

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Program Overview

Cohort 5 Recruitment Presentation

Fall 2020

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

Innovation Crossroads is a public-private partnership founded by Oak Ridge National Laboratory and supported by the DOE Office of Energy Efficiency and Renewable Energy's Advanced Manufacturing Office and the Tennessee Valley Authority.



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LEEP Premise and Vision

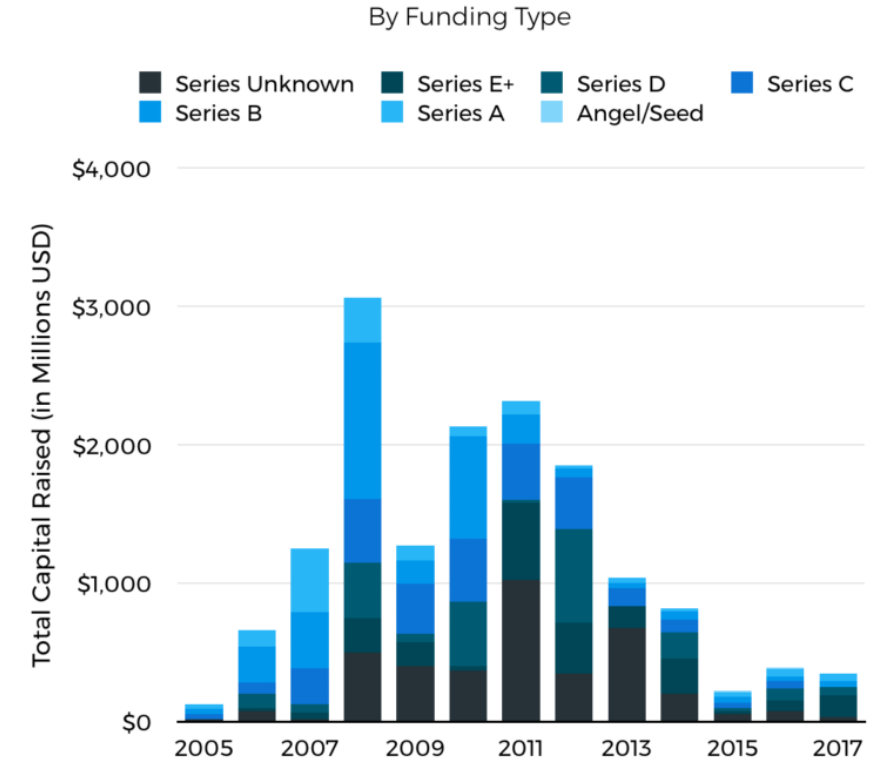
- **Premise:**

- Hardware-based startups are challenging
 - Require technical and business expertise
 - Capital intensive
- Early-stage VC funding is decreasing

- **Vision:**

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

VC Funding Into U.S. Cleantech Startups



crunchbase news

cyclotronroad

2015

INNOVATION
CROSSROADS

2016

CHAIN REACTION
INNOVATIONS

2016

INNOVATION
CROSSROADS

Accelerating Innovation by Embedding Entrepreneurs at ORNL

- Innovation Crossroads, located at Oak Ridge National Laboratory, is the Southeast's only entrepreneurial research and development program based at a U.S. Department of Energy national laboratory.
- Innovation Crossroads, supported by Oak Ridge National Laboratory, the US Department of Energy's Advanced Manufacturing Office, and Tennessee Valley Authority, is an innovation program that serves as a platform for supporting and mentoring entrepreneurial researchers whose early-stage innovations are presently too challenging or technically uncertain to pursue in a venture capital-financed startup.
- Innovation Crossroads embeds innovators at Oak Ridge National Laboratory for up to two years through entrepreneurial mentorship and cooperative research and development. This unique fellowship opportunity allows selected innovators to leverage the Labs unique scientific facilities, equipment, capabilities, and experts to advance their early-stage scientific discoveries into potentially commercialize-able opportunities within an accelerated time period.



Sponsors and Impact Areas

Sponsors

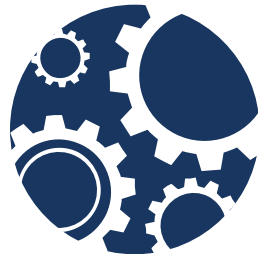


Impact Areas



Clean Energy & Global Security

Mission: Deliver scientific discoveries and technical breakthroughs that will accelerate the development and deployment of solutions in clean energy and global security.



Energy & Advanced Manufacturing

Mission: Catalyze research, development and adoption of advanced manufacturing technologies and practices to drive U.S. economic competitiveness and energy productivity.



Integrated Grid

Mission: Support investments in technologies to achieve an integrated grid: a power system that is highly flexible, resilient, and connected and that optimizes energy production, delivery, and use.

