



INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

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.



U.S. DEPARTMENT OF
ENERGY



INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Program Overview



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.



Lab-Embedded Entrepreneurship Program

- The Lab-Embedded Entrepreneurship Programs take top entrepreneurial scientists and engineers and embeds them within U.S. national laboratories to perform early-stage research and development (R&D) that may lead to the launch of energy or manufacturing businesses in the future.
- The Lab-Embedded Entrepreneurship Programs provide:
 - Technological access and support
 - Training and assistance to develop entrepreneurial insight and skills
 - Introduction to ecosystem partners
 - Platform needed to take their ideas from the lab to the marketplace

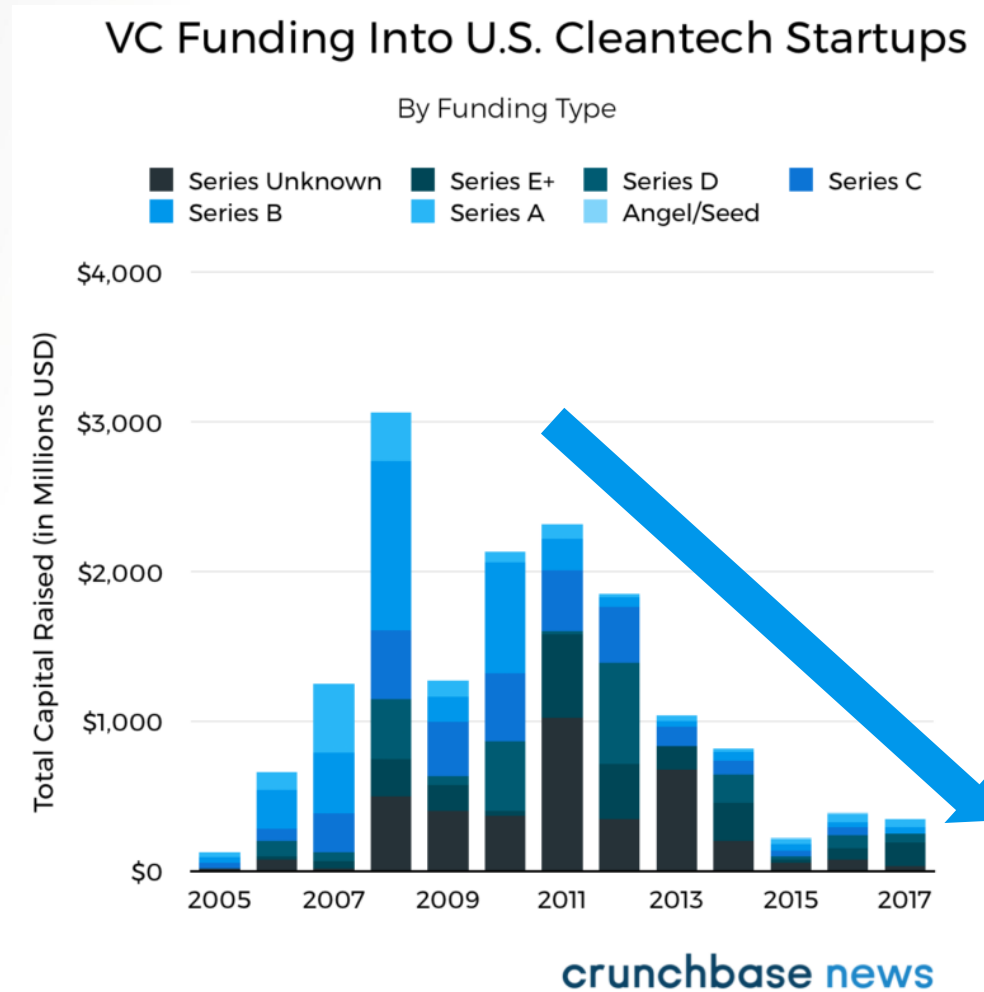


The Innovation Crossroads Premise

- Hardware-based startups are challenging.
- They require time and access to expertise....both technical and business
- Why not leverage ORNL and regional resources to help the best and brightest start new companies in energy or advanced manufacturing?



