


# Vermont DOE EPSCoR

By coupling innovative ideas from EPSCoR-eligible institutions with leading-edge capabilities at the DOE national laboratories, these grants are aimed to enhance the research of EPSCoR investigators while building expertise and capabilities that will enable the institutions to compete more successfully for other federal R&D funding. In this way, the DOE EPSCoR program advances the geographic diversity of researchers conducting competitive energy-related research.

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## Impact of VT DOE EPSCoR FY21-22

Two Vermont Professors are the beneficiaries of the US Department of Energy's (DOE) plan to award $21 million in funding for 29 new projects through DOE EPSCoR Lab Partnerships in FY 2022. The two recipients are Jihong Ma, PhD of the University of Vermont (UVM) for her project "Multi-scale Study of Self-Healing Polymers to Enhance Carbon Dioxide Removal" and Ben Cotts of Middlebury College for his project "Elucidating Transient Localized Disorder of Semiconductor Nanocrystals."

Vermont was one of 18 states and Puerto Rico to receive funding as part of this award. "The projects selected for awards will help to build expertise and capabilities at the EPSCoR institutions and will strengthen their connections to the wealth of capabilities at the DOE national laboratories," said Asmeret Asefaw Berhe, Director of the DOE Office of Science in discussing the funding.

Both projects are addressing issues important to the state of Vermont. For example, Dr. Ma's project could help identify the materials to fight against climate change. Dr. Cotts' project could enable new critical components for quantum computing, the next generation of information technology.

These projects will also further strengthen the partnership between Vermont and other jurisdictions and DOE national laboratories to spark new collaborative efforts in energy-related research. For example, Dr. Ma will work with experts on polymer synthesis and characterization from the University of Alabama and Oak Ridge National Laboratory. Drs. Cotts and Ma will work with scientists from Argonne National Laboratory to work on structural characterization of nanocrystals.

Also, the two leading researchers will incorporate the results from these projects into the classes they teach (such as the Materials Engineering and Advanced Heat and Mass Transfer class that Ma teaches at the University of Vermont) to further broaden the knowledge and stimulate the interest of next-generation scientists and engineers in climate change mitigation research and development.

In addition to the institutional benefits, these projects will also help to achieve the State of Vermont's renewable energy goals and fulfill the promise of a clean energy future by reducing $CO_2$ emissions.

## Program Overview

There are two active VT DOE EPSCoR projects led by Vermont researchers. One, being led by Dr. Jihong Ma, an Assistant Professor of Mechanical Engineering at the University of Vermont, in collaboration with the University of Alabama and Oak Ridge National Laboratory, tackles carbon dioxide removal issues using a combination of theories, simulations, and experimentation.

Another project is led by Dr. Ben Cotts an Assistant Professor of Chemistry and Biochemistry at Middlebury College. Dr. Cotts is working with Dr. Jihong Ma from the University of Vermont, in collaboration with Argonne National Laboratory, to increase efficiency and reliability of semiconductor nanocrystals under device operating conditions using a combination of simulations and experiments.

# Vermont DOE EPSCoR Funding FY21-22

| Program/Grant Name | Type / Institution | FY | Cong District | Amount |
|---|---|---|---|---|
| **Multi-scale Study of Self-Healing Polymers to Enhance Carbon Dioxide Removal** (PI: Jihong Ma, DE-SC0023473) | University of Vermont | 2022 | VT | $750,000 |
| **Elucidating Transient Localized Disorder of Semiconductor Nanocrystals** (PI: Benjamin Cotts, DE-SC0023425) | Middlebury College & University of Vermont | 2022 | VT | $750,000 |
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| | | | **Total Funds** | **$1,500,000** |