



Yale

EDUCATION

Beyond the Lab

Students in AGLP broaden their skills beyond academic research

Pursuing a Ph.D. in engineering can be arduous but extremely rewarding work, delving deeply into one topic and often taking the research to places never before explored.

But it's also good to occasionally look up from your microscope, get out of the lab and broaden your skill set. That's where the SEAS Advanced Graduate Leadership Program (AGLP) comes in. It's a competitive program designed to provide doctoral students with experiences and training outside of their specific area of research. The idea is to widen participants' career opportunities, particularly in academia, policy and public service, and business.

Launched in 2009 with a grant from the Goizueta Foundation, AGLP provides participating students a coursework sequence in the Yale School of Management or a semester-long internship designed to fit their career aspirations. We spoke with four AGLP members — all currently pursuing their Ph.D.s — about their experience with the program. Their work with AGLP has launched start-ups, helped Connecticut in its efforts to keep millennials in the state and brought the Yale philosophy on makerspaces to the White House.

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Jonathan Chen

In the early part of his work toward a Ph.D. in biomedical engineering, Jonathan Chen worked on a device designed to measure the immune response of cells at the single cell level. The researchers went on to receive a patent for the device, which became the foundation for the Yale start-up Isoplexis.

“Being a part of that process and seeing all of that unfold was really inspiring, and I wanted to learn more,” Chen said. “Not just the science of it all, but what it takes to take something that started in a lab and bring it out to the greater society.”

Chen got a chance to see that side of the innovation process this past semester with an internship with Elm Street Ventures, a New Haven-based seed and early stage venture fund with close connections to Yale. He did research there for a number of projects, which involved looking into technologies and competing companies. He then drafted internal reports based on that information.

His efforts mainly focused on the launch of Elm Street Ventures’ latest spin-off, Osmol Therapeutics. On that project, he worked with Brian Dixon, an Elm Street Ventures partner and the CEO of Osmol. Like many of the venture fund’s investments, it’s based on research done at Yale — in this case, by Barbara Ehrlich, professor of pharmacology and cellular and molecular physiology.

Chen worked on internal memos about the company, wrote up explanations of the clinical need for the product, details about the science behind it and an assessment of risk

factors. Rob Bettigole, a managing partner at Elm Street Ventures, said Chen was a big help in getting everything ready for the September launch of Osmol.

“Jon’s pretty familiar with a lot of the science of what we’re working on, so he’s starting at a pretty high level,” he said. And what he didn’t already know, Bettigole said, Chen got up to speed quickly.

It’s one thing to have great ideas and great research, but innovations also require practical know-how to get them to market and make a real difference. In that regard, Chen said working with Elm Street Ventures was “an awesome opportunity.”

“I think everyone’s ultimate goal for their research is to help as many people as possible and to turn your research — or help turn someone else’s research — into something that’s going benefit the public,” he said. “That’s something that really drives me, and sometimes people don’t know the avenues. A firm like Elm Street Ventures can help bring that to the table.”

Outside of the internship, Chen said AGLP has been instrumental in shaping his interest in investments and entrepreneurship.

“We meet with industry leaders in different fields,” he said. “We’ve partaken in a lot of discussions and we hear about conflict management, negotiating, and a lot of skills that are very applicable in pretty much any space.”



Thomas Kwan

When he first came to Yale, Thomas Kwan was intrigued by the Center for Engineering Innovation & Design (CEID). Design spaces are traditionally appropriated for distinct disciplines and he initially thought the CEID was geared toward mechanical and electrical engineering.

“It wasn’t until I was in the space that I really understood how welcoming and collaborative the CEID space and culture is,” he said.

As a doctoral candidate in environmental engineering, Kwan was interested in how makerspaces such as the CEID can be leveraged for green design and education. One of the first projects he designed asked multidisciplinary student groups to fabricate two hand juicers in the CEID and assess their environmental impact if manufactured at a large scale. By employing a rapid life cycle analysis, the students were able to make informed design decisions sparking an innovative, experiential, and sustainable approach to modern making and design.

Three years later, Kwan was at the White House talking up the virtues of the CEID and other makerspaces.

