

# INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

# Welcome

September 12, 2024

Oak Ridge National Laboratory is managed by UT-Battelle for the U.S. Department of Energy.

Innovation Crossroads was founded and funded by the U.S. Department of Energy's Advanced Materials and Manufacturing Technologies Office, with additional support from the Office of Energy Efficiency and Renewable Energy's Building Technologies Office, DOE's Office of Electricity, Office of Science's Advanced Scientific Computing Research program and Basic Energy Sciences program, and the Tennessee Valley Authority.

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# Outline

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- Meet Our Innovators
- Program Metrics
- Alumni Spotlight
- Ecosystem and Partners
- Programming and Curriculum
- Application Process
- Discussion

# INNOVATION CROSSROADS

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## Program Overview

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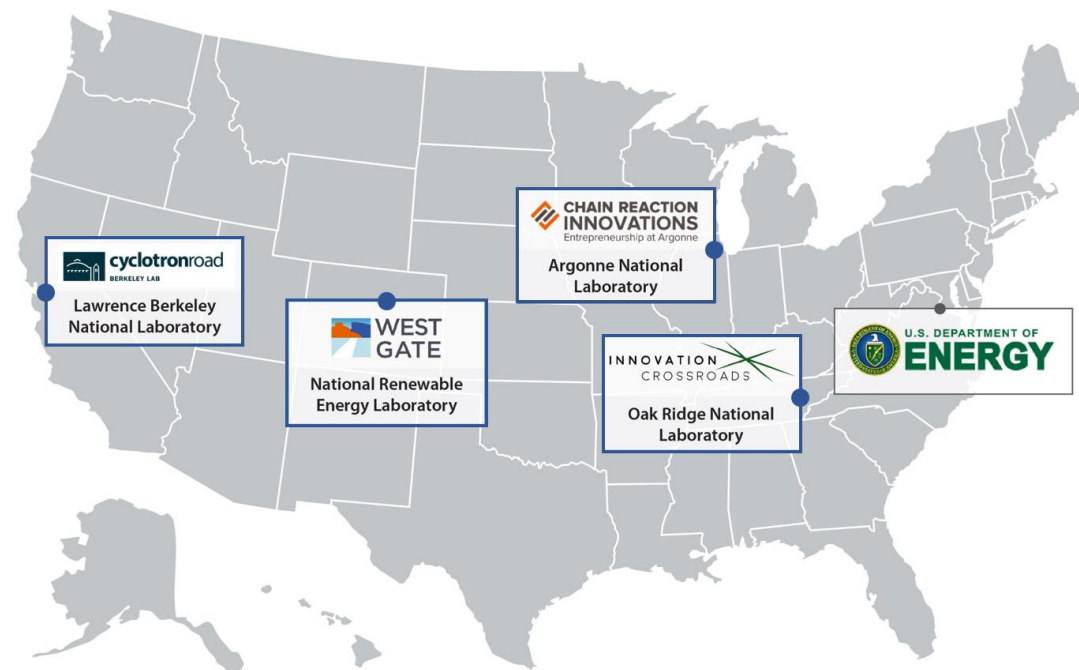
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# About the program