How We Support Our Innovators

- **A two-year fellowship** – Innovators receive a yearly living stipend of \$78,900 to \$89,000, along with a health insurance stipend and travel allowance.
- **Lab access and research funding** – In addition to unparalleled access to facilities, research tools, equipment, and expertise at Oak Ridge National Laboratory, 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 exposed to a wide range of leaders from academia, industry, government, and finance that can serve as advisors and partners.



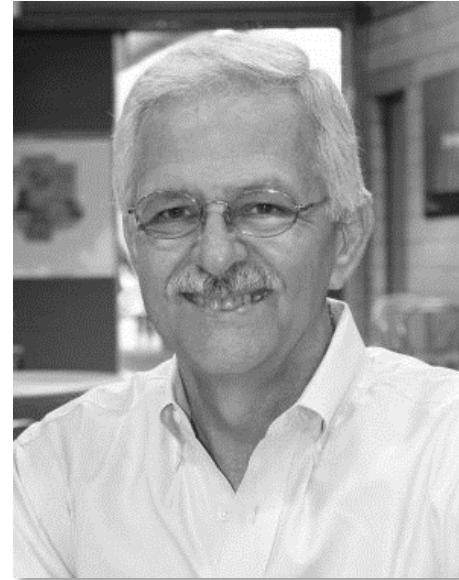
ORNL's Innovation Crossroads Team



Dan Miller
Program Lead



Kelly Wampler
Business Specialist



Gary Rawlings
Commercialization Consultant



John Bruck
Senior Business Advisor

Leadership Council: A National Network of Visionaries

- **Brendan Abolins**, *Eastman Chemical Company*
- **Coleman Adams**, *Clean Energy Venture Group*
- **Jason Blumberg**, *Energy Foundry*
- **Doug Buerkle**, *LTM Ventures*
- **Aaron Chockla**, *True North Ventures*
- **Jonathan Goldman**, *Georgia Tech VentureLab*
- **Alison Gotkin**, *United Technologies Research Center*
- **Paul Leggett**, *Mithril Capital Management*
- **Sanjiv Malhotra**, *SPARKZ Inc.*
- **Eric McFarland**, *University of California, Santa Barbara*
- **Stacey Patterson**, *University of Tennessee*
- **Vig Sherrill**, *General Graphene*
- **Mary Anne Sullivan**, *Hogan Lovells*
- **Van Tucker**, *Launch Tennessee*
- **Grady Vanderhoofven**, *Three Roots Capital*
- **Peter Winter**, *In-Q-Tel*
- **Johanna Wolfson**, *PRIME Impact Fund*
- **Jetta Wong**, *LA Cleantech Incubator*



INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Program Metrics

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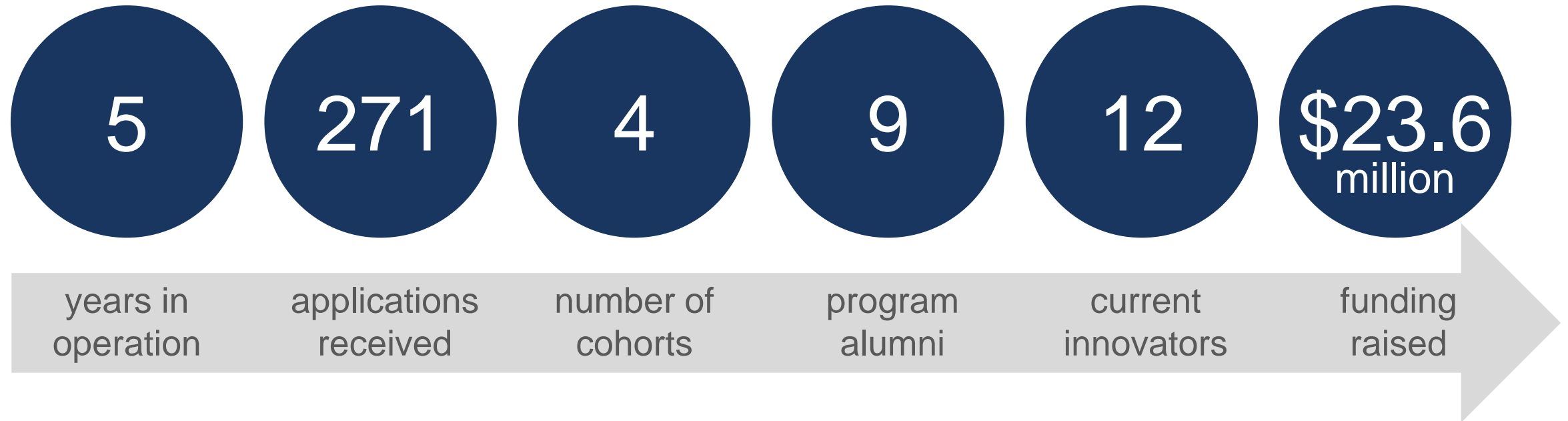
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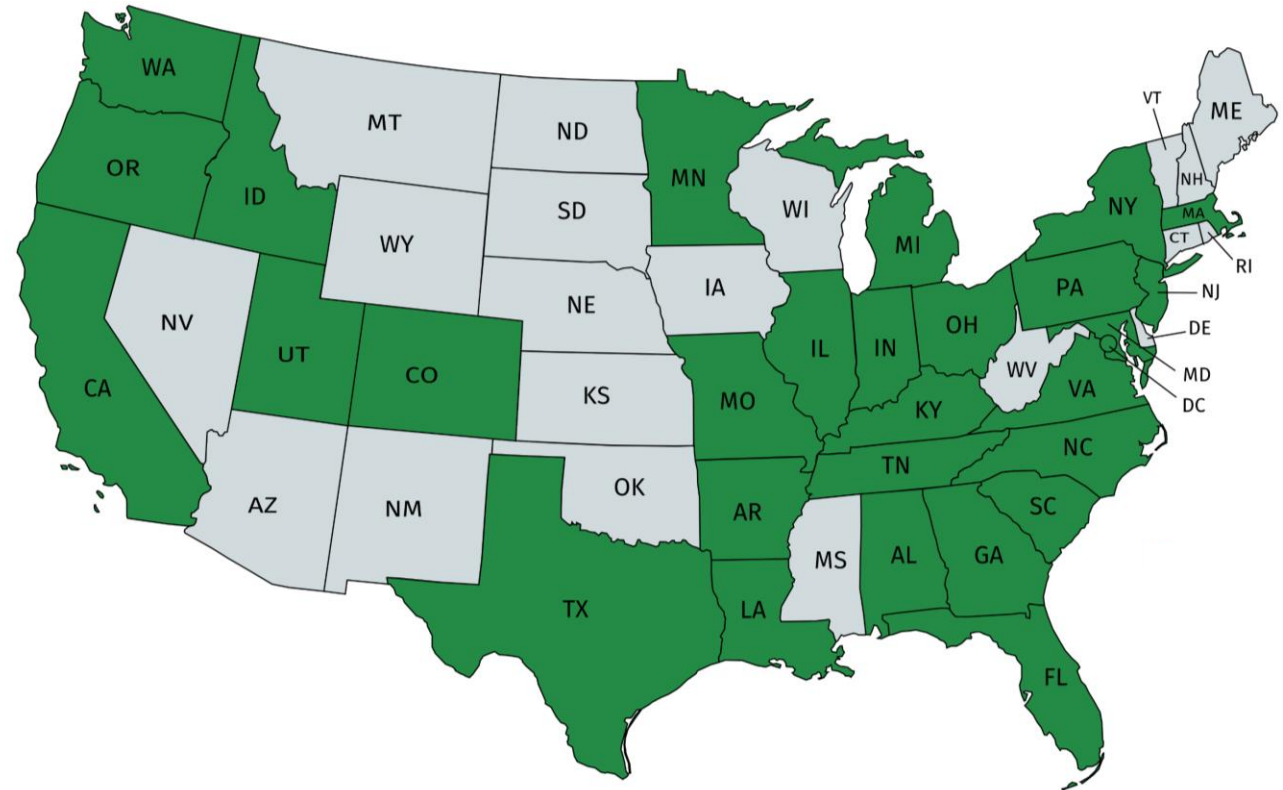
Driving Impact by Embedding Entrepreneurs at ORNL



Cohort 5: Attracted 83 Candidates from 29 States

STATE	#	STATE	#
Alabama	1	Minnesota	1
Arkansas	1	Missouri	1
California	12	New Jersey	2
Colorado	3	New York	5
District of Columbia	1	North Carolina	1
Florida	3	Ohio	1
Georgia	4	Oregon	2
Idaho	1	Pennsylvania	1
Illinois	6	South Carolina	1
Indiana	2	Tennessee	7
Kentucky	2	Texas	4
Louisiana	2	Utah	1
Maryland	4	Virginia	5
Massachusetts	3	Washington	1
Michigan	1		