Now, through the AGLP, Kwan serves as something of an ambassador for makerspaces, looking at ways that universities and other institutions can make the best use of the spaces. He has spent time meeting with managers of educational makerspaces, networking with government officials, and giving sustainable design talks and workshops at international conferences.

His efforts earned him an invitation to a symposium at the White House in June as part of the National Week of Making. There, he and CEID Assistant Dr. Joseph Zinter shared their thoughts on what makes a successful makerspace. They talked about CEID best practices, emphasized a culture of inclusion, and how makerspaces can fundamentally change higher education pedagogy.

Daragh Byrne, a founder of the MakeSchools Alliance, which organized the symposium at the White House, said Kwan’s talk and his other work are going a long way to enrich the makerspace community.

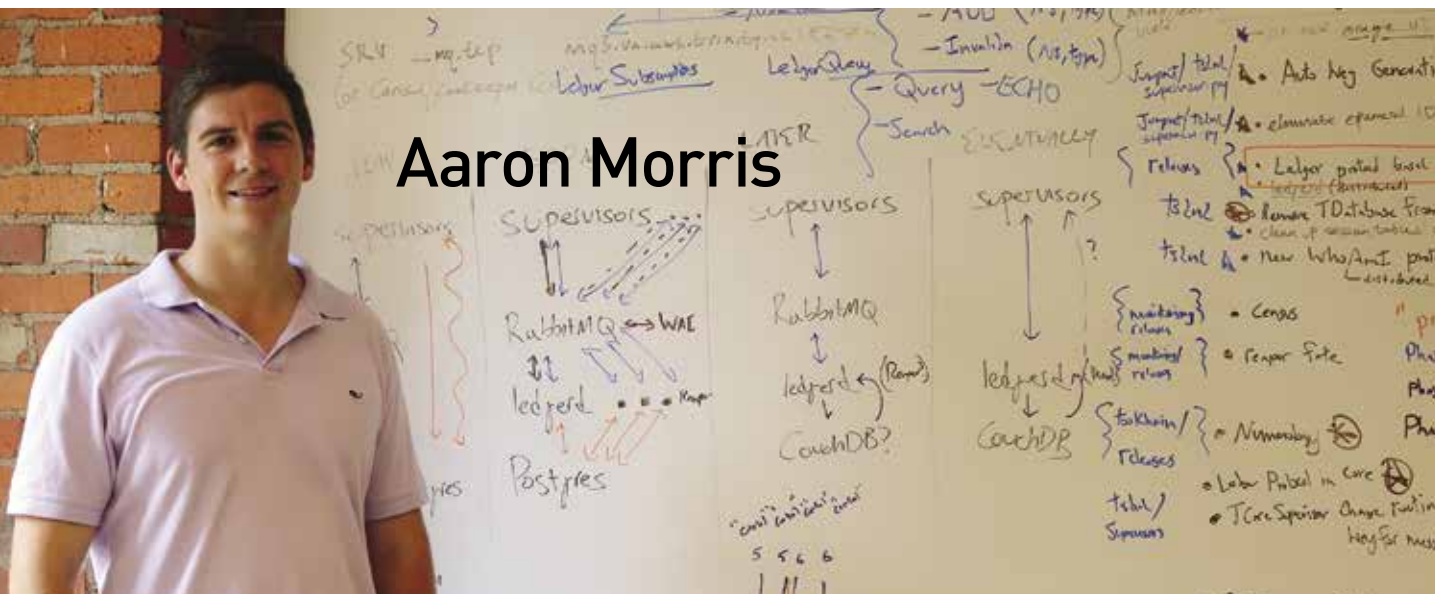
“I think the work he’s doing is really interesting,” he said. “One of the great things he’s doing is sharing his perspectives and showing what Yale’s doing — and how those best practices translate to the larger community. I think there’s been a real receptiveness to these ideas.”

With his background in environmental engineering, it makes sense that Kwan also focuses on how makerspaces can foster sustainable innovation. Kwan said he’ll continue to build on his work in the program by exploring different educational settings and how they influence learning.

“My experience with AGLP really enabled me to view education differently and how people learn in different ways,” he said. “It’s really changed my perspective on how we communicate information and the best ways to do that.”

