Activating Tomorrow’s Technology Leaders

How Cyclotron Road’s Entrepreneurial Fellowships Are Bridging the Science-to-Product Gap
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The Problem

Entrepreneurial scientists are uniquely capable of creating transformative products that can benefit society, but today’s research ecosystem does not support the path from science to product. That means our smartest, best trained people aren’t able to develop solutions to pressing problems in energy, manufacturing, defense, food, and health.
What We Do

Cyclotron Road activates tomorrow’s technology leaders by supporting world-leading scientists as they move a transformative technology concept toward a first product.

Our entrepreneurial fellowships empower these innovators with funding, access to world-class research facilities, and intensive business mentorship.

Since 2015, we’ve supported 41 fellows focused on advanced energy, materials, and manufacturing technologies.

AS A FELLOWSHIP, OUR SUPPORT ENABLES A NEW PATH FOR THE DEVELOPMENT OF AN INNOVATOR AND THEIR IDEA THAT OTHERWISE WOULD NOT EXIST.
Our Reach

More than 650 entrepreneurial scientists and engineers from around the world have applied for Cyclotron Road since 2015. Last year, we had 177 applicants for Cohort Four, the most in our history.

This response validates the immense pool of scientific talent that could be harnessed to convert scientific discoveries into new technologies.

- Chemistry: 23%
- Materials Sciences: 6%
- Mechanical Engineering: 20%
- Biology: 18%
- Physics: 12%
- Electrical Engineering: 8%
- Other: 13%

**FINALIST GRADUATE UNIVERSITIES**

- Boston University
- California Institute of Technology
- Columbia University
- Duke University
- Johns Hopkins University
- Massachusetts Institute of Technology
- Penn State University
- Princeton University
- Stanford University
- Texas A&M University
- University of British Columbia
- University of California, Berkeley
- University of California, Irvine
- University of California, Los Angeles
- University of Colorado
- University of Houston
- University of Hawaii
- University of Michigan
- University of Minnesota
- University of South Carolina
- University of Texas, Austin
- University of Texas, Arlington
- University of Virginia

**FELLOWSHIP APPLICANTS BY YEAR**

- Cohort 1 (2015)
- Cohort 2 (2016)
- Cohort 3 (2017)
- Cohort 4 (2018)

**FINALIST FIELDS OF EXPERTISE**
Meet Cohort Four

Our most recent cohort joined Cyclotron Road in May, 2018. Across their projects they are advancing new technology concepts for long-duration energy storage, clean power generation, sustainable chemicals, quantum computing, and beyond.

http://www.cyclotronroad.org/fellows#cohort4
Our Support

Over the last four years, Cyclotron Road fellows have demonstrated that our support can enable key learning cycles, pivots, and de-risking milestones. Our support builds a bridge to partnerships and financing opportunities that are aligned with an appropriate path to market. This is especially important for industries like energy, manufacturing, and electronics, where barriers to entry are massive and competition is fierce.

**Key Milestones Achieved at Cyclotron Road**

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<th>Milestone</th>
<th>Percent of Graduating Teams</th>
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<tr>
<td>Market or tech pivot</td>
<td>60%</td>
</tr>
<tr>
<td>Funding for first prototype</td>
<td>80%</td>
</tr>
<tr>
<td>Built first prototype</td>
<td>60%</td>
</tr>
<tr>
<td>&quot;No-go&quot; decision on project</td>
<td>20%</td>
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Percent of graduating teams
Etosha Cave spent her PhD at Stanford working to convert CO₂ pollution into valuable commodity chemicals. After years of research, she and her colleagues were convinced they could build something transformative: a reactor that would produce the world’s first economical carbon neutral fuels. They founded a startup, Opus 12, to bring this vision to market.

But, after a few conversations with potential partners and investors, they were stuck. The problem wasn’t the technology’s transformative potential. People understood that. But without a working prototype that could take several years and millions of dollars to assemble, investors and customers were too skeptical to buy in.

