

# **Cyclotron Road: Empowering Tomorrow's Manufacturing Leaders**

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**Cyclotron Road/Lawrence Berkeley National Lab & Activation Energy  
2015 - 2019**

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# Overview

Cyclotron Road is an entrepreneurial research fellowship program based in Berkeley, CA. As Cyclotron Road fellows, leading **innovators are embedded at Lawrence Berkeley National Laboratory (LBNL) for two years** while they advance a technology project with the potential for global impact in materials, manufacturing, clean power, or semiconductors.

## Quick facts:

- Established 2014 by LBNL
- Managed as a partnership between LBNL and independent nonprofit Activation Energy
- Supported by: the DOE's Advanced Manufacturing Office; DARPA; the California Energy Commission; and leading corporations and philanthropies
- Currently supporting 27 fellows across 19 projects
- Supported 29 alumni fellows across 21 projects
- Total community of more than 150 entrepreneurial technologists

## Timeline:

**Project Start Date:** Annual

**Budget Period End Date:** 08/30/2020

## MYPP Area: Workforce Development

## Annual Project Budget and Costs:

| Budget                   | DOE Share | Total   |
|--------------------------|-----------|---------|
| Overall Budget           | \$2.5M    | \$2.5M  |
| Approved Budget (BP-1&2) | \$2.5M    | \$2.5M  |
| Costs as of 3/31/19      | \$1.25M   | \$1.25M |

## Project Team and Roles:

- **Lawrence Berkeley National Lab (LBNL):** Institutional host focused on the facilities and technical expertise needed to support early-stage applied research and development.
- **Activation Energy:** Independent nonprofit organization focused on the success of fellows translating research to commercial products.

# Project Objective(s)

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## Problem:

New energy and manufacturing technologies based in the hard sciences will be fundamental to ensuring US competitiveness and energy security in the 21<sup>st</sup> century. Yet, there are critical gaps in today's research ecosystem that prevent scientists and engineers from maturing new concepts to the point of commercial viability.

## Objective:

Our mission is to empower scientists and engineers to advance their research from concept to viable first product, positioning them for broad, long-term societal impact.

**cyclotronroad**



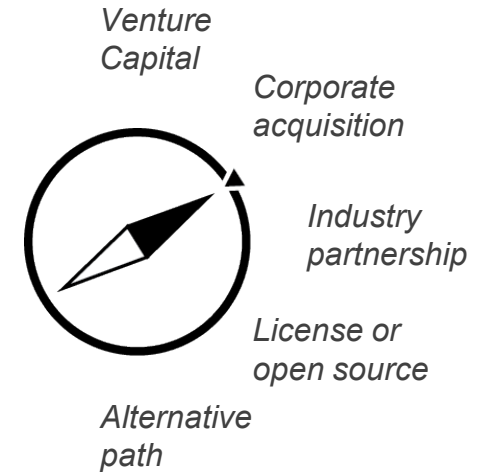
# Technical Innovation

## Bridging the Science-to-Product Gap

Critical gaps in our research ecosystem prevent even the most qualified innovators from advancing hard science concepts to the doorstep of the market.



