

# Center for Advanced Research Computing



GENE  
SEQUENCING



QUANTUM  
CHEMISTRY



COMPUTATIONAL  
FLUID  
DYNAMICS



MACHINE  
LEARNING



CLIMATE  
MODELLING

HIGH-PERFORMANCE COMPUTING

Matthew Fricke,  
Research Associate Professor

Hussein al-Azzawi  
Systems Manager



# CARC Provides

CARC Provides High Performance Computing to all UNM Researchers.

- State of the Art Computing Infrastructure
- Skilled support to deploy and assist with computational software pipelines



# CARC Provides

5,500+ CPUs (general computation)

100+ GPUs (artificial intelligence, chemistry, quantum, etc)

1.2 Petabytes of Fast Storage

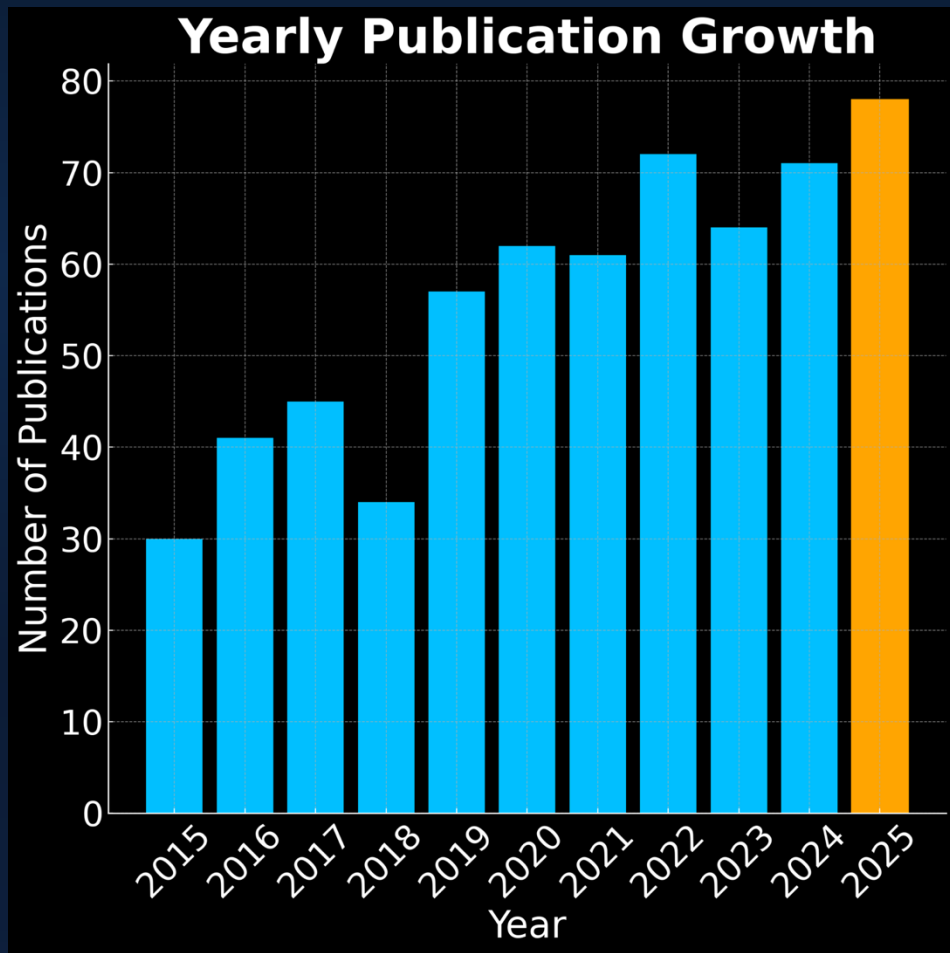
## Large Scale Computing Powers Cutting Edge Research at UNM