Plus: Colombia - 1, Egypt - 1,
India - 4, Mexico - 4



■ Applicants' Residence

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Application Process

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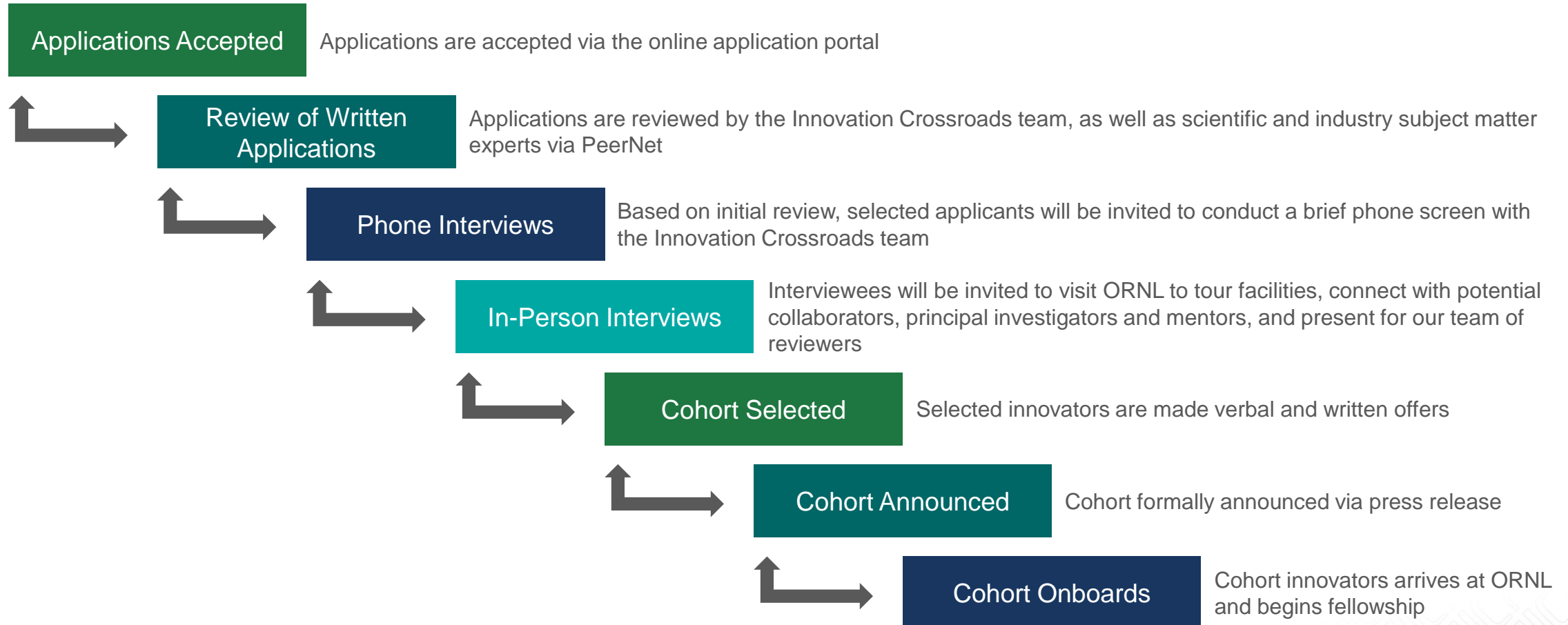
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The Process



Cohort 5 Topic Areas

- **Advanced Manufacturing Track:**

- **Advanced Materials:** Discover and design next-generation materials and chemical processes for energy
- **Biotechnology:** Understand complexity in biological and environmental systems
- **Energy Systems:** Accelerate R&D and manufacturing of integrated energy systems
- **Isotopes:** Provide strategic capabilities in isotopes
- **National Security:** Deliver S&T to address pressing national security challenges
- **Neutron Science:** Advance the impact and application of neutron science
- **Nuclear Science:** Enhance scientific basis for breakthrough nuclear technologies and systems
- **Supercomputing:** Scale computing and data analytics to exascale and beyond

- **TVA Track:**

- **Advanced clean generation**, including advanced nuclear
- **Energy storage** and battery integration
- **Electric vehicles** and electrification
- **Smart cities** and connected communities
- **Grid integration and modernization**, including T&D controls, sensors, analytics, and distributed energy resources
- **Carbon removal**, including direct air capture
- **Hydrogen economy** (production, storage, transportation, and utilization)

Potential Sponsor: Building Technologies Office

- Cost effective technologies and tools that support building energy efficiency
- Thermal energy storage systems for buildings
- Areas of particular interest and needed innovation include:
 - Advanced Building Retrofits such as both offsite and onsite envelope innovations
 - Advanced Building Construction with new construction innovations
 - Air sealing and diagnostics
 - High-R building insulation
 - Advanced thermal management technologies for envelopes and HVAC
 - Advanced methods (using usage data or other indicators) for detecting and alerting homeowners/facility managers of faults in major energy-using systems