# Technical Approach



① **Recruit** world-class entrepreneurial scientists and engineers

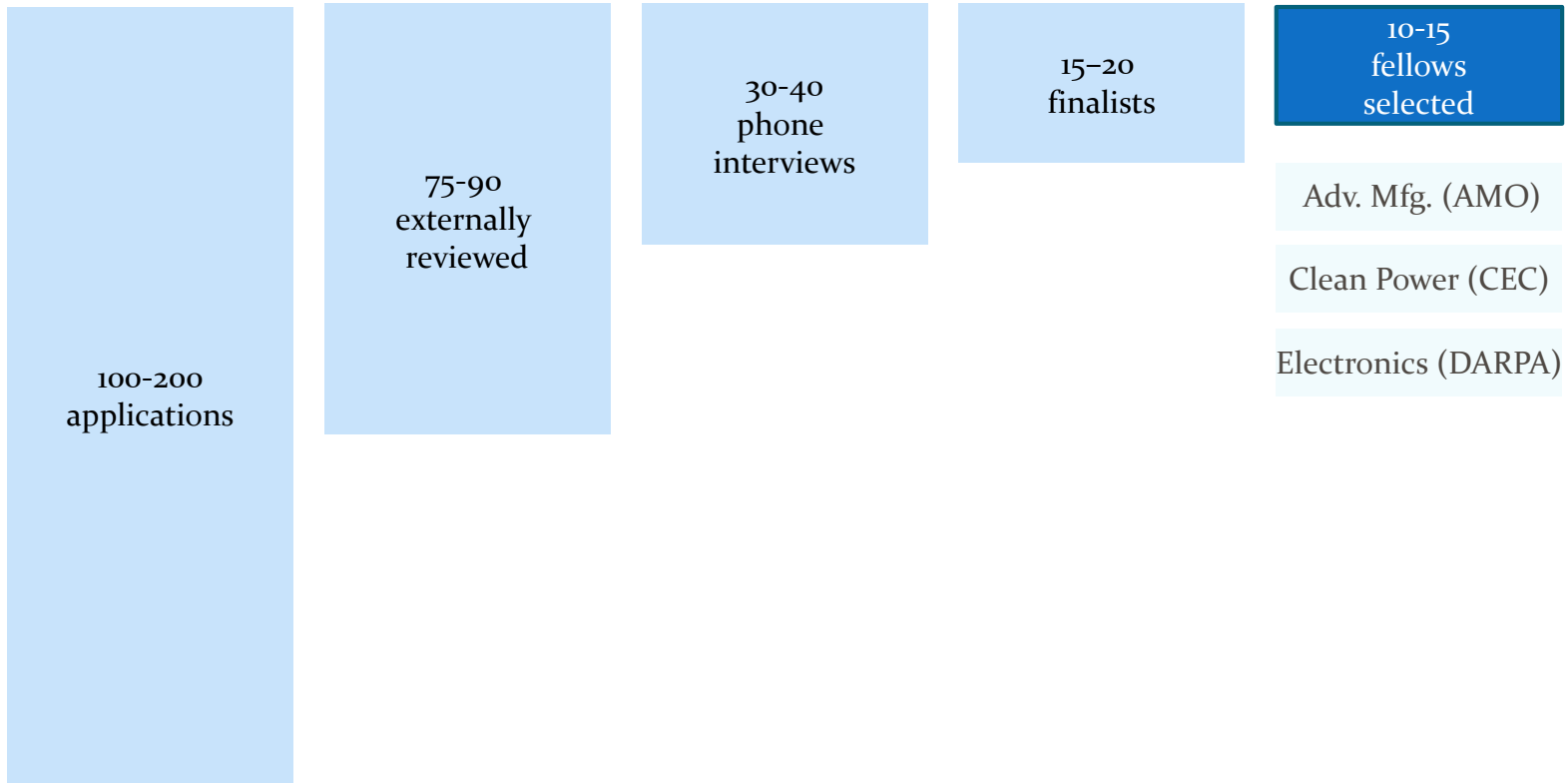
② **Empower** them to make rapid progress toward a first product

③ **Position** their technologies for path to market

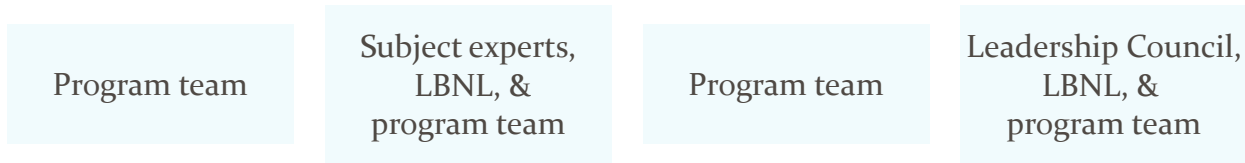
# Technical Approach (Cont'd)

**1. Recruit:** Attract and select the very best entrepreneurial scientists and engineers working on hard technologies. We look for entrepreneurial leaders from among the top researchers in the field—ones with the rare combination of exemplary technical skills, an impact-oriented mindset, and a commitment to build value by solving commercially relevant problems.