Dedicated Machine Room with Cooling and Redundant Power

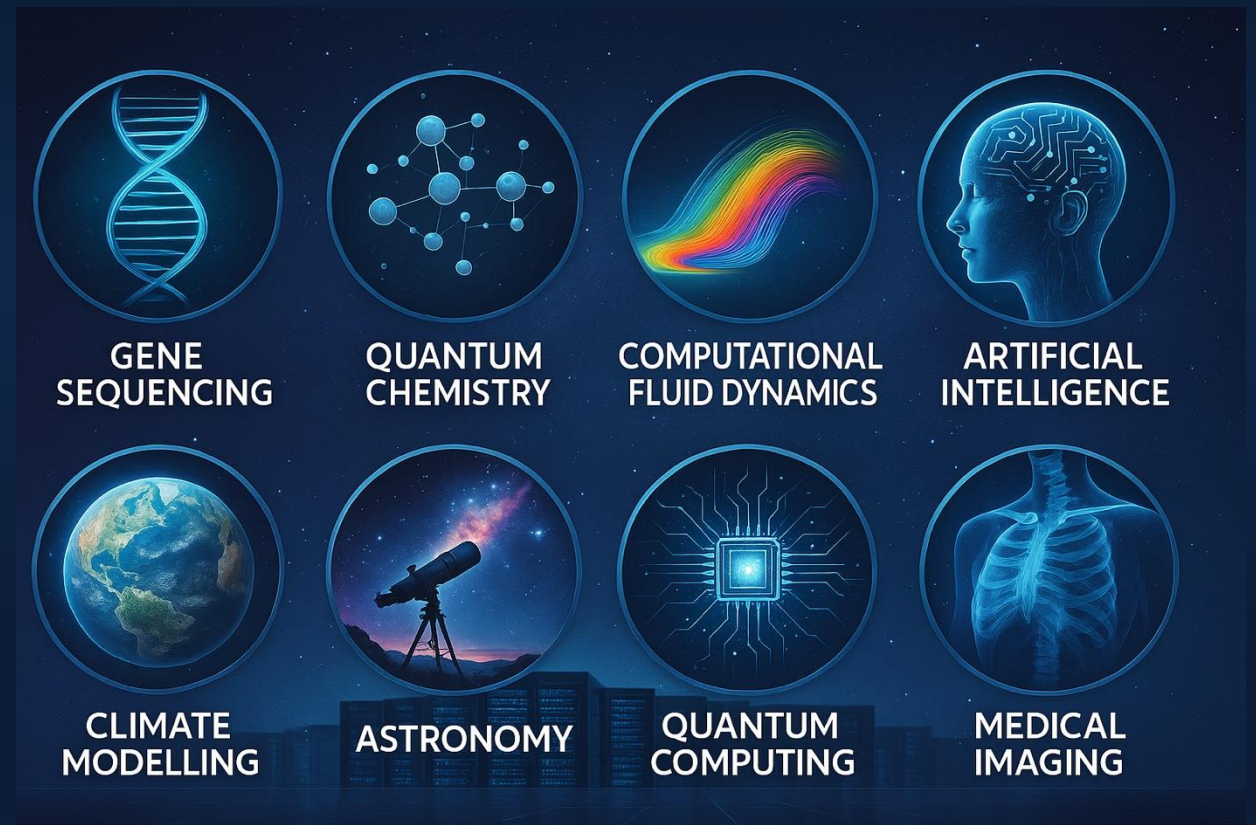
Data snapshots multiple times a day to keep data safe

Trained HPC Personnel to build systems, keep them secure and operational, and provide training on how to run various software on those systems.





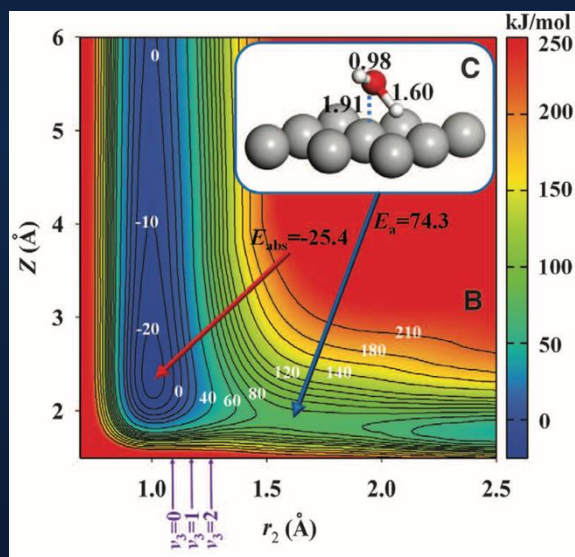
Over the past 10 years publications acknowledging CARC doubled.