Need for additional Clean Energy Technology Investments



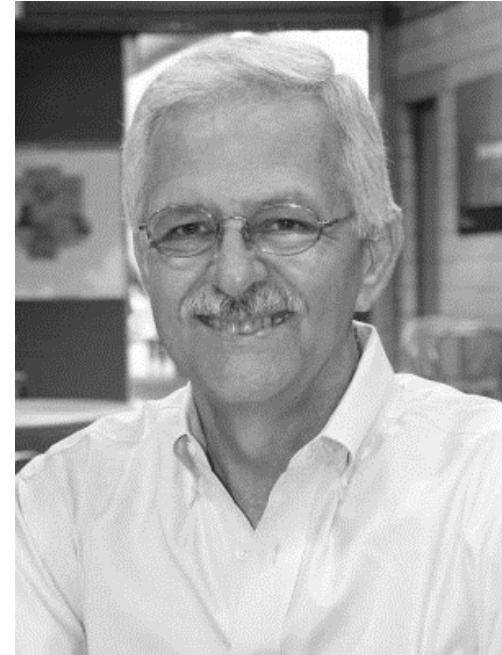
ORNL's Innovation Crossroads Team



Dan Miller
Program Lead



Kelly Wampler
Business Specialist



Gary Rawlings
Technology Consultant

Sponsors and Impact Areas

Sponsors



Impact Areas



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.

Topics of Interest

ENERGY & ADVANCED MANUFACTURING	SHARED INTEGRATED GRID
Sponsor	
DOE Advanced Manufacturing Office	Tennessee Valley Authority
Specific technologies of interest include	
Additive Manufacturing	CO2 Capture, Sequestration and Utilization
Advanced Materials Manufacturing	Distributed Energy Resources (DER) Integration
Battery Manufacturing and Recycling	Electric Vehicles and Charging Systems
Bioenergy and Biomaterials	Equipment Health and Condition Monitoring
Combined Heat and Power (CHP) Systems	Grid Visibility
Composites and Carbon Fiber	Grid-Scale Energy Storage
Critical Materials	Increasing Flexibility of Generation Resources
Lightweight Metals Processing	Industrial Electrification (Electric Applications to Replace Fossil Fuels)
Low-Temperature Materials Synthesis	Predictive Analytics (AI/ML)
Nuclear Materials and Systems	Utilization of Inverter-Based Resources
Roll-to-Roll Processing	
Sensors and Controls	
Sustainable Manufacturing	
Waste Heat Recovery Systems	
Don't feel that your technology fits into one of the categories above, but could benefit from ORNL resources and capabilities.... Apply! We are looking for talented entrepreneurs.	

Leadership Council

- **John Bruck** - *Entrepreneur-In-Residence, Anderson Center for Entrepreneurship and Innovation, University of Tennessee*
- **Doug Buerkle** - *Founding Executive Director, Nexus-NY*
- **Aaron Chockla** - *Venture Capitalist, True North Ventures*
- **Margaret Dolan** - *President and Chief Executive Officer, Launch Tennessee*
- **Jonathan Goldman** - *Principal, Georgia Tech VentureLab*
- **Alison Gotkin** - *Associate Director of Business Development, United Technologies Research Center*
- **Chris Haase** - *Director, Critical Material Institute*
- **Alfred Lam** - *Vice President, Chrysalix Venture Capital*
- **Paul Leggett** - *Managing Director, Mithril Capital Management*
- **Kate Kornau** - *External Innovation Manager, Eastman Chemical Company*
- **Eric McFarland** - *Professor of Chemical Engineering, University of California, Santa Barbara*
- **Stacey Patterson** - *Vice President for Research, Outreach and Economic Development, The University of Tennessee*
- **Vig Sherrill** - *Founder, General Graphene*
- **Mary Anne Sullivan** - *Partner, Hogan Lovells*
- **Grady Vanderhoofven** - *President and Chief Executive Officer and Board Member, Three Roots Capital*
- **Johanna Wolfson** - *Principal, Prime Impact Fund*
- **Jetta Wong** - *Senior Advisor for Northern California Operations, LA Cleantech Incubator (LACI)*



Eligibility Criteria

- Must have PhD or equivalent experience
- Must be focused on energy or manufacturing innovation
- Must leverage ORNL R&D capabilities and have an impact on DOE or TVA missions
- Must be willing to relocate to the Knoxville-Oak Ridge area
- Must be US citizens or lawful permanent residents at time of application



Innovator Benefits: \$500,000 Entrepreneurial Fellowships

Participants selected receive:

- **A two-year fellowship** – Includes a personal living stipend of up to \$90,000/year depending on education and experience, along with health insurance 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 \$200,000 of 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.



What's a CRADA?