Steps:



Reviewers:



# Technical Approach (Cont'd)

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2. **Empower:** We provide our innovators with the credibility and resources to make rapid progress translating their ideas to a viable product, including:

## A two-year fellowship

Rapid progress requires an “all-in” commitment. Our program fellowship provides a living stipend and health insurance so that innovators can dedicate 100% of their working time on their projects.

## Access to world-class research facilities and expertise

Science innovation requires sophisticated infrastructure. Cyclotron Road participants receive access to facilities, equipment, and expertise at LBNL. We provide a small amount of initial research funding to facilitate access and collaboration with the LBNL’s staff scientists.

## Training, mentorship and networking

Fellows receive intensive training and mentorship covering all aspects of the journey from concept to product. We expose them to a wide range of leaders from academia, government, industry, and finance that can serve as advisors or partners in support of their effort.




# Technical Approach (Cont'd)

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**3. Position:** Our approach is to help fellows take their technology from concept to prototype demonstration. Our goal is simple: allow innovators to mature their ideas to the point where the most suitable commercial partners can take over. In strengthening this alignment, we enable the private sector to support science innovation more efficiently and successfully, driving better outcomes and greater impact on society.

## Hard Tech Development Framework

|                   | <b>Enter</b>               |  | <b>Exit</b>                  |
|-------------------|----------------------------|--|------------------------------|
| <b>Technology</b> | <i>Concept</i>             |  | <i>Prototype</i>             |
| <b>Market</b>     | <i>Unknown opportunity</i> |  | <i>Validated application</i> |
| <b>Team</b>       | <i>Founding scientist</i>  |  | <i>Team and partnerships</i> |
| <b>Funding</b>    | <i>Public</i>              |  | <i>Private</i>               |



# Results and Accomplishments

For innovators working to commercialize new technology, our fellowship program creates a path that would otherwise not exist.

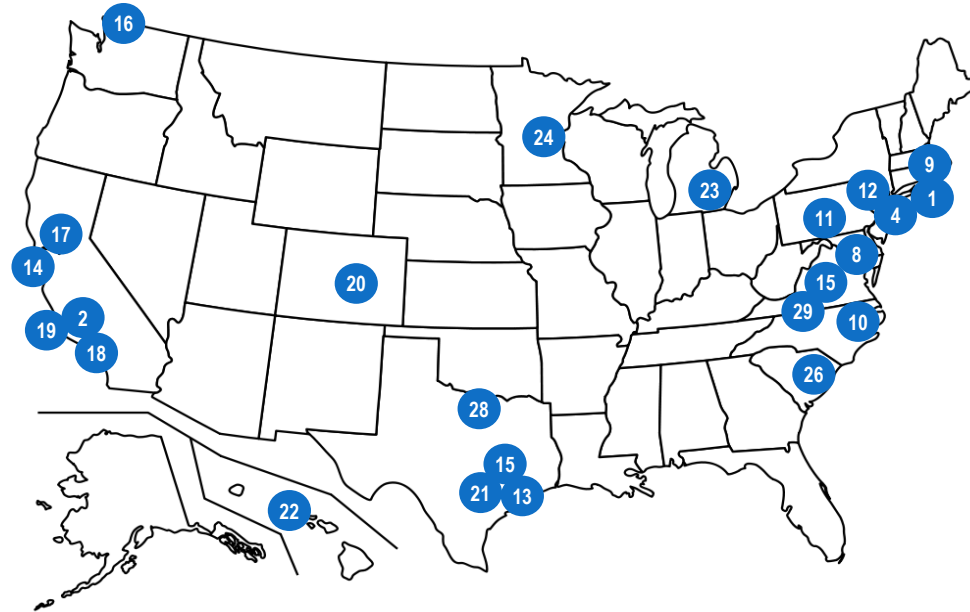
## Results Snapshot

- Active collaborations with LBNL: **18**
- Jobs created: **100+**
- Technology to prototype: **20**