41 Workshops on computational aspects of topics including crystallography, astronomy, quantum computing, artificial intelligence, climate modelling

160 researcher support meetings per year

# Researcher Spotlights



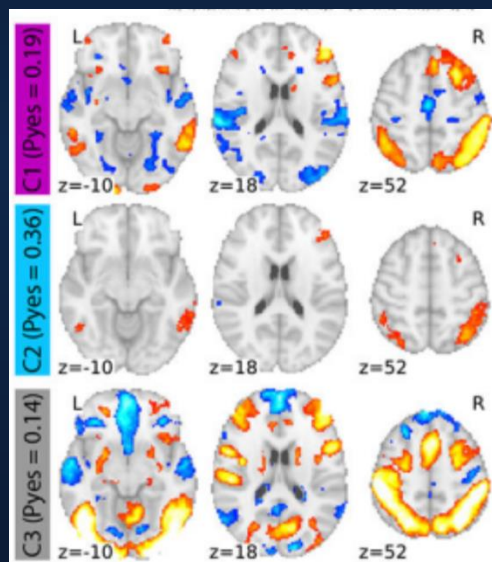
**Vibrationally Promoted Dissociation of Water on Ni(111)**  
*et al.* P. Morten Hundt **Science** (2014)

Hua Guo

Computational Chemistry

Citations 30138 h-index 86

The computations Hua has run at CARC would have taken 7,000+ years on a laptop

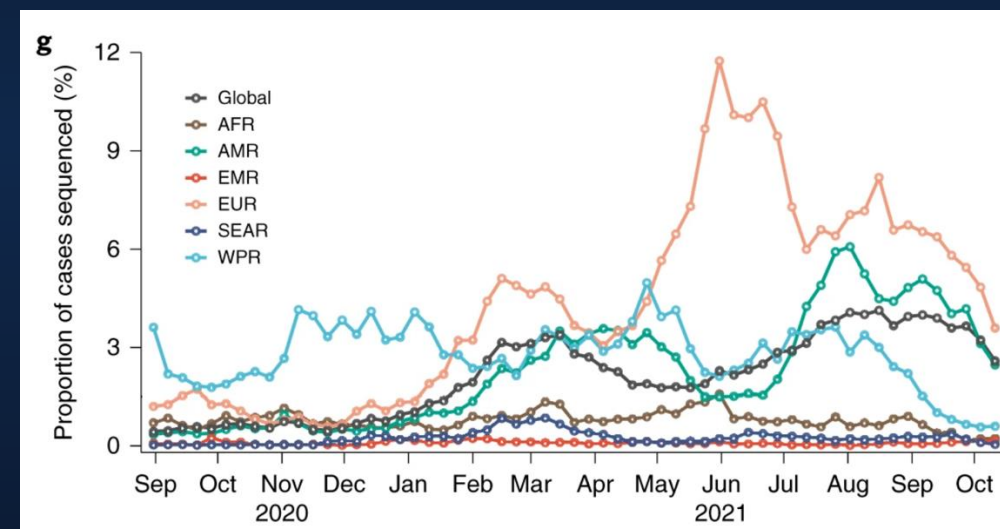


"Variability in the analysis of a single neuroimaging dataset by many teams." **Nature** (2020)