Over two years supported by Cyclotron Road, Cave and her co-founders were able to validate a first market, build a prototype reactor, form a key commercial partnership, and, ultimately, raise funding they needed to build a team and scale their company.

“Cyclotron Road allowed us to build the prototype that we needed to get private funding.”

Etosha Cave, Cofounder and CSO, Opus 12
“Cyclotron Road really encouraged me to go out and talk to people. Without that insight, I would be barking up the wrong tree right now.”

Pete Frischmann, Founder and CEO, Sepion Technologies

Pete Frischmann developed a nanoporous polymer as a scientist at Berkeley Lab. Months of market research showed that his invention could unlock ultra-lightweight Li-S batteries for electrified air travel. He founded a company, Sepion Technologies, to spin out the invention. But would investors have the appetite for a far-future market?

As a fellow at Cyclotron Road, Frischmann spoke to dozens of investors and strategic partners to find out. He quickly realized his initial concept would be nearly impossible to finance as a first market. It was back to the drawing board for his new company.

With support from our fellowship and access to facilities at Berkeley Lab’s Molecular Foundry, Frischmann was able to shift his focus to membranes for Li-ion and Li-metal batteries, while demonstrating the performance and manufacturability of his polymer at industrial scale. His new direction was rewarded with a multimillion dollar grant from ARPA-E and, upon exiting the program, an initial round of private investment.
“If we can make this work, it has a lot of promise to act as a bridge to a lower-carbon future.”

Tom McDonald, Founder and CEO, Mosaic Materials

As a PhD student at UC Berkeley, Tom McDonald studied metal-organic-frameworks—new materials with an unrivaled ability to absorb gases, such as CO$_2$. McDonald saw a huge potential impact in this field: MOFs were one of the most promising ways to achieve carbon capture and use it to mitigate climate change.

But, while thousands of MOF materials with commercially relevant properties had been discovered in academic labs, few, if any, had entered commercial use. Capturing this opportunity would require scaling MOF synthesis from grams to kilograms and finding a high-value first market.

With Cyclotron Road support, McDonald and two cofounders started Mosaic Materials to do just that. Working at Berkeley Lab, Mosaic scaled up their synthesis within a few months. They also spoke to dozens of customers to identify high-value applications for CO$_2$ removal in submarines, natural gas purification, and biogas upgrading. This unlocked funding from the California Energy Commission for a pilot demonstration and their first private investment, both key stepping stones to a first commercial product.
Our Impact

We’ve now supported 41 fellows across 30 transformative technology projects. They have collectively attracted more than $80 million in early-stage funding beyond our fellowship support.

These results have created a center of mass for the innovation community, attracting executives and influencers from the world’s largest corporations and philanthropies to get involved.
Why It Matters

Science entrepreneurs struggle to find their footing in today’s innovation system, even though their innovations could address society’s most pressing needs. Our goal is to keep them in the game, focused on maturing their ideas into transformative products and businesses.

Ultimately, our success will be driven by the positive impact created by our fellows and alumni over the course of their careers, measured on the scale of gigawatts, tons of CO$_2$, billions of dollars, and millions of lives.
Want to learn more about Cyclotron Road?

Visit our website cyclotronroad.org

Acknowledgement
The continued progress of Cyclotron Road would not be possible without foundational support from the DOE Advanced Manufacturing Office and the California Energy Commission, as well as the guidance and support of the Leadership Team of Lawrence Berkeley National Laboratory and the Activation Energy Leadership Council.
Supporters and Partners

We are assembling a community of committed public and private partners to support Cyclotron Road. Through donations of time, money, equipment, or services, our partners allow us to advance our mission while supporting their aligned strategic priorities.

Interested in partnering with us? Visit our website to learn more and start the conversation.

Thank you to our supporting partners:

Cyclotron Road is a partnership between Lawrence Berkeley National Laboratory and Activation Energy