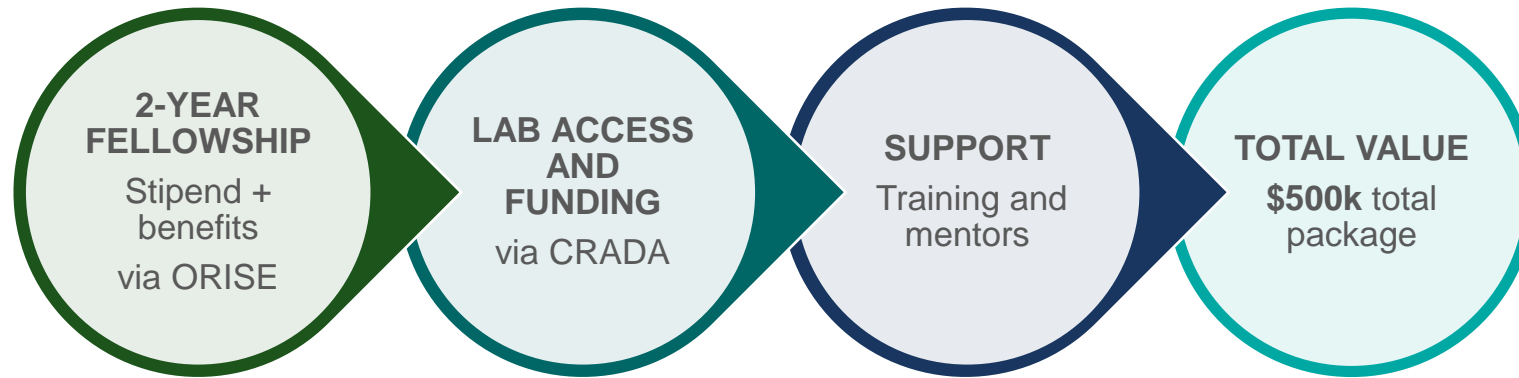
The Lab-Embedded Entrepreneurship Program (LEEP) is a fellowship that connects entrepreneurs with world-leading scientists and facilities at US Department of Energy national laboratories. LEEP accelerates the deployment of transformative energy technologies that address climate change and other challenges, while also creating jobs, promoting domestic manufacturing, and providing benefits to disadvantaged communities.



## Vision:

- **Recruit** the best energy and advanced manufacturing innovators
- **Leverage** expert mentorship and world-class facilities at national labs on a win-win basis
- **Position** people and technology for market

# World class support for startups



## Program Sponsors:

- U.S. Department of Energy's
  - Advanced Materials and Manufacturing Technologies Office
  - Building Technologies Office
  - Office of Electricity
  - Office of Energy Efficiency and Renewable Energy
  - Office of Science Advanced Scientific Computing Research program
  - Office of Science Basic Energy Sciences program
- Tennessee Valley Authority
- Oak Ridge National Laboratory

INNOVATION  
CROSSROADS





# Providing multi-faceted support

Innovation Crossroads offers unique multi-faceted support tailored to the individual needs of each startup company. This unique structure, combined with ORNL's diverse capabilities, provides fellows the opportunity to take their groundbreaking research to market more quickly and with more impact.

## National lab expertise

ORNL is DOE's largest science and energy laboratory and home to some of the nation's most significant user facilities. Because Innovation Crossroads entrepreneurs work within ORNL, they have immediate access to essential tools and resources. This access reduces cost, risk, and R&D time, allowing fellows to focus on creating the next generation of game-changing technologies.

## Multidisciplinary collaboration

Innovation Crossroads participants work with ORNL's renowned scientists and engineers across many disciplines, including biological and environmental sciences, advanced materials, neutron sciences, nuclear science and engineering, and high-performance computing, providing a platform for accelerating innovation.

## Business mentoring assistance

Innovation Crossroads has a growing network of partners who offer a unique entrepreneurial and business mentoring experience. The program facilitates connections with industry executives, investors, entrepreneurs, and other experts from academia, government, and finance who can serve as advisors and mentors to help develop priorities, mature skills, provide guidance, and make connections to their broader networks.

# Accelerating innovation by leveraging ORNL's unique resources and capabilities



Building Technologies  
Research and  
Integration Center

Carbon Fiber  
Technology  
Facility

Center for Nanophase  
Materials Sciences

High Flux  
Isotope Reactor

Center for Structural  
Molecular Biology

Manufacturing  
Demonstration Facility

National  
Transportation  
Research Center

Spallation Neutron  
Source

Oak Ridge Leadership  
Computing Facility



# INNOVATION CROSSROADS

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## Meet The Team

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# Innovation Crossroads leadership team and mentors