Eligibility Criteria

- Must apply as individuals, not as companies or organizations
- Must have PhD or equivalent experience
- Must leverage ORNL R&D capabilities and have an impact on the Department of Energy (DOE) and/or Tennessee Valley Authority (TVA) mission
- Must be willing to relocate to the Knoxville-Oak Ridge area for 2-years
- Must be a US citizen or lawful permanent resident at time of application
- Must successfully execute a Cooperative Research and Development Agreement (CRADA) with Oak Ridge National Laboratory
- Must disclose background IP 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. Attach requested application materials as a single PDF document containing the following information:
 - **Resume (*one page*)**
 - Please provide a resume highlighting your education, experience, and skills.
 - **Tell us about yourself (*one page*)**
 - Provide the back story on you and your project. Where did the idea originate? What is the current status of your technology and team? Why do you want to pursue this effort and what makes you qualified to do so? Explain why you have chosen to pursue an entrepreneurial career path.
 - **Project abstract (*one page*)**
 - Briefly describe how you envision making your technology a market reality. Please describe the market you intend to reach, its customers, potential suppliers/distributors/manufacturers, relevant intellectual property (status of any licenses, etc.), barriers to entry, sophistication of market, market incumbents, etc.
 - **Tell us about your technology concept (*two pages*)**
 - Describe the technology concept you want to pursue. Use the Heilmeyer catechism as a guide for what's most relevant.
 - **What is the potential impact on the DOE, TVA, and/or ORNL mission? (*one paragraph*)**
 - Please comment on the potential for impact on U.S. energy and manufacturing competitiveness. More specifically on the potential for impact on the sponsor's mission area for your primary application track.
 - **Why ORNL and Innovation Crossroads? (*one page*)**
 - What most attracts you to Innovation Crossroads? Why would this be the ideal home for you and your project (vs. alternative paths)? Which people and/or facilities at ORNL would be particularly valuable in supporting your work?
 - **What else? (*one page*)**
 - An extra page for anything else that you feel we should know.

Heilmeier Questions

- What are you trying to do?
 - Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares?
 - If you are successful, what difference will it make?
- What are the risks?
- How much will it cost?
- How long will it take?
- What are the mid-term and final “exams” to check for success?

Evaluation Criteria

- How innovative is the proposed approach
- Potential market impact
- Applicant's technical understanding of the problem and proposed solution
- Evidence that ORNL capabilities can help advance the idea
- Soundness of the business concept
- Likelihood that the idea can be matured in the 2-year program

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Meet Our Innovators

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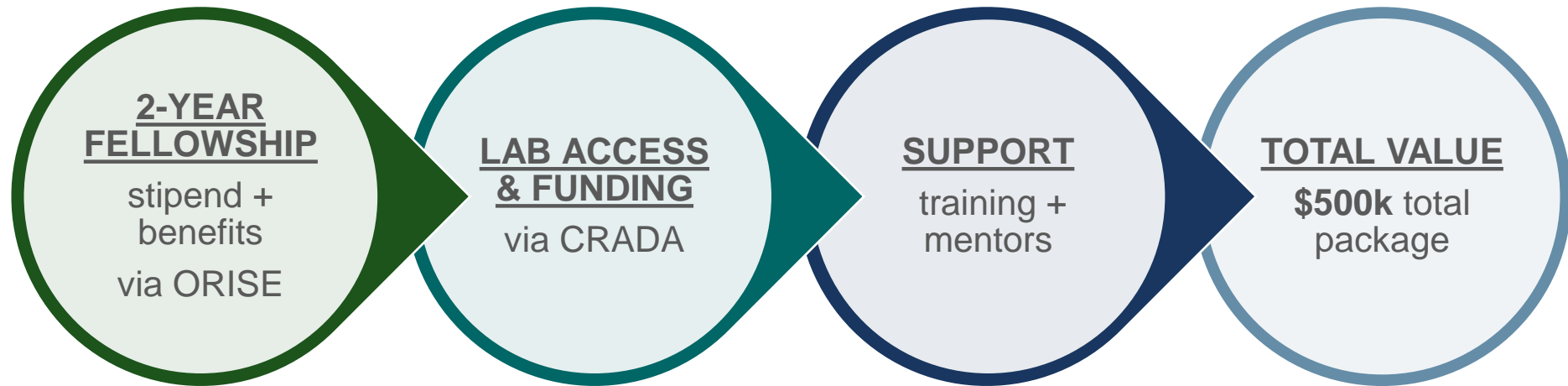
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World Class Support for Startups



COHORT 1

- 2017-2019
- 4 Innovators (3 Companies)
- Sponsors: AMO, ORNL



COHORT 2

- 2018-2020
- 5 Innovators
- Sponsors: AMO, ORNL



COHORT 3

- 2019-2021
- 7 Innovators
- Sponsors: AMO, ORNL, TVA



COHORT 4

- 2020-2022
- 5 Innovators
- Sponsors: AMO, ORNL, TVA

Innovation Crossroads Innovators – Alumni



Anna Douglas
SkyNano Technologies
Vanderbilt University



Michell Ishmael
Active Energy Systems
Cornell University



Matthew Ellis & Samuel Shaner
Yellowstone Energy
Massachusetts Institute of Technology



