND MOST COMPREHENSIVE HUMANITIES CENTERS IN THE UNITED STATES, THE SIMPSON CENTER OFFERS UW SCHOLARS A RICH SPECTRUM OF OPPORTUNITIES FOR INTELLECTUAL COMMUNITY. THE CENTER SUPPORTS RESEARCH AND COLLABORATION THAT ALLOWS SCHOLARS TO BUILD NETWORKS LOCALLY, AT THE UW AND BEYOND.

THE CENTER PROVIDES FUNDING AND ADMINISTRATIVE SUPPORT FOR FELLOWSHIPS, RESEARCH CLUSTERS, GRADUATE STUDY GROUPS, CONFERENCES, SYMPOSIA, AND MICROSEMINARS, ALLOWING FACULTY AND GRADUATE STUDENTS TO EXCHANGE IDEAS AND DEVELOP PROJECTS WITH COLLEAGUES, VISITING SCHOLARS, AND MEMBERS OF CULTURAL INSTITUTIONS IN THE COMMUNITY.

## THE IMPACT OF AN INTERDISCIPLINARY PROGRAM

"There is a strong impact because most of our alumni are still in the state, still in the Seattle-Tacoma area. They graduate into pretty good careers, with Microsoft, Google, the City of Tacoma, etc. An additional impact is in diversifying the tech workforce. We have lots of female students. We continually sponsor the Women in Cybersecurity conference, and there are more than 100 company recruiters doing on-site interviews. One international female student was hired by Microsoft at the project management level two, which is amazing. I'm a very student-focused faculty. My bar is low. If my students get a good job, I'm happy!"

—Yan Bai

"[MHCI+D] graduates a different kind of professional than other programs. Consistently we've heard from people in practice enjoy working with MCHI+D students, because our students are more capable of responding to difficult challenges due to their broader understanding of the field."

—Michael Smith

"The humanization of education, to use Paulo Freire's term."

—Bruce Burgett

"I've seen grad students and faculty developing the idea of what I call the 'fourth portfolio' — research, teaching, service and public engagement. Graduate students are now thinking of this as part of what they do — it's the new normal."

—Kathy Woodward

"We do a lot of the basic research underlying the headline-grabbing translational work, like searching for an Alzheimer's cure."

—Jane Sullivan

"The immediate impact is that we are introducing faculty to each other. It sounds mundane, but this is a huge campus, and even those doing research on the same issues don't know each other. The greater impact is we are helping faculty reframe how they ask questions about their research, helping them rethink how they're going to respond to the challenges they're addressing. We help them think about the trajectory from research to application. We engage them with the city. I think the city is looking at the University as a resource in a way they never have before."

—Thaisa Way



## MARY LIDSTROM

### INTERDISCIPLINARITY IS OUR COMPETITIVE EDGE

“Our emphasis on interdisciplinarity came out of the Two-Years-to-Two-Decades strategic planning effort a few years ago. That University-wide discussion identified interdisciplinary collaboration as one of the trends for the future, as well as our competitive edge.

A concept that I've always had is this: Departments are in silos, as they are very degree-focused, discipline-focused. Interdisciplinarity and collaboration should be the bridges that connect them and make them stronger; the collaboration should be complementary, not competitive. That's what we've always done here at the UW. But what almost all our peers do, whether it's an interdisciplinary program or research education program, is make them into another silo. They're just different silos under the Vice Provost of Research or the Graduate School.

Creating new silos doesn't work well. You need a culture like we have here at the UW. This is what works. Part of my job is to make sure that emerging fields are complementary, supporting and seen as an asset. This is what helps them recruit top faculty and top students.

Interdisciplinarity is part of the culture of the Pacific Northwest. And what happens is that once that culture gets momentum, then faculty choose other faculty who are collaborators. It is an asset in recruiting new faculty who are interested in collaboration.

A culture of collaboration helps attract women and minorities — students, faculty and postdocs — by providing a sense of belonging. People are drawn to this culture. People want to collaborate. They are not invested in ego; they are invested in understanding problems. They are more flexible.