**Mike Paulus**  
Director, Partnerships



**Jennifer Caldwell**  
Director, Technology Transfer



**Dan Miller**  
Program Director



**Kelly Wampler**  
Program Manager



**Karen Dunlap**  
Partnerships Communications  
Coordinator



**Gary Rawlings**  
Commercialization Consultant



**Angelique Adams**  
Business Solutions Consultant



**John Derrick**  
Strategic Consultant



**Mike Paley**  
Government Funding Consultant

# Leadership council

## *Guidance from industry and investment leaders*

- **Brendan Abolins** - Eastman Chemical Company
- **Coleman Adams** - Clean Energy Venture Group
- **Jason Blumberg** - Energy Foundry
- **Brandon Bruce** - Techstars
- **John Bruck** - Market Square Ventures
- **Doug Buerkle** - LTM Ventures
- **Lindsey Cox** - Launch Tennessee
- **Eric Dobson** – Community Equity Partners
- **Jonathan Goldman** - Georgia Tech VentureLab
- **Alison Gotkin** - Raytheon Technologies Research Center
- **Maha Krishnamurthy** - University of Tennessee Research Foundation
- **Paul Leggett** - Mithril Capital Management
- **Vig Sherrill** - General Graphene
- **Lilly Tench** – Spark Innovation Center
- **Grady Vanderhoofven** - Three Roots Capital
- **Peter Winter** - In-Q-Tel
- **Johanna Wolfson** - Prime Impact Fund



# INNOVATION CROSSROADS

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## Meet Our Innovators

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# Meet our innovators



## COHORT 2017

2017-2019

4 Innovators / 3 companies

Sponsors: AMO, ORNL



## COHORT 2018

2018-2020

5 Innovators

Sponsors: AMO, ORNL



## COHORT 2019

2019-2021

7 Innovators

Sponsors: AMO, ORNL, TVA



## COHORT 2020

2020-2022

5 Innovators

Sponsors: AMO, ORNL, TVA



## COHORT 2024

2024-2026

7 Innovators

Sponsors: AMMTO, ORNL,  
TVA, BTO, SC-BES



## COHORT 2023

2023-2025

7 Innovators

Sponsors: AMMTO, ORNL,  
TVA, BTO, OE, SC-ASCR



## COHORT 2022

2022-2024

5 Innovators

Sponsors: AMMTO, ORNL,  
TVA

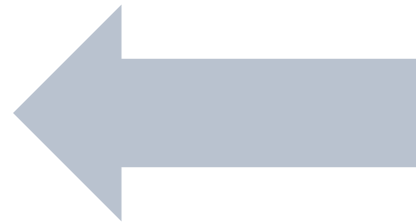


## COHORT 2021

2021-2023

6 Innovators

Sponsors: AMO, ORNL,  
TVA, BTO





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## Program Metrics

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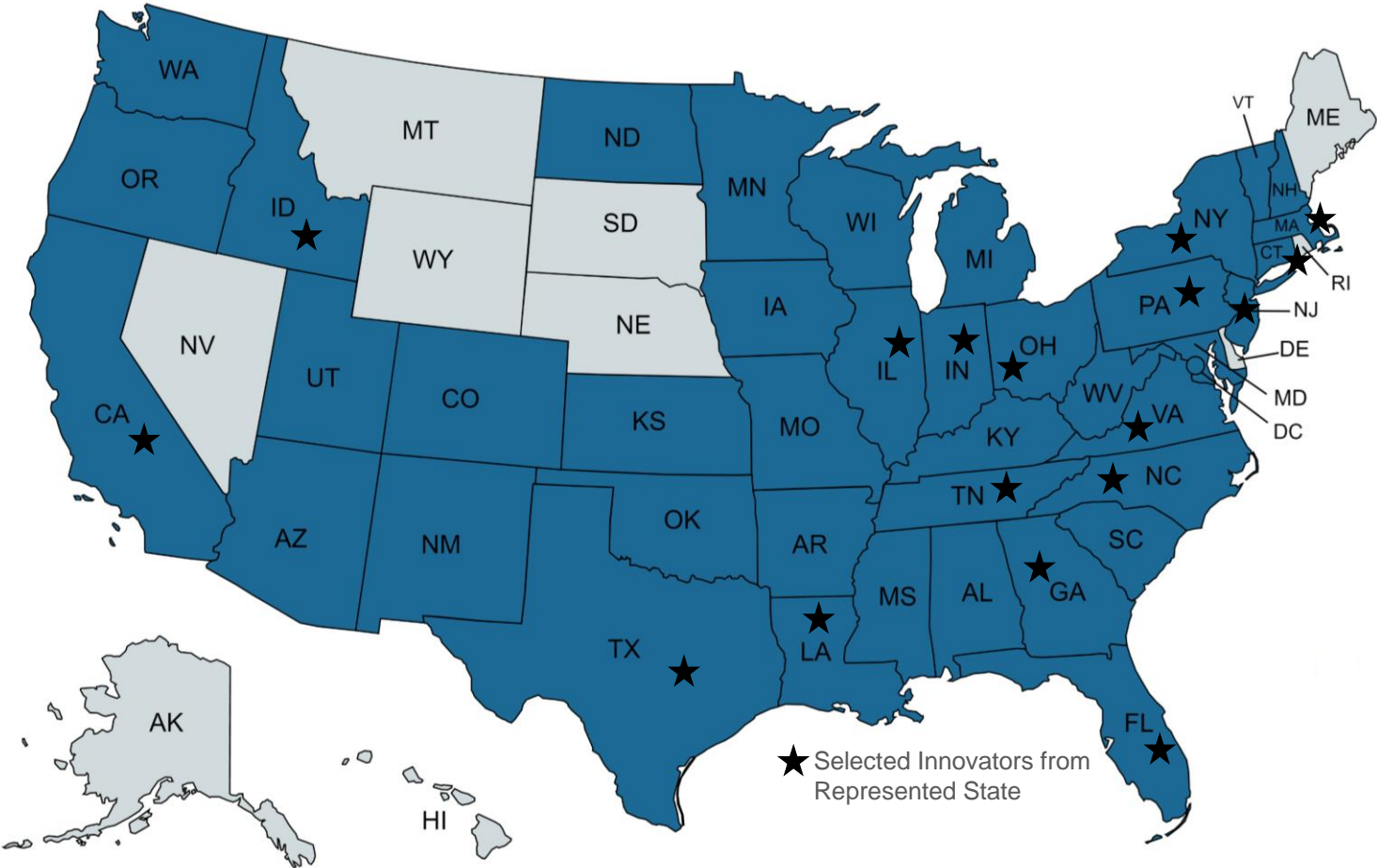
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# Nationwide: Attracted 403 Candidates from 40 States