- An agreement between ORNL and companies to conduct specified R&D activities consistent with the mission of the laboratory
- Each party provides personnel, services, facilities, equipment, intellectual property or other resources via the CRADA
- For Innovation Crossroads, up to \$200k* of DOE funds will be used to finance ORNL's portion of the project. Innovators will be asked to provide in-kind contributions
- Innovation Crossroads staff will assist innovators with introductions to candidate PIs and with the development of CRADA statements of work, schedules and budgets
- CRADAs should be completed during the innovator's 2-year appointment

**Subject to availability of funds. DOE funds ORNL through appropriations.*

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Application Process

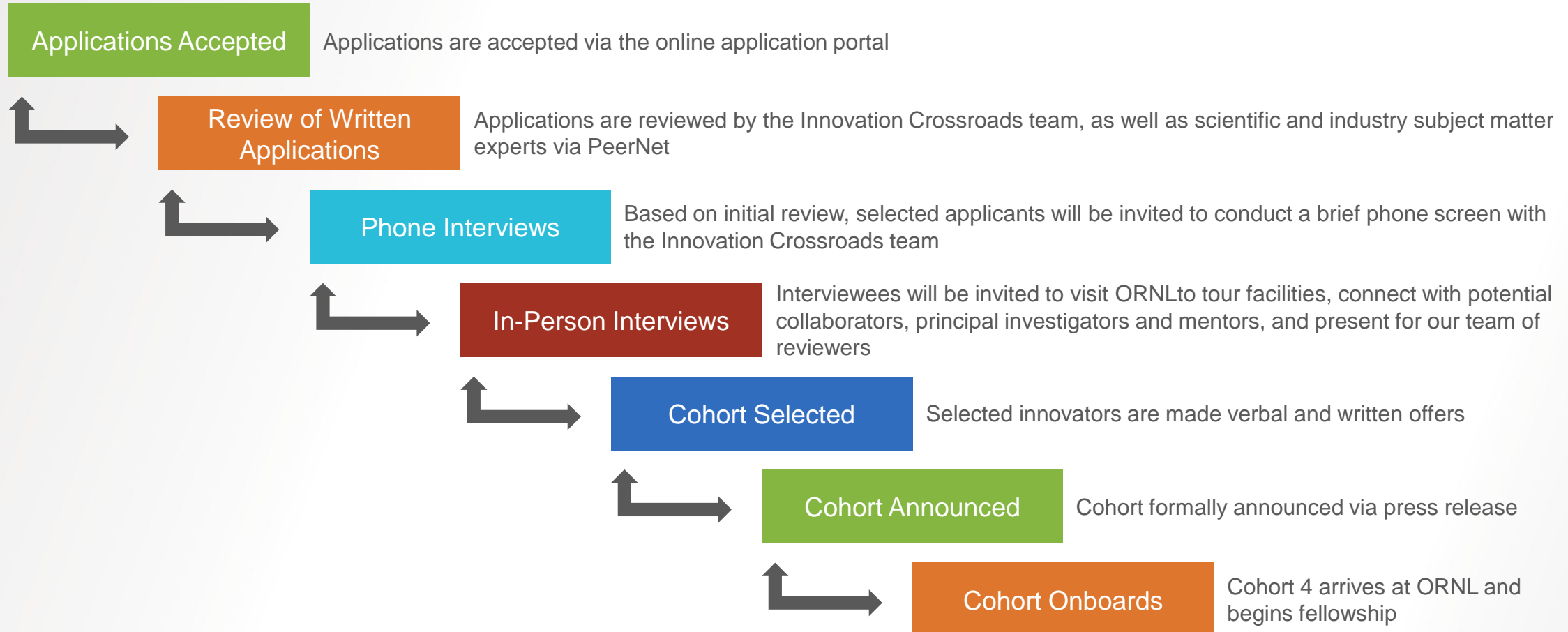


Oak Ridge National Laboratory is managed by UT-Battelle for the U.S. Department of Energy.

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.



The Process



Cohort 4 Key Dates

- **Applications open:** September 17, 2019 at 8:00 am (EDT)
- **Applications close:** October 31, 2019 at 5:00 pm (EDT)
- **Initial application review:** November 2019
Applications are reviewed by the Innovation Crossroads team, as well as scientific and industry subject matter experts
- **Phone interviews:** December 2019
Based on initial review, selected applicants will be invited to conduct a brief phone screen with the Innovation Crossroads team.
- **In-person interviews:** January/February 2020
Interviewees will be invited to visit Oak Ridge National Laboratory to tour facilities, connect with potential collaborators, principal investigators and mentors, and present for our team of reviewers.
- **Cohort four selected:** March 2020
- **Cohort four starts at Innovation Crossroads:** May 2020

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.*
 - **Project abstract** (one paragraph)
 - *Provide an abbreviated summary of your research technology.*
 - **Tell us about yourself** (one page)
 - *Explain why you have chosen to pursue an entrepreneurial career path.*
 - **Tell us about your technology concept** (two pages)
 - *Describe the technology concept you want to pursue. Use the Heilmeier catechism as a guide for what's most relevant.*
 - **What is the potential impact on the DOE or TVA mission?** (one paragraph)
 - *Please comment 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? 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



U.S. DEPARTMENT OF
ENERGY

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.