Collaboration goes beyond the University. The sciences, humanities, education and social sciences involve community engagement. And the UW collaborates closely with industry such as Microsoft and Boeing, and non-profits such as the Allen Institutes and the Bullitt Foundation.

Elizabeth Nance is an example of an early career faculty member who chose the UW for our collaborative culture. Elizabeth, assistant professor in Chemical Engineering, researches nanoparticle-based tools, imaging methods and flow. This is heavy-duty nanotechnology and biology, and she uses it to study infant brain injury by working with pediatric researchers in the School of Medicine. She came here because of the group that works on infant brain injury — all women researchers, by the way. Elizabeth was a postdoc at another university. She described to me how incredibly difficult it was for her to break down barriers between medicine and engineering, and she's an engineer, although she did find people who would work with her.

The advantage to having our medical school on campus is that proximity helps promote collaboration; this group welcomed Elizabeth with open arms. Even our physicians, who have a primary focus on clinical care, have had this long history of collaborating with engineers.

Elizabeth had many offers, and she chose the UW because of the very supportive atmosphere in the department. She set up a group called Women in Chemical Engineering for undergraduates, based on a similar group in Chemistry. Elizabeth's group has been incredibly successful with graduate students mentoring undergrads.

Interdisciplinarity seems to be mostly about STEM, but CHID (Comparative History of Ideas) has been running for 30 to 40 years. It was almost revolutionary at the time it started.

Other great examples of interdisciplinarity include the aspect of genome science focused on precision medicine. It's highly interdisciplinary. Other examples at UW are Population Health and Urban@UW.

Another example: The Clean Energy Institute is more than research. It has a big education arm, joint graduate



program with Pacific Northwest National Laboratory, and summer programs for underrepresented minorities. Clean Energy is not degree-granting but highly facilitating.

To alleviate some barriers to interdisciplinarity, we need to identify those barriers and use policy to drop them. What we don't have is money. But we do have authority to change policy. What are those barriers? Tenure and promotion, for example. Every time we look at something, we need to ask the question, "Does it inhibit interdisciplinary research?" Another example is the activity-based budgeting income split when it comes to teaching. I think it could be tweaked more. Next year, we have an ABB review and have an opportunity to revisit this issue.

There are isolated departments with chairs who tell their junior faculty, "Don't do a joint grant because I want the research cost recovery." A portion of research grants are returned to academic units to cover indirect costs of doing research. But the RCR needs to be shared through sub-accounts. There's a policy solution in place to follow. Policy has to be guidance because there could be circumstances that are not feasible. Somehow the resources can be shared. Those resources could be in-kind, like administrative support.

We should consider fostering collaboration when awarding promotion or tenure. Academic culture maintains that the work you do, yourself in your own lab, is how you prove your intellectual merit. Interdisciplinarity is important. Some deans have added collaboration as one of the promotion and tenure positives, but it's not a requirement.

When you get into biological and life sciences, you need the equivalent of an NIH R01 grant as a principal investigator to earn tenure. Data science people collaborate, and they might not have their own grant. It's very important to show your intellectual drive and contribution, but that can be done in collaborations as well as in single investigator work.

Another issue with interdisciplinarity is that tenure promotion committees might not have the expertise on the subject to judge the work of someone in another area. You can solve this problem by bringing someone in from the other department. We need to address that evaluation committee up front when hiring.

We need creativity and flexibility in appointments upon hiring. Interdisciplinarity is our competitive edge. Top junior faculty want joint appointments; they want to work across boundaries. We have recruited faculty from Harvard, Stanford and Berkeley because they want the interdisciplinary approach, and they can't do it as easily in those places.

Most of all, we need leadership that understands collaboration and believes that interdisciplinarity doesn't diminish your silo, it actually strengthens it."