Fellowship Began: May 2017
Fellowship Completion: May 2019

Innovation Crossroads Innovators – Cohort 2



Don DeRosa

Eonix

State University of New York at Albany



Shane McMahon

Lux Semiconductors

State University of New York at Albany



Justin Nussbaum

Ascend Manufacturing
University of South Florida



Megan O'Connor

Nth Cycle
Duke University



Matt Smith

TCPoly
Georgia Institute of Technology



Fellowship Began: May 2018
Fellowship Completion: August 2020

Innovation Crossroads Innovators – Cohort 3



Jesse Claypoole
MantaPoole Technologies
State University of New York at Albany



William Fitzhugh
American Nanotechnologies
Harvard University



Hicham Ghossein
Endeavor Composites
University of Tennessee



Alex Lewis
Electro-Active Technologies
University of Tennessee



Trevor McQueen
Neptune Fluid Flow Systems
Stanford University



Leila Safavi
Purist
University of California Irvine



Jesse Thornburg
Grid Fruit
Carnegie Mellon University



Fellowship Began: June 2019
Fellowship Completion: June 2021

Innovation Crossroads Innovators – Cohort 4



Renee Carder
PixelEXX Systems
University of California



Danielle Castley
Becq
Dartmouth College



Joe Fortenbaugh
Actinic
Pennsylvania State University



Thomas Foulkes
AquaQuant Laboratories
University of Illinois



Erica Grant
Quantum Lock Technologies
University of Tennessee

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Programming and Ecosystem

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Recurring Meetings

- Weekly group meeting with all innovators
- Monthly 1-on-1 meetings with each company
- Annual renewal briefing with each innovator



Regional Entrepreneurial Ecosystem



TALENT

- Innovation Crossroads
- University of Tennessee



SUPPORT

- Energy Mentor Network
- Innov865 Alliance
- Knoxville Entrepreneur Center
- Launch Tennessee
- PYA
- Startup Knox
- TAEBBC
- University of Tennessee



R&D ASSETS

- Oak Ridge National Laboratory
- Tennessee Valley Authority
- University of Tennessee



CAPITAL

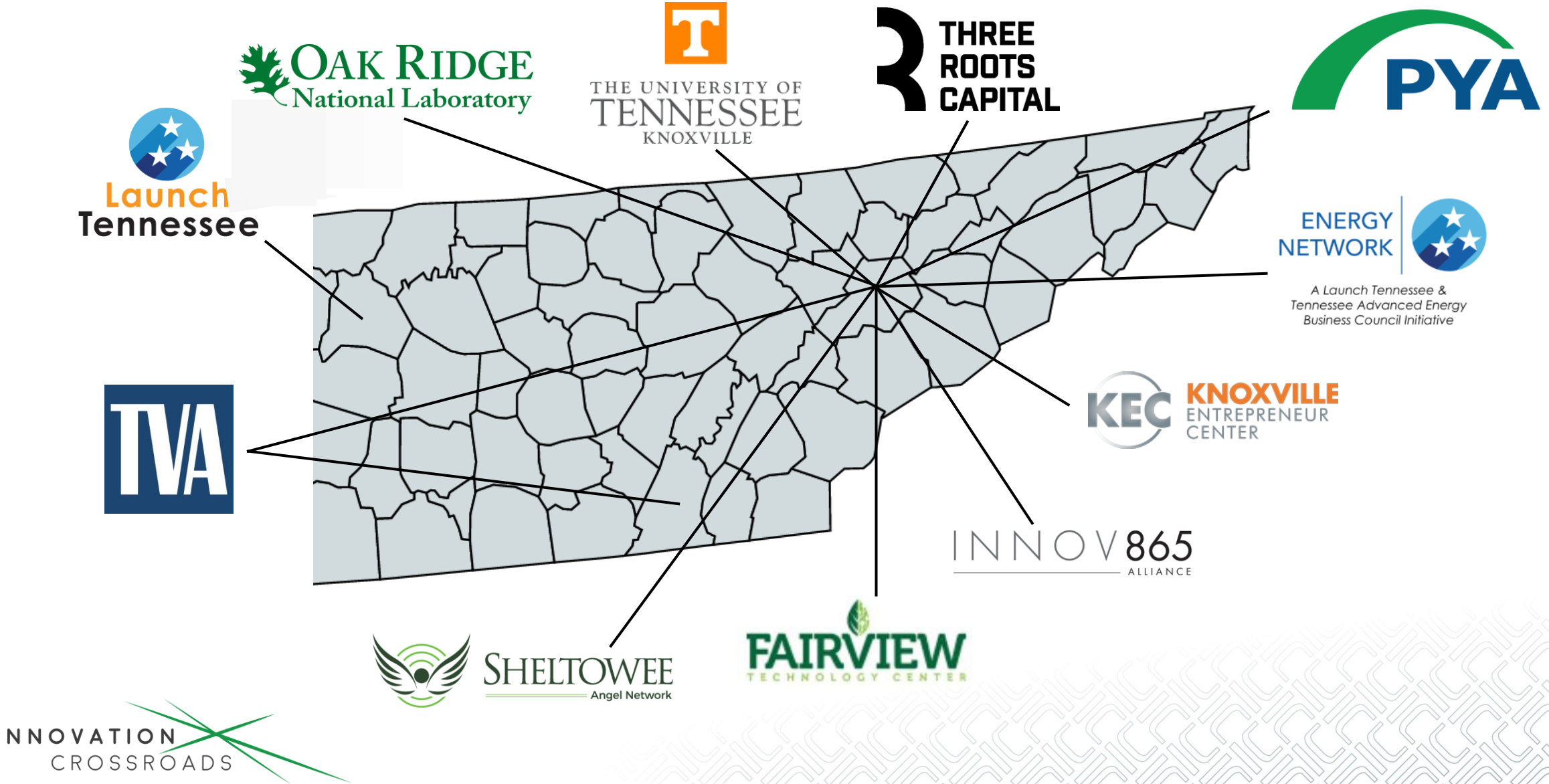
- Angel Capital Group
- Cocoon Resources
- Three Roots Capital