## Fellow Pipeline Snapshot

| Cohort      | Applicants | Fellows   | Projects  | Active Projects |
|-------------|------------|-----------|-----------|-----------------|
| I, II       | 280        | 19        | 12        | 12              |
| III         | 137        | 10        | 9         | 8               |
| IV          | 178        | 13        | 9         | 9               |
| V           | 235        | 14        | 10        | 10              |
| <b>TOT.</b> | <b>830</b> | <b>56</b> | <b>40</b> | <b>39</b>       |

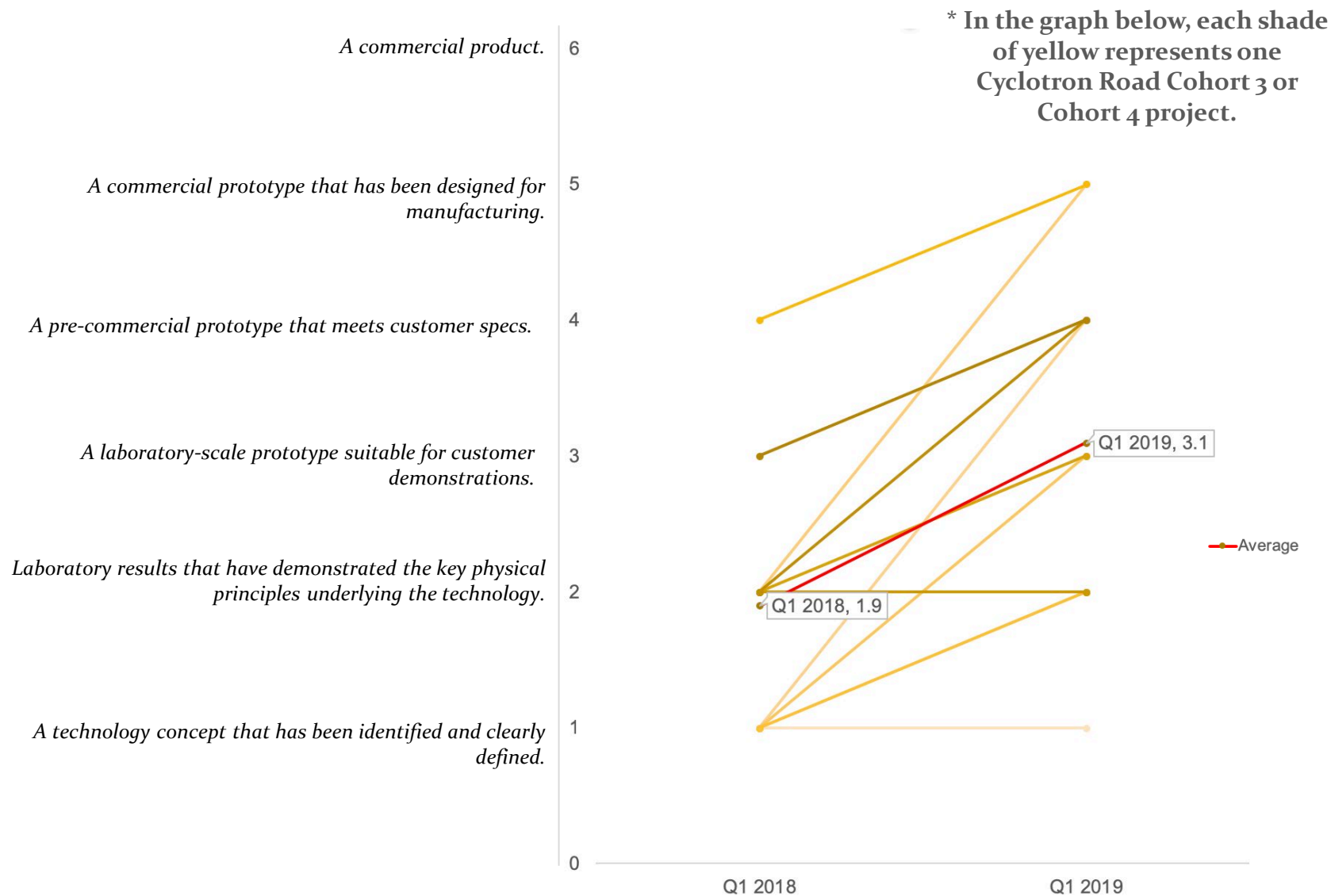
## Graduate Universities of Cyclotron Road Finalists