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## OFFICE OF RESEARCH

TO ENABLE THE ACHIEVEMENT OF EXCELLENCE BY THE RESEARCH COMMUNITY, THE OFFICE OF RESEARCH:

- PARTNERS WITH THE RESEARCH COMMUNITY TO CREATE A CULTURE OF HIGH ACHIEVEMENT
- PROMOTES SHARED RESPONSIBILITY, THE ETHICAL CONDUCT OF RESEARCH, AND COMPLIANCE
  - ENHANCES RESEARCHERS' ABILITIES TO OBTAIN AND MANAGE GRANTS
  - STRATEGICALLY INVESTS IN PROMISING RESEARCH AND RESEARCHERS
- CREATES INTEGRATED SERVICES, TRANSPARENT RESEARCH ADMINISTRATION, INFRASTRUCTURE, AND STREAMLINED PROCESSES
  - ADVOCATES FOR THE NEEDS OF THE UW RESEARCH COMMUNITY
    - BROADENS AWARENESS OF THE VALUE OF UW RESEARCH
    - DEVELOPS STRONG RELATIONSHIPS WITH SPONSORS
  - ENHANCES THE ABILITY TO PERFORM RESEARCH IN A GLOBAL COMMUNITY
  - SUPPORTS STRONG INFRASTRUCTURE FOR INTERDISCIPLINARY RESEARCH



## ATTRACTING FACULTY AND GRADUATE STUDENTS

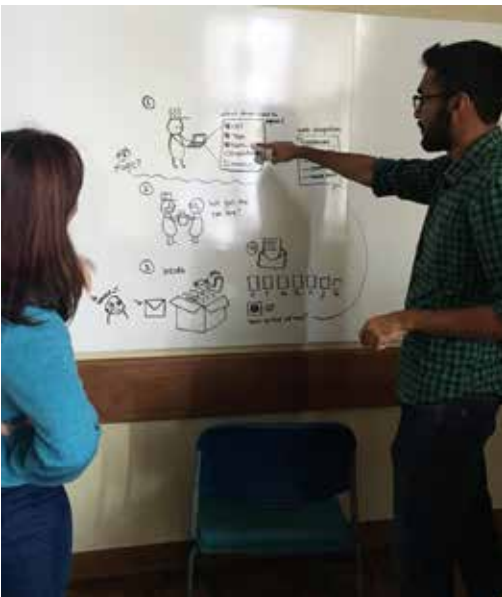
"When candidates for faculty positions interview here, they are impressed to learn that the University of Washington has the precious resource that is the Simpson Center. The center is effectively a recruitment tool."

—Kathy Woodward

"If a student is trying to decide between applying to two similar departments, they would only have about 10 faculty they can work with, but hey, come over to Neuroscience and you have a pool of 150 faculty you can work with!"

"Because students are coming in stellar, faculty are competing for students more than vice versa in a regular department. Why be part of this program? To get access to these students."

—Jane Sullivan



"If you don't have a broader body of expertise to draw on, students end up with a narrow view of what the discipline can be. In the case of MHCI+D, we have a broad and large group of faculty interested and engaged in this area through the DUB group. This engagement gives both faculty and students an opening to work that are happening in all the member departments. If a student is interested in working on a project, it's possible for them to reach out and get support from a faculty member in that area. This contributes to increasing the quality of research and design work coming from the program. We're starting to get noticed as a result of that faculty engagement. Our students have entered and been recognized in significant competition in academia and industry, and that only happens because faculty can advise those groups."

—Michael Smith

"We had a student who was stuck for a very long time because he was trying to work just under his chair. When we shook up his committee and required him to work with multiple people, he was outta here. He had his research project, which he did extensive research for, and he produced a really wonderful dissertation. He also had a public intellectual project, which was a blog about ISIS, which wasn't his specific research topic, but he was in a good position to comment on it and interpret news. He's emerged as one of the top commentators on ISIS, to the extent that he was featured in Teen Vogue! But when I really realized his work was having an impact was when we started getting multiple applications to the program that listed him as the specific person they wanted to work with! They didn't seem to understand that he was a student! That is some strong evidence of the outreach of our students!"

—Cabeiri Robinson

## BENEFITS AND OPPORTUNITIES

"Many of our faculty members have been able to carve out new intellectual spaces. One area with most advancement has come from computational neuroscientists teaming up with basic neuroscientists, opening up areas for both groups. Modelers have an opportunity to gain real life perspective from 'wet lab' scientists. If you can create a model about how a system should behave and then you can go back to a biological system and test if that's borne out is the strongest test. We're seeing more and more of these collaborative efforts."