Innovation Crossroads Innovators – Alumni



Samuel Shaner & Matthew Ellis
Yellowstone Energy
Massachusetts Institute of Technology



Michell Ishmael
Active Energy
Cornell University



Anna Douglas
SkyNano Technologies
Vanderbilt University



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: May 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

Cohort Statistics



COHORT 1

- 50 Applications Received
- 21 States Represented
- 16 Semifinal Interviews
- 9 Final Interviews
- 4 Innovators
- \$3,170,143 Raised



COHORT 2

- 36 Applications Received
- 22 States Represented
- 14 Semifinal Interviews
- 9 Final Interviews
- 5 Innovators
- \$1,774,000 Raised



COHORT 3

- 60 Applications Received
- 28 States Represented
- 21 Semifinal Interviews
- 11 Final Interviews
- 7 Innovators
- \$1,184,120 Raised

INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Programming and Ecosystem



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.

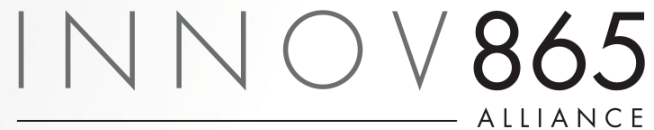


Recurring Meetings

- Bi-weekly group meeting with all innovators
- Monthly 1-on-1 meetings with each company
- Monthly networking social
- Annual renewal briefing with each innovator



More than just a fellowship...



Launch Tennessee: 36|86 Entrepreneurship Festival

- 36|86 Entrepreneurship Festival brings together the best innovators and difference-makers for two days of networking, programming, and entertainment on the latest in technology and entrepreneurship
- At 36|86, top startups from ORNL's Innovation Crossroads accelerator and other DOE labs, including Chain Reaction Innovations as Argonne National Lab, will pitch live on stage



August 26-27, 2020
Nashville, Tennessee

PYA: Financial Consulting

- PYA Healthcare is contributing partner-level support to guide innovators on financial matters:
 - Introduction to PYA team and services
 - QuickBooks demonstration and personal set-up assistance
 - Individual and company tax preparation assistance



Anderson Center for Entrepreneurship and Innovation: Financial Literacy and Investor Readiness



Financial Literacy

- The Language of Business
- Relevance of External Reporting
- Discussion of Real-Time Examples
- Financial Modeling
- Financial Policy and Decision Making
- Financial Accounting vs Cost Accounting
- Internal Measurement and Reporting
- Investment Decisions
- Linking Operations to Financial Outcomes



Investor Readiness

- Introduction to Investor Readiness
- The Funding Spectrum
- Valuation
- Term Sheet
- Cap Tables
- Due Diligence
- Our Startup Community

FedTech: Entrepreneurship Training

- Training Schedule:
 - 3 Pre-workshop webinars
 - 3 Day intensive in-person workshop
 - Post-workshop webinar
- Workshop Topic Areas:
 - Crafting your elevator pitch
 - Running a tech startup – a users guide
 - Q&A with IP lawyer
 - Government funding overview
 - Proposal story telling
 - Lessons from the trenches – top startup mistakes
 - Essentials for marketing your startup
 - Q&A with Investor
 - Developing your sales pipeline
 - What investors look for before writing a check
 - Developing your story – what's next for you
 - Individual breakout sessions with instructors



INNOVATION CROSSROADS

OAK RIDGE NATIONAL LABORATORY

Discussion



U.S. DEPARTMENT OF
ENERGY

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.



NOW ACCEPTING APPLICATIONS FOR COHORT 4

APPLY TODAY!

INNOVATIONCROSSROADS.ORNL.GOV

PROGRAM

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

ELIGIBILITY REQUIREMENTS

- Must have PhD or equivalent experience
- Must be focused on energy or manufacturing innovation
- Must leverage ORNL R&D capabilities and have an impact on Department of Energy or Tennessee Valley Authority mission
- Must be willing to relocate to the Knoxville-Oak Ridge area
- Must be US citizen or lawful permanent resident at time of application

IMPORTANT DATES

- September 17, 2019 – Applications Open
- October 31, 2019 – Applications Close
- May 2020 – Cohort 4 Begins

WHAT YOU GET

- **A two-year fellowship**
Includes a personal living stipend of up to \$90,000/year depending on education and experience, along with health insurance 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 up to \$200,000 of 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.

INFORMATIONAL WEBINARS

- Friday, September 20th at 2:30 p.m. (EDT)
- Wednesday, October 9th at 2:30 p.m. (EDT)
- Thursday, October 24th at 2:30 p.m. (EDT)