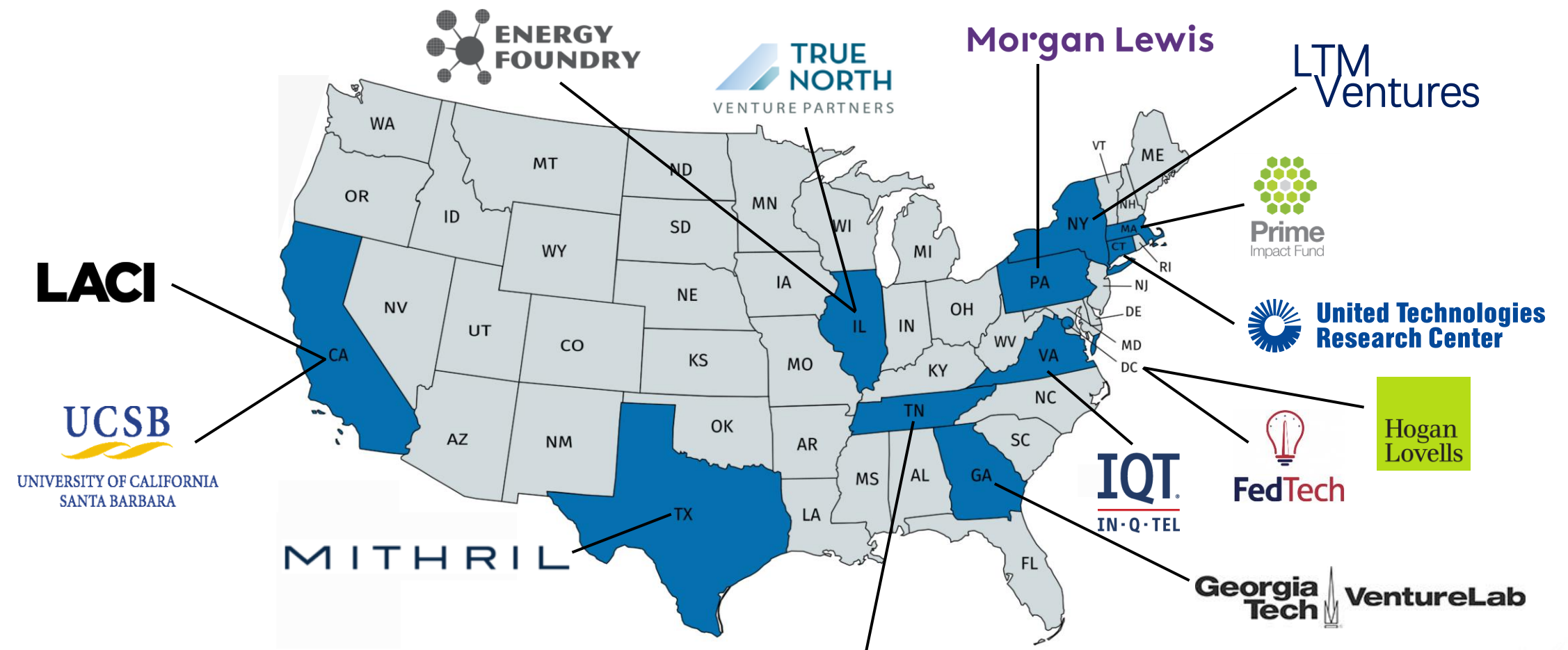
SPACE

- Anderson Center for Entrepreneurship and Innovation
- Fairview Technology Center
- Spark Innovation Center
- Ts117 Coworking Space

Development of a Regional Entrepreneurial Ecosystem



Development of a Robust Advisory Network



Featured Ecosystem Partners

ENERGY NETWORK



The Energy Mentor Network is run by the Tennessee Advanced Energy Business Council in partnership with Launch Tennessee. The Energy Mentor Network program is a free statewide mentoring program for early-stage companies in the life science and advanced energy industries. The objective of the program is to pair entrepreneurs with mentors and industry specific expertise to develop a compelling commercialization strategy and prepare for funding and growth.