—Jane Sullivan

"Each faculty brings a set of sensibilities and training that supports the students in these different areas. This will allow and train students to translate the field to another audience. This is something that self-selects the faculty who participate — those who are willing to cooperate and collaborate."

—Cabeiri Robinson

"The School of Interdisciplinary Arts & Sciences at UW Bothell recruits faculty and staff who want to do problem-based, interdisciplinary work. We make sure that what counts for professional advancement is appropriate to the values of the dossier and the candidate under consideration, not the discipline that claims them."

— Bruce Burgett

"Cybersecurity is a very complicated process. It's not just tech, it's also social work and policy and law. Cybersecurity by nature is interdisciplinary. From the management side, you need someone with vision. All our students are training for this purpose of leadership. We surveyed the alumni of our program on their career paths. We found that their technical skills helped launch them into their first jobs, but then, after a few years, they were being promoted to management because of their leadership skills."

—Yan Bai

"Students now are not always thinking in terms of the tenure track. Many expect they will spend some time in the academy and some time outside of it. We have a master's student in engineering who is assisting with the Emerald Corridor Collaboratory. The reason he applied for this job and the reason he's so fantastic at it is because, as he said, "Yeah, I'm studying to be an engineer and an academic, but I also see myself working in the city, and I want to know how to work with the mayor's office, how to work with politicians." He's been able to meet with people in four different cities, he's creating these networks, he's learning how to apply science, how policies are made, so we've created this opportunity for a graduate student to explore his options and understand what roles he can play and what skills he needs. Working with the mayor's office is very different than working to get tenure."

—Thaisa Way

# THE PACIFIC NORTHWEST

“There’s something about the PNW that fosters collaboration. Something in the air.”

—Shwetak Patel

“As a culture, we share the Pacific Northwest ethos of being overly humble. We are open to having dialogues about ideas and treating each other with respect. There are a lot of technical pieces about the science of how people collaborate. But there is a whole set of soft skills we tend to select for and cultivate as a culture here.”

—Lisa Graumlich





## RICH GARDNER

### OUR FAVORITE WORD IS YES

The genesis of the Molecular & Cellular Biology Program was to do something to make the UW stand out and bring departments under a larger umbrella. Intellectually, the program came from many disciplines — biochemistry, microbiology, genetics — trying to cross-feed each other. They wanted to create something interdisciplinary because they were already doing interdisciplinary work at the department level. They wanted to create something macro where students could come and do science in a way that doesn't restrict them in one way or another.

Starting the program wasn't easy. It took time and effort, and a lot of convincing to get UW Medicine and the Graduate School to invest in it. Then it took about five years to get running because we're a Ph.D. program, so students who came in weren't graduating until 2001.

Since then, the program has actually grown on a huge trajectory. The first class was four people, and now our incoming class will be 30 people. It took awhile for UW to get on the map for MCB, but now we compete with schools like Berkeley, Harvard and MIT. It just shows people in the world don't know what you're trying to do until you do it.

At MCB, our favorite word is yes. If you come to us and want to start an initiative, we say yes because we want to break down barriers and make things happen. Nina Salama (co-director of MCB) and I try to push boundaries and overcome barriers. And we work with a lot of people to try to make that happen.

Our structure is amazing in that we do get to say yes. Individual departments and divisions don't always get to do the same things. In MCB, there's a broader vision and a vision to make new kinds of things come through.

One of the great things about biomedical research is that we can be at the interfaces of different fields: the ones you can't predict. Right now, we're focusing a lot of research on computation and biology. If we didn't have the Molecular & Cellular Biology Program, I don't know if that could happen. Interdisciplinary means that when new interfaces collide, we can be right there.

We have 250 faculty under our umbrella, which is a huge opportunity for collaboration. The research is very much student and faculty driven. Where the research needs to go, people make it happen and that's what MCB stands for.

We would love continued support from the university to keep this momentum going because we generate really

great biomedical science. We need to keep doing that if we want to compete in the world. Not only does our science benefit the prestige of the (MCB) program in the world, but the prestige of UW in the world.