STATE	#	STATE	#
Alabama	6	Mississippi	3
Arizona	7	Missouri	4
Arkansas	3	New Hampshire	1
California	40	New Jersey	8
Colorado	9	New Mexico	2
Connecticut	6	New York	30
District of Columbia	2	North Carolina	9
Florida	13	North Dakota	2
Georgia	16	Ohio	17
Idaho	2	Oregon	5
Illinois	21	Pennsylvania	7
Indiana	4	South Carolina	5
Iowa	1	Tennessee	66
Kansas	1	Texas	24
Kentucky	8	Utah	4
Louisiana	9	Vermont	1
Maryland	9	Virginia	13
Massachusetts	14	Washington	1
Michigan	10	West Virginia	1
Minnesota	2	Wisconsin	4

Plus: Brazil – 1, Canada – 1, Colombia – 1, Egypt – 1, France – 1, India – 2, Mexico – 1, Nuevo Leon – 1, South Korea – 1, Ukraine – 1, Other – 2



★ Selected Innovators from Represented State

# Driving impact by embedding entrepreneurs at ORNL

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45

startups  
supported

\$94  
million

in non-dilutive  
funding received

239+

jobs  
created

\$106.6  
million

venture funding  
raised

17

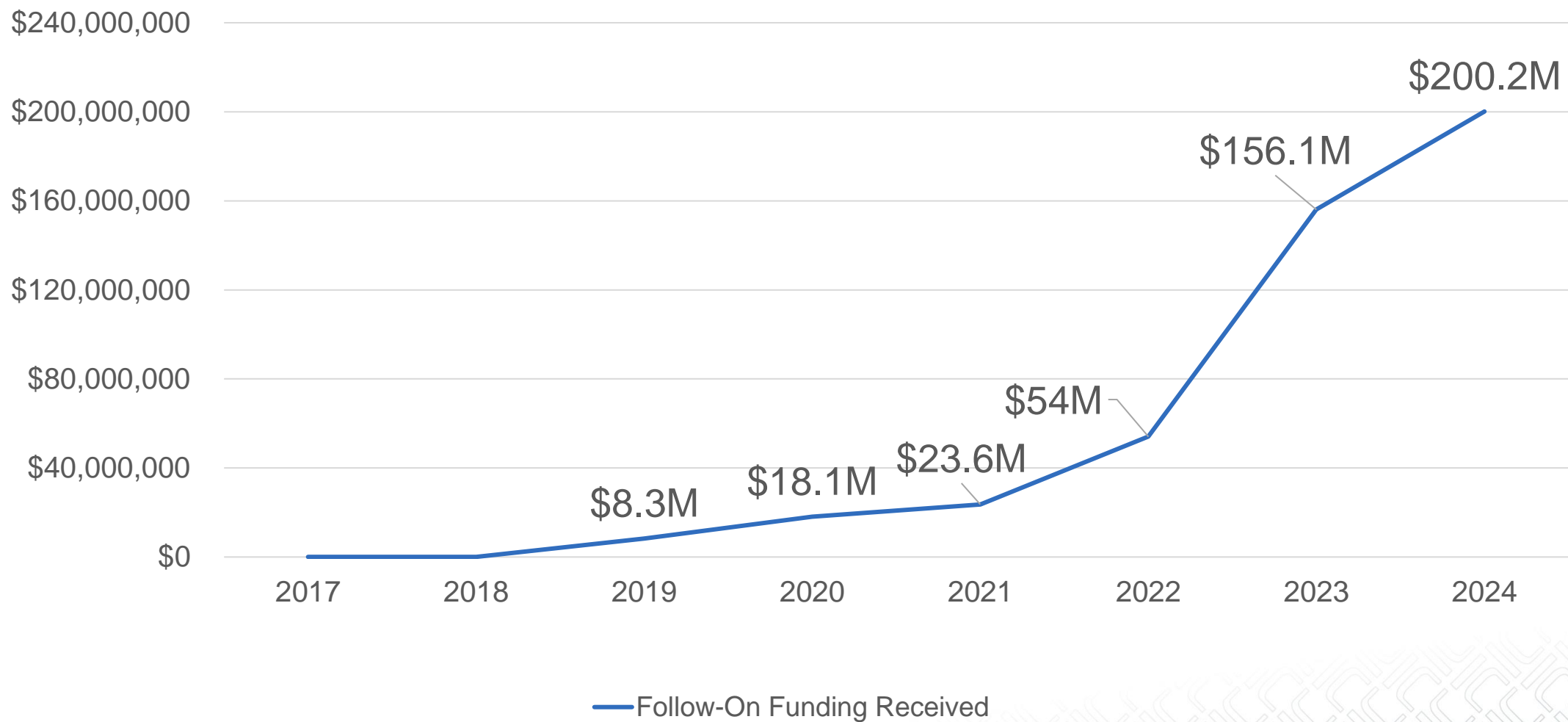
startups  
with sales

\$11.3  
million

in sales  
revenue



# Innovator follow-on funding received





# Retaining alumni companies in the region

## COHORT 2017 ALUMNI

May 2017 – May 2019

2 of 3 companies  
remain in region



## COHORT 2018 ALUMNI

May 2018 – August 2020

3 of 5 companies  
remain in region



## COHORT 2019 ALUMNI

May 2019 – August 2021

4 of 7 companies  
remain in region



## COHORT 2020 ALUMNI

June 2020 – June 2022

