

 Tenant Spotlight

“Better, Faster, Cheaper, Greener”: Tenant Spotlight on AIMATX and Their New Materials to Save the Planet

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8 min read



The AIMATX team at Bakar Bio Labs. On red chairs: Professors Omar Yaghi and Jennifer Chayes. Interim CEO Christian Borgs is above Prof. Chayes in second row. Photo courtesy AIMATX

By Bella Liu.

Generative AI has exploded into materials science. The space is crowded with startups claiming to be able to work miracles.

But even though you can now design materials with incredible properties, you still have to make them.

[AIMATX](#), a participant in the Bakar Labs for Energy & Materials pilot program and a tenant at Bakar Bio Labs, is a materials innovation company that’s using AI to design not only remarkable new materials, but also more practical, efficient paths to synthesize them. Co-founder Jennifer Chayes — who also serves as the Dean of the College of Computing, Data Science, and Society at UC Berkeley — describes AIMATX as a “materials on demand” type of operation.

“It starts with a customer saying, ‘I want a material with this, that, and that property,’” Chayes said. “I want a sneaker with this property. I want a face cream with this property. I want something that can transport a drug that would have been destroyed in the stomach down to the small intestine without being disrupted so it can be absorbed there. I want something to have very, very particular properties, and I’m not really happy with anything I find in online catalogs. So then you’d go to AIMATX to have the material made.”

Chayes continued, “This will change the entire way people manufacture things, because they don’t start from the materials that exist. They start from their dream properties and then create materials.”

As of right now, AIMATX is focused on the production of metal-organic frameworks (MOFs) and covalent organic frameworks (COFs), ultraporous crystalline synthetic materials that are each designed to catch a particular molecule, hold it, and then release it under different conditions, making them useful for processes like water absorption or drug delivery. MOFs and COFs are the invention of Professor Omar Yaghi, a pioneer of reticular chemistry and another AIMATX cofounder who Chayes remembers being instantly charmed by.

“A little over three and a half years ago,” Chayes said, “[former UC Berkeley Chancellor] Carol Christ introduced me to Omar Yaghi and said, ‘Berkeley has a great chemist who’s been talking about data science and AI. Can I introduce him to you?’ So Omar and I started talking. That led to the gift that established the Bakar Institute of Digital Materials for the Planet to help found a field at the boundary of AI and Materials, attracting faculty, post-docs and grad students from across Berkeley and LBNL. And I kept being amazed at MOFs and COFs. I was also distressed to hear that these great things took two to three years to make.”

One of AIMATX’s first goals, even before they were officially AIMATX, was speeding up the time it took to produce MOFs and COFs. Chayes describes working with Yaghi and Christian Borgs, a Berkeley professor of computer science and another future AIMATX co-founder, on cutting the production timeline of MOFs and COFs down from years, to months, to weeks.

“Within one year, we sped it up by a factor of 50,” Chayes said. “Now we’ve got it down to one week. And we’re also getting really good at predicting

new molecules, new MOFs, new COFs. Our AI engine is also getting smarter and smarter, so we'll start to do this even faster for a broader variety of MOFs and COFs, and ultimately for many other kinds of materials too. We will become a better, faster, cheaper, and greener way to make anything you want to make."

With the ongoing AI boom we're experiencing, Chayes admits that the chemistry field is currently crowded with other companies that are also applying the powers of generative AI to material science. But Chayes says AIMATX is blending the two fields in ways no one else has yet.

"There are AI-first companies. And there are older materials companies that have now brought in AI," Chayes said. "We are, I think, way ahead of the competition in that we're not a materials company that slapped AI on in the end, and we're not an AI company that slapped materials on at the end. We are an AI-plus-materials company. We are a native hybrid company, and I don't know of any other native hybrid companies like us."

AIMATX's founding "superteam," Chayes says, also gives the company a competitive edge.

"We have Omar [Yaghi], who's the inventor of this field," Chayes said. "We have Christian [Borgs] and myself, we were at Microsoft together for 23 years founding and leading AI labs before coming here five and a half years ago. And we have Matei [Zaharia] who's the co-founder and CTO of Databricks. We have Bingqing [Cheng], who's a young rock star computational chemist. And we have Fernando [Perez], the co-inventor of Jupyter who is probably the best platform builder on the face of the earth. So we have a pretty nice team of founders."

But beyond her accomplished and intellectually-stimulating colleagues, Chayes also credits Berkeley's general culture of innovation with giving AIMATX an edge over the field.

"Bakar Labs is startup nirvana," Chayes said. "It's not only the people in the facilities, but what they make available. For example, we have been able to bring in some of Omar's graduate students as interns, which is huge for us."

Chayes says that while AIMATX has just started working with their first customer — they're developing COFs that can capture carbon directly from the air — she foresees a future in which AIMATX is the future of manufacturing.

"10 years from now, you're going to want something, and you're going to ask us to make a material," Chayes said. "As Omar always says, 'If someone can dream it, I can make it.'"



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