Small pots of money can make a big difference in getting initiatives off the ground. When Erica Sanchez, PhD'16, was awarded the Grad School Medal, she wanted a more personal hooding ceremony. Katie Peichel (Nina's predecessor) and I, we thought, we have no way to make this happen. We approached former Graduate School Dean Dave Eaton and said, we need a little money to create something



awesome, and then the barriers fell down. We thought that was a barrier we couldn't cross, but we did, due to the support of the Grad School and the Medical School.

Of all the interdisciplinary programs, we're fairly wealthy in terms of resources. We usually ask for small things here and there. Between the Grad School and Fred Hutch and our sister institutes, that brings in quite a bit of money. The program didn't want to be dependent on the University of Washington. We get money from everybody which really helps us work really well.

Yet barriers to collaboration still exist. It seems to me like we have a richness of ideas and disciplines at the UW, so why can't we come together and talk about the needs of the university together? There are barriers between the Medical School and upper campus, and at MCB, we're never really in contact with the School of Arts & Sciences. To do more interdisciplinary research at the UW, we need to break down barriers between the departments and schools.

I like the idea of organizing people coming together. It could even be a lunch once per year to talk about how we could work on grants together. I think if we develop personal interactions, that will inspire new ideas. At the National Science Foundation, they really want truly interdisciplinary proposals. I think input from the UW will start these conversations, which will lead to money to do the science.

Another space where interdisciplinary efforts are needed is increasing the diversity of the UW. A month ago, I was looking into requiring MCB faculty to attend or participate in something diversity-focused. I was looking at what is out there at the UW in terms of workshops on diversity. I found we're pretty sparse on that. For our department to put on a diversity initiative, we would need university support. And we can't do it on a programmatic basis. We need to bring programs together.



*MCB students take a group selfie. Courtesy of Ricky Padilla-Del Valle*

I know we're doing something great at MCB when people really want to come here. And the students who turn us down, they always say that our recruitment was the best recruitment event they came to in all their travels. We have a really warm and welcoming environment here, and it's because we are unified as a family. We work really hard to make that happen.

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## MOLECULAR AND CELLULAR BIOLOGY

THE MCB GRADUATE PROGRAM ENCOMPASSES MORE THAN 200 LABORATORIES AT THE UNIVERSITY OF WASHINGTON, FRED HUTCH, PACIFIC NORTHWEST RESEARCH INSTITUTE, SEATTLE CHILDREN'S AND THE BENAROYA RESEARCH INSTITUTE. THE OPPORTUNITY TO COLLABORATE WITH THESE INSTITUTIONS IS ANOTHER REASON WHY UW MCB IS ONE OF THE PREMIERE PLACES IN THE WORLD FOR GRADUATE RESEARCH STUDIES IN THE BIOMEDICAL SCIENCES.

## ADVICE FOR HOW TO INCREASE CROSS-DISCIPLINE WORK

"I go to a lot of meetings, I have a lot of coffees, I reach out to a lot of individuals. I ask a lot of people, and my struggle is how do I give back? This university asks a lot of its faculty, and I often feel like I ask even more. I'm always trying to look for ways to help. Can we hire a student to help you? Can I organize a peer review of your paper to help you get this out and help you get funding? Understand how to bring people in, and then let them shine.

You need incredible persistence, and I don't mean persistence in the sense of being a pain in the ass, but persistence because we're all busy, we all get asked to do a lot, we can't even do everything we want to do. You have to ask people what they need in order to come to the table. That's the kind of persistence I'm talking about. Have faith that the fundamental desire is there.

The other thing is — and I frustrate a lot of donors — I am comfortable with not knowing the outcome. I think you have to be really comfortable with ambiguity, and not knowing the outcome."

—Thaisa Way

"The first year I co-directed this program, it was a month before I understood my co-director. When we talk about project management, I talk about project planning, design, implementation, evaluation. She's talking about the management of the people. I learn a lot from the business faculty's perspective. I'm coming from the tech world, so I want to get it done, get it done, get it done. But you can't do it this way. You have to listen, you have to compromise, you have to be patient. Make small changes with the ultimate big change in mind. Staff support is key to get logistics off of your plate. Calculate your time, and then advocate for staff support."