1 of 5 companies  
remain in region



## COHORT 2021 ALUMNI

June 2021 – June 2023

3 of 6 companies  
remain in region



# INNOVATION CROSSROADS

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## Alumni Spotlight

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# Alumni spotlight



- Opened a 20,000 square foot private lab/office in Knoxville, Tennessee
- Secured \$2 million DOE ARPA-E award with partners Endeavor Composites and the University of Tennessee, Knoxville
- 2020 R&D 100 Award Winner
- Named 2019 Forbes 30 Under 30 in Energy



- Opened first-of-its-kind 21,000 square foot refining facility in Fairfield, Ohio
- Raised \$37 million Series B round, with an additional \$7 million in non-dilutive
- Closed a \$13 million Series A round, led by Clean Energy Venture
- Named 2019 Forbes 30 Under 30 in Energy



- Opened first bio-based insulation manufacturing plant in the U.S.
- Received \$1.1 million from NYSERDA to manufacture bio-based insulation product using regionally grown industrial fibers
- Raised \$5.7 million in seed funding from more than 1,700 investors via Wefunder



- Made history by signing a first-of-its-kind, record-setting direct air capture purchase agreement with Google, valued at \$100 per ton
- 2024 R&D 100 Award Winner
- Unveiled first, industrial direct air capture pilot facility in Knoxville, Tennessee
- Named 2024 Forbes 30 Under 30 in Energy