FedTech provides entrepreneurship support by offering business development workshops focuses on proposal capture, team development, and company operations. In addition, innovators have direct access to the FedTech team of seasoned entrepreneurs and early-stage startup investors, allowing for customized advising opportunities, where mentors counsel on government funding strategies, business development, industry relationship building, and much more.



The Innov865 Alliance develops, supports, and promotes the Knoxville region's entrepreneurial ecosystem. It is a collaborative effort to celebrate and showcase Knoxville as a great place for entrepreneurs to start and grow businesses and increase access to capital. In addition to their signature event, Innov865 Week, the Innov865 Alliance coordinates other activities throughout the year, including pitch competitions, educational opportunities, and social events.

Featured Ecosystem Partners



The Knoxville Entrepreneur Center is a local mentor-driven business accelerator that serves as the front door for entrepreneurs in the Knoxville region and a resource for anyone looking to start or grow a business in Knoxville. By nurturing and supporting a culture of entrepreneurship, they foster innovation, creativity, and job growth within the community. Join the KEC entrepreneurial community to gain access to the capital, customers, and talent needed to be successful.



Launch Tennessee is a public-private partnership that supports entrepreneurs from ideation to exit. They are guided by a vision to make Tennessee the most startup-friendly state in the nation. Tennessee is one of few states with an entrepreneur-resource infrastructure operating at the state level. Through Launch Tennessee's statewide network, they deliver curriculum, mentors, funding opportunities, and more to entrepreneurs building high-growth-potential businesses.



Morgan Lewis is committed to serving the public good. As such, their innovative and award-winning partners provide pro-bono council to Innovation Crossroads innovators via structured quarterly webinar sessions and one-on-one customized council. Webinar topics include: U.S. patent system, international patent applications, IP management and protection for lean start-ups, inventorship and enterprise considerations, preparing for due diligence, angel and venture funding, etc.



Featured Ecosystem Partners



PYA is a national professional services firm providing deep functional expertise in tax, audit and assurance, healthcare, technology, business advisory, and management consulting. PYA's team contributes partner-level support to innovators, by offering financial and business strategy insights and guidance. Their team of professionals meets with innovators as a group and individually to provide general accounting support, QuickBooks demonstration, and personal set-up assistance.



Tennessee
Advanced Energy
Business Council

TAEBC champions advanced energy as a job creation and economic development strategy. They educate public officials and business leaders about Tennessee's advanced energy assets, establish strategic partnerships to connect assets with opportunities, and inform policy that expands and strengthens the industry. In addition, TAEBBC develops programs that connects and leverages the state's assets with opportunities to promote Tennessee's advanced energy economy.



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

In partnership with the University of Tennessee in Knoxville, program innovators have direct access to work with Bredeesen Center graduate student interns for market research and customer discovery assistance, receive pro bono legal guidance and assistance from the UT College of Law Legal Clinic, and tap into a network of coaches, mentors, and business development resources and programs made available by the Anderson Center for Entrepreneurship and Innovation.

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Discussion

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APPLY FOR COHORT 6 THIS FALL

APPLICATIONS OPEN SEPTEMBER 2021

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

PROGRAM

Innovation Crossroads is an early-stage entrepreneurial fellowship program at Oak Ridge National Laboratory that matches aspiring entrepreneurs with experts, mentors and networks in technology related fields to take their world-changing idea from R&D to marketplace.

ELIGIBILITY REQUIREMENTS

- Apply as individuals, not as companies or organizations
- Have PhD or equivalent experience
- Leverage ORNL R&D capabilities and have an impact on the DOE and/or TVA mission
- Be willing to relocate to the Knoxville-Oak Ridge area for 2-years
- Be a US citizen or lawful permanent resident at time of application
- Successfully execute a 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**
The two-year fellowship includes a personal living stipend, plus a health insurance stipend and travel allowance.
- **Lab access and research funding**
In addition to unparalleled access to facilities, equipment, and expertise at Oak Ridge National Laboratory, fellows receive R&D funding to support collaboration opportunities with researchers across the lab.
- **Business mentors, entrepreneurial training, and networking**
Participants receive access to experienced business mentors, entrepreneurial training programs, and exclusive networking opportunities. Innovators are also exposed to a wide range of leaders from academia, industry, government and finance that can serve as advisors and partners.