—Yan Bai

"Students want to be interdisciplinary, but there are cultural mismatches between programs on campus. For example, students studying design, when working with informatics undergrads, might find it hard because they don't necessarily share values and often have different ways of problem solving. Faculty need to find mechanisms to support students when there is productive tension between fields. For example, this friction can come in the form of conflicting feedback to students between different faculty (in co-instructed courses), which can be frustrating for them. But, it also forces them to sort through the feedback and make meaning of it. At the faculty level, we're capable of understanding that mismatch between fields better through experience. For example, most DUB faculty are motivated by common things, like contribution to academic discourse and mentoring students. So while there may be some friction between faculty intellectually, the values we share help us align our goals. A lot of navigating this interdisciplinary work comes from experience and empathy."

—Michael Smith

"Do the self-work to figure out what draws you to seek an education. Remember that core when the institution tries to turn you into something else. Find allies in the work and organize with them."

— Bruce Burgett



## RECOMMENDATIONS FOR UNIVERSITY SUPPORT

"I was the chair, with Tom Daniel, of a committee to look into the organization of colleges. The underlying question was how to support interdisciplinarity. But no one wanted to merge, everyone looked at their own colleges and scholars and concluded — surprise! — that everything was working just fine. So we decided to make some recommendations around easing barriers to interdisciplinarity, not only for faculty but also for students, in particular, graduate students. For example, every faculty member could be offered the equivalent of one course as a free agent. Say they want to teach in the honors program. Say we have this wonderful faculty member in the German department doing work on environmental issues. What if they taught a course in the College of Environment, and the German department supported that?"

—Kathy Woodward

"The uncertain nature of external funding is the biggest challenge that faculty members face to being able to take on students. We need a better mechanism for splitting apart the ability of a faculty member to take on a student, so entry to a lab is not tied to that lab having funding for a student."

—Jane Sullivan

"Funding for interdisciplinary programs is key — you can't bring people in to work in this institutional space without supporting it. TAships dedicated to the interdisciplinary program are critical, but currently they are dedicated to academic departments."

"One challenge is that the director of an interdisciplinary program is not invited to the leadership meetings of the schools or colleges where faculty are participating and where she has an appointment. This is a structural contradiction since most of the program's faculty are in the College of Arts & Sciences and most of the classes are through departments in Arts & Sciences."

—Cabeiri Robinson

"More than anything it's convincing chairs and deans that the work faculty do that is interdisciplinary is a vital part of their service to their academic unit and the University. It should count when being considered for tenure. I have heard that the attitudes of some chairs towards interdisciplinarity is: 'As long as it doesn't get in the way of real work it's fine.' And it's that attitude that needs to change."

—Michael Smith

"Incentivize more low-stakes relationship-building across institutional and professional divisions. Learn from other sectors outside of education about how to collaborate across difference."

—Bruce Burgett

## RECOMMENDATIONS FOR UNIVERSITY SUPPORT, CONT.

"Physically, as we develop West Campus, we should be thinking of having flexible collaborative space. I think there are a lot more faculty like me who would rather have space in a collaborative space than in their department."

"We have to collectively establish language around how we value these forms of scholarship, teaching and service. Lots of us are doing it, lots of us are talking about it, but we haven't codified it, haven't made it part of the expectations. We need to have more robust expectations, and it needs to come from the top down. Our deans are getting there, but they're still stuck in 'That's great but you're gonna get more journal articles, right?' If you want to be the #1 university in impact, then articles might not get us there."

"The University should have team facilitators. Teams don't always work well together. If you're going to collaborate, you're going to run into hard things, and there are people who can help teams through that."

"If you want to get kids into reading, you have to have a lot of books around. You have to put out more books than they could possibly read. The University should be asking, 'What should we put out there? The space for collaboration? The funding to take a few weeks in the summer to develop a project?'"

To me, the exciting thing about UW is there are a lot of brilliant people with incredible ideas. I think the University's ultimate objective ought to be bringing them together and uplifting them."

—Thaisa Way