# INNOVATION CROSSROADS

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## Ecosystem and Partners

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# Creating an innovation ecosystem

## Incubators and Accelerators



2016



2020

## Local Supporters



# INNOVATION CROSSROADS

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## Programming and Curriculum

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# Spark Cleantech Accelerator

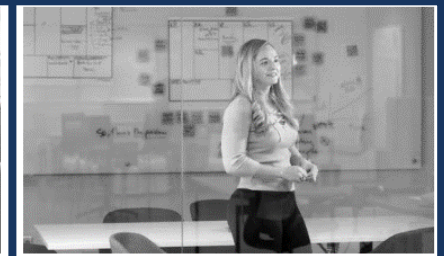
- Entrepreneur-fellows in Innovation Crossroads will complete the Spark Cleantech Accelerator, a 12-week program offered by the University of Tennessee, Knoxville, Spark Innovation Center at the UT Research Park.
- The Spark Cleantech Accelerator was created in partnership with Evergreen Climate Innovations and other partners to support early stage cleantech businesses and drive commercialization of their technologies by leveraging the unique science and technology resources of East Tennessee.
- By combining the resources of Innovation Crossroads and the Spark Cleantech Accelerator, we are building a stronger program for entrepreneurs.
- The accelerator curriculum will focus on four key areas, with a tangible deliverable associated with each: Product, Business Model, Finance, and Pitch.
- In addition to the core topics, each program participant will have the opportunity to select a “minor” concentration such as Intellectual Property Strategy, Brand Development, or Supply Chain Management. Minor topics will be finalized based on the needs and interests of the selected cohort.



## Product

*Deliverable:* Minimum Viable Product

- Focus on defining and creating basic product
- Quick testing and validation of business idea
- Rapid prototyping physically or virtually
- Mitigate capital intensity to prove the concept if applicable



## Business Model

*Deliverable:* Go-to-Market Plan

- Formalize vision, mission and strategy
- Value proposition to target customer
- Understand how to make money generate ROI
- Customer discovery
- Pricing, channels, sales strategy, and marketing



## Finance

*Deliverable:* Basic Financial Model

- Understanding of costs, cost structure, and revenue streams
- Understanding of funding options (dilutive and non-dilutive)
- Funding strategy
- Learn to speak to financial projections and strategy



## Pitch

*Deliverable:* Public pitch at Demo Day

- Story telling
- Pitching to customers
- Pitching to investors
- Public speaking
- Slide and graphic design
- Lots of practice!

# Recurring program activities

Activities	Description
Innovator's Institute	Educational seminars
Founders' Forum	Live Q&A with program alumni, community members, experienced startups founders, etc.
Pitch Practice	Innovators practice a particular pitch style and/or a pitch for a particular audience.
Monthly Technical Update	Innovator presents monthly status update (i.e., technical progress, business progress, awards/achievements, needs, etc.) to Staff/PI(s)/Mentors/Advisors.
Monthly Group Meeting	Review of program calendar, ORNL/IC updates and news, Q&A, networking, etc.