- |  |   |                                    |
|--|---|------------------------------------|
| 1. Boston University                     | 11. Penn State University                 | 21. University of Houston          |
| 2. California Institute of Technology    | 12. Princeton University                  | 22. University of Hawaii           |
| 3. Colorado State University             | 13. Rice University                       | 23. University of Michigan         |
| 4. Columbia University                   | 14. Stanford University                   | 24. University of Minnesota        |
| 5. Cornell University                    | 15. Texas A&M University                  | 25. University of New Mexico       |
| 6. Duke University                       | 16. University of British Columbia        | 26. University of South Carolina   |
| 7. Georgia Institute of Technology       | 17. University of California, Berkeley    | 27. University of Texas, Austin    |
| 8. Johns Hopkins University              | 18. University of California, Irvine      | 28. University of Texas, Arlington |
| 9. Massachusetts Institute of Technology | 19. University of California, Los Angeles | 29. University of Virginia         |
| 10. North Carolina State University      | 20. University of Colorado                |                                    |

# Results and Accomplishments (Cont'd)

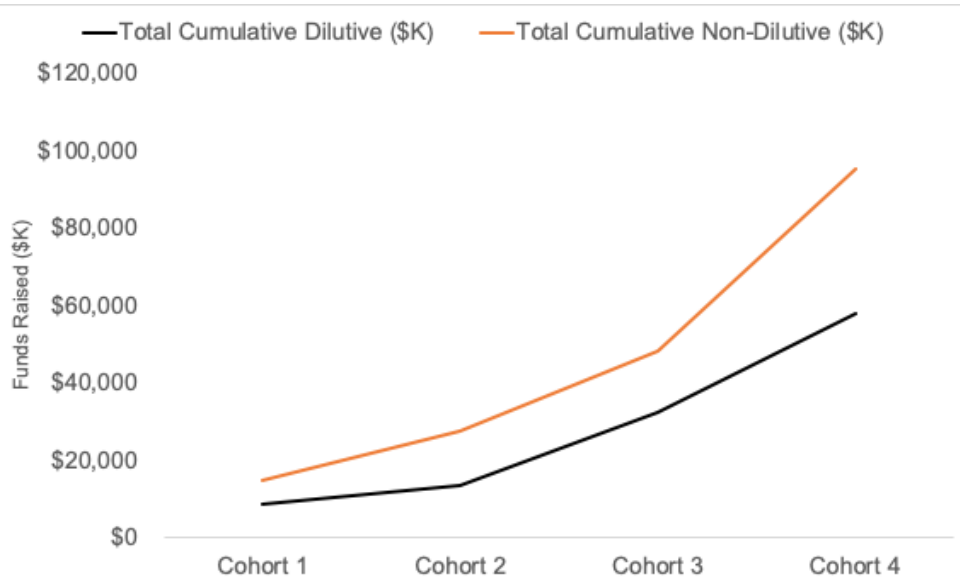
## Technology Development Over One Year (2018 – 2019)



# Transition (beyond DOE assistance)

Cyclotron Road's mission is to aid fellows in transitioning their technology innovations to the commercial marketplace. When we select Cyclotron Road fellows, we consider the commercial viability of the project and throughout the fellowship we give fellows the time, flexibility, support, network, and resources to form a strategy for post-fellowship technical development and deployment.

## Cumulative Dilutive and Non-Dilutive Funds Raised



## Quick snapshot:

- Direct funding / follow-on: **\$15M / \$100M+**
- Degree of funding alignment with goals: **>80%**
- Revenue: **\$1M+**
- Commercial Partnerships: **13+**
- Visitors to Cyclotron Road / year: **~300**
- Subscribers to newsletter: **3000+**