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Aaron Morris



Aaron Morris is working toward his Ph.D. in biomedical engineering, with a focus on biomaterials and tissue engineering. He's also interested in entrepreneurship, so he signed up for an AGLP internship at the Yale Entrepreneurial Institute (YEI).

One of his main tasks over the semester was working with EZ Ice, a start-up company from Yale that's developing ice rinks that can be built in the backyard. The company planned to promote the product at an event in Canada, but were advised to first file a patent before making any public statements about their innovation. That's where Morris' background came in handy.

"I'd never submitted a patent application before, but I'm an engineer, and it's something I was interested in learning how to do," Morris said. "I thought I could help them with it — and they needed help, because they needed to do it quickly."

They had about two weeks. Morris, who's read plenty of patents for his research, immersed himself in the world of personal rink innovations and drafted a patent application. He and the EZ Ice team — the principals are four undergraduate students — had several meetings with Anthony D. Sabatelli, an attorney with Dilworth IP, the intellectual property law firm that serves as a YEI corporate partner. Between Morris' text and the designs from the EZ Ice team, most of the draft was solid. Sabatelli made sure the phrasing was legally binding.

Morris said working on the patent was important in understanding the process, particularly, he added, "if I want to patent my own ideas or help someone else."

"I learned a lot through this process and I certainly learned a lot about breaking down a product," he said. "For a patent, you need to break a product down to a bunch of parts."

Erika R. Smith, the former deputy director of YEI, said Morris was "an amazing part of the program this year" and that his research background was instrumental in getting the patent together so quickly.

"His help was critical to the team because they were going out to promote their idea and without the provisional patent, they'd be giving their idea away," said Smith, who now serves as the Director of the Blavatnik Fund for Innovation at Yale.

In general, she said, the AGLP has served an important role for graduate students by allowing them to gain knowledge and skills that they might not be exposed to in their academic work, but could help them as they explore career options. And it's been a great benefit to YEI, too.

"The AGLP interns really help our teams advance with the expertise that they provide," she said.



Amanda Pellowe

As much as Amanda Pellowe enjoys pursuing a Ph.D. in biomedical engineering, she's also intrigued by the world of science policy. Unlike the long-term goals of academic research, she said, things can happen a little quicker in policy-making.

For her internship at Yale's Office of Federal Relations, Pellowe was charged with two main tasks. One was to conduct an analysis of tech transfer — that is, how innovations move from initial research to final product. She conducted case studies of small companies that have come out of Yale, and looked at how Yale resources are being used for these companies. She also put together timelines that chronicled those companies' growth, ultimately determining where they ended up and whether they have provided jobs in the area.

For her second project she worked with the Connecticut Department of Economic & Community Development (DECD) to figure out whether millennials are leaving the state and why.

"It's part of a talent recruitment project they're working on and they're very concerned that they're losing talent in the state," she said. "So I helped put together some focus groups with graduate students to understand those issues a little better."

Concerns about job prospects and a lack of public transportation were near the top of the list. But Pellowe was surprised to also hear the focus groups talk about family life.

"When you read about millennials, it's all about how they want fun and you need to have networking," she said. "But a lot of people said the lack of child care and unaffordable housing prevents them from starting families and establishing roots here."

She put together a report for the DECD, which has a group working on some initiatives to address those issues. Richard Jacob, Associate Vice President for Federal and State Relations, said Pellowe's work was a significant contribution.

"She's very talented and has an energy and enthusiasm for policy," he said. "And her being a grad student helps, since we want to better understand how students perceive Connecticut as a place to stay."

The AGLP has been good for Yale, he said. "In the policy world, there's a dearth of technical and scientific expertise, so it's helpful for us to have a framework to work with on that."

Pellowe enjoyed the experience and is now looking at fellowships that would allow her to continue this line of work. She's also gotten involved with the Yale Science Diplomats, the policy group for graduate students at Yale. Without AGLP, she said, it would have been a lot harder to get an idea of how she would have taken to policy work.

"That's the struggle with a lot of graduate students, because you're really only trained to do academic research," she said. "I think this gave me a great opportunity to explore." 🏆