# INNOVATION CROSSROADS

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## Application Process

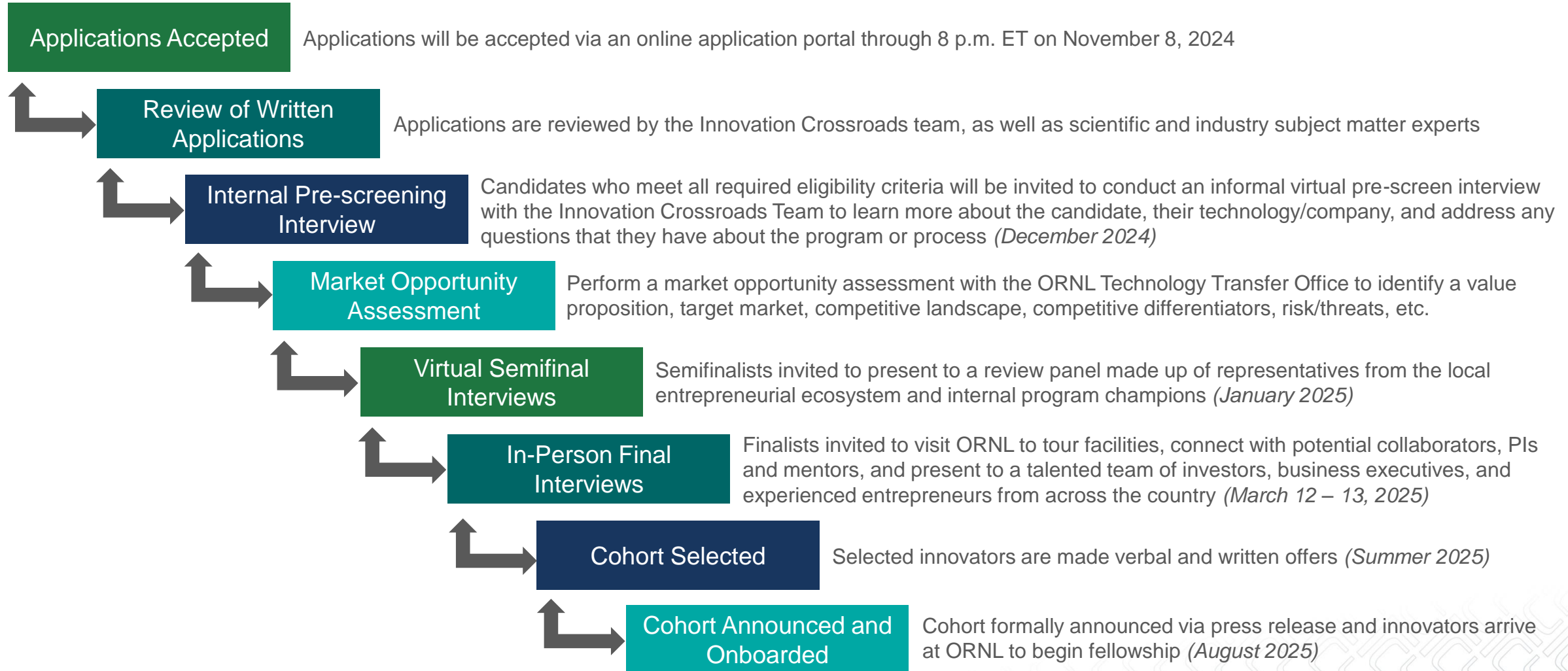
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# The process



# Technology areas of interest

- Advanced materials
- Carbon capture, utilization, and sequestration
- Circular economy technologies and systems
- Data and networking systems and technology
- Energy storage and grid optimization
- Improving manufacturing efficiency
- Industrial decarbonization
- Lowering building carbon and energy footprints
- Negative emissions technologies and carbon dioxide removal (CDR)
- Nexus of energy, water, and agriculture
- Quantum computing
- Solar and wind energy
- Other



# Eligibility criteria

- **For acceptance into the program, applicants:**

- Must apply as an individual, not as a company or organization (if you are part of a team, each member of your team can apply as an individual)
- Must have doctoral degree or equivalent experience
- Must leverage ORNL R&D capabilities and have alignment with DOE's and/or TVA's mission
- Must be willing to relocate to the Knoxville-Oak Ridge area for two years
- Must be a U.S. citizen or lawful permanent resident at time of application
- Must have raised no more the \$2 million USD in debt or equity funding from non-government sources within three years prior to program application
- Must successfully execute a cooperative research and development agreement (CRADA) with ORNL
- Must disclose background intellectual property rights, if necessary, that may be needed to freely operate on R&D-related tasks as outlined within the CRADA

# Application information

1. Complete online application form
2. Applications should consist of a single 8-page PDF document containing the following information:
  - **Cover Page:** Include only your completed "Basic Information" table.
  - **Abstract:** Provide a brief summary of your application.
  - **Problem and Solution:**
    - **Problem Statement:** Describe the problem your innovation addresses and its impact.
    - **Technology Description:** Summarize your product/solution and how it solves the problem.
    - **Scientific Feasibility:** Explain the soundness of the science behind your solution.
    - **Tech Development Plan:** Outline your development plan and risk mitigation strategies.
    - **Alternative Approaches:** Justify why your solution is superior to alternatives.
  - **Mission Impact:**
    - **Importance of Problem:** Highlight the urgency and significance of the problem.
    - **Relevance to Sponsors:** Discuss the potential impact on DOE, TVA, and ORNL missions.
    - **Time to Market:** Estimate the timeline for your first commercial sale.
  - **ORNL Fit:**
    - **Program Resources:** Explain how your team will benefit from Innovation Crossroads and ORNL's resources.
    - **Passion/Motivation:** Demonstrate your commitment and drive to commercialize your technology.
  - **Business Potential:**
    - **Competitive Edge:** Explain your advantage in the marketplace.
    - **Market Understanding:** Show your expertise in the market and identify opportunities.
    - **Market Share:** Estimate the market share your innovation could capture and why.
  - **Personal Narrative:** Share the origin of your idea and your motivation for pursuing it.
  - **Additional Info:** Include any other relevant details.
  - **Resume:** Recommended 1-page, included within the 8-page limit.

**Submit Your Application:** Access the application template and submit your application here: [https://usg.valideval.com/teams/ornl\\_ic\\_2025/signup](https://usg.valideval.com/teams/ornl_ic_2025/signup)

# High-level evaluation criteria

- Candidate eligibility
- How innovative is the proposed approach
- Applicant's technical understanding of the problem and proposed solution
- Potential market impact
- Soundness of the business concept
- Evidence that ORNL capabilities can help advance the idea
- Likelihood that the idea can be matured in the 2-year program
- Weight of candidate experience and/or formal education from a premier institution in a technologically advanced field



# INNOVATION CROSSROADS

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## Discussion

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NOW ACCEPTING APPLICATIONS FOR COHORT 2025

**APPLY TODAY!**

[INNOVATIONCROSSROADS.ORNL.GOV/APPLY](https://innovationcrossroads.ornl.gov/apply)

### PROGRAM

Launching new energy-related technology companies has become increasingly difficult, contributing to a significant decline in energy startups over the past decade. To address this challenge, Innovation Crossroads was founded and funded by the U.S. Department of Energy's (DOE) Advanced Materials and Manufacturing Technologies Office (AMMTO), with additional support from the Office of Energy Efficiency and Renewable Energy's Building Technologies Office (BTO), DOE's Office of Electricity, Office of Science's Advanced Scientific Computing Research program and Basic Energy Sciences program, and the Tennessee Valley Authority (TVA). The program harnesses the unique scientific resources and capabilities of Oak Ridge National Laboratory (ORNL) to connect the nation's leading innovators with experts, mentors, and networks in technology-related fields, helping to transform groundbreaking ideas from research and development (R&D) into market-ready solutions.

### ELIGIBILITY REQUIREMENTS

- Apply as individuals, not as companies or organizations
- Have doctoral degree or equivalent experience
- Leverage ORNL R&D capabilities and have alignment with DOE's and/or TVA's mission
- Be willing to relocate to the Knoxville-Oak Ridge area for two years
- Be a US citizen or lawful permanent resident at time of application
- Have raised no more the \$2 million USD in debt or equity funding from non-government sources within three years prior to program application
- Successfully execute a Cooperative Research and Development Agreement (CRADA) with ORNL
- Disclose background IP rights, if necessary, that may be needed to freely operate on R&D related tasks as outlined within the CRADA

### WHAT YOU GET

- **A two-year fellowship** – Innovators receive a yearly living stipend of \$115,000, along with a health insurance stipend and professional development allowance for travel funding, educational training and development, and customer discovery activities.
- **World-class lab access and research funding** – In addition to unparalleled access to facilities, research tools, equipment, and expertise at ORNL, innovators receive R&D funding to support collaboration opportunities with researchers across the lab.
- **Business mentors, entrepreneurial training, and networking** – Innovators receive access to experienced business mentors, entrepreneurial training programs, and exclusive networking opportunities. Innovators are also connected to a wide range of leaders from academia, industry, government, and finance that can serve as advisors and partners.

### KEY DATES

- September 4, 2024 – Applications open
- September 12, 2024 – Recruitment webinar
- October 8, 2024 – Recruitment webinar
- October 30, 2024 – Recruitment webinar
- November 8, 2024 – Applications close
- March 12-13, 2025 – In-person final interviews at ORNL
- August 2025 – Cohort 2025 starts at Innovation Crossroads