Jeremy Hogeveen

Cognitive Neuroscience

Psychology Department



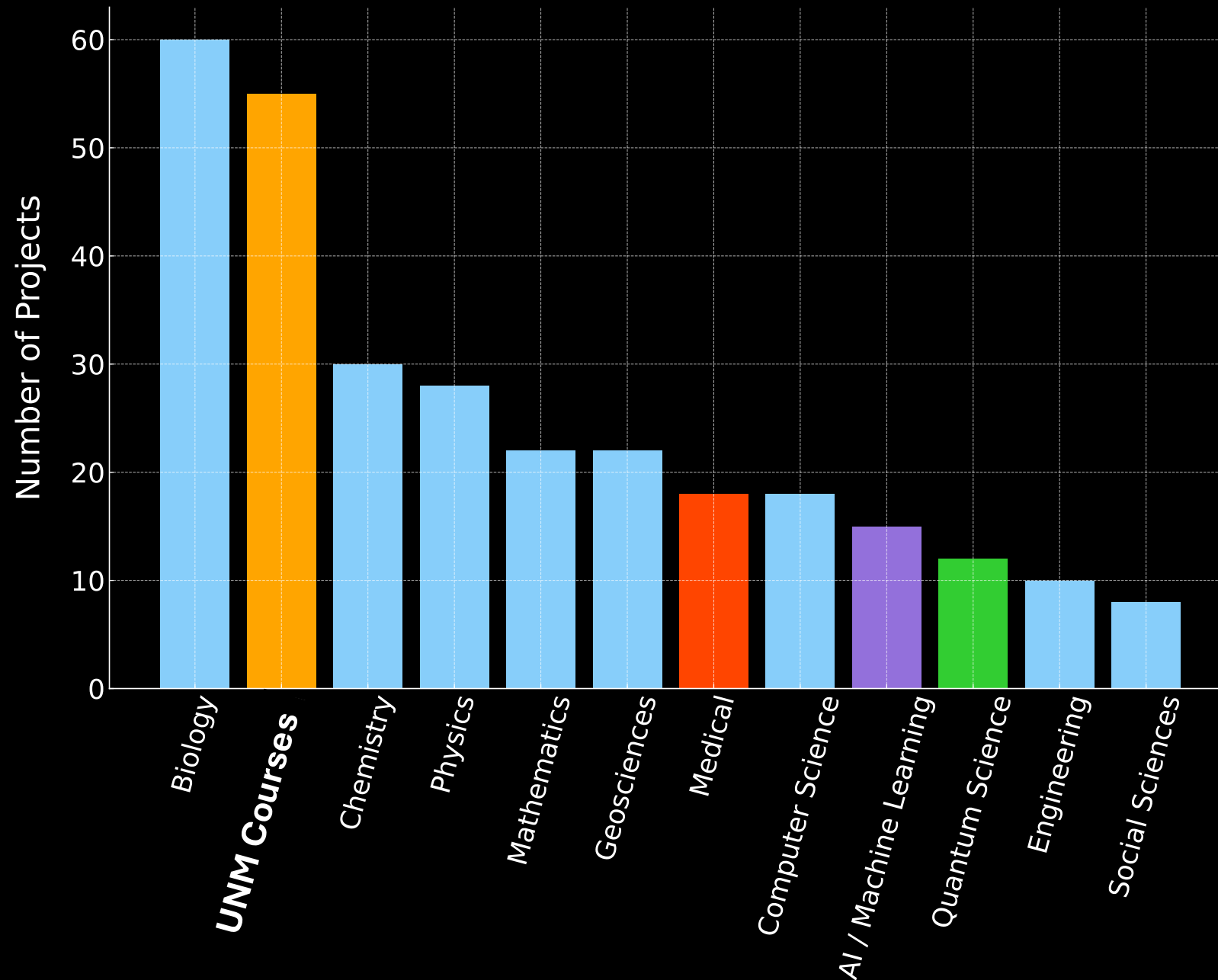
"Global landscape of SARS-CoV-2 genomic surveillance and data sharing." **Nature genetics**

Daryl Domman

Center for Global Health

During the pandemic all novel CoViD sequencing for 4 states was done at CARC.

# CARC Projects by Field of Science



## Yearly **Education** Impact

UNM Courses are our third largest category with 55 UNM courses listed as active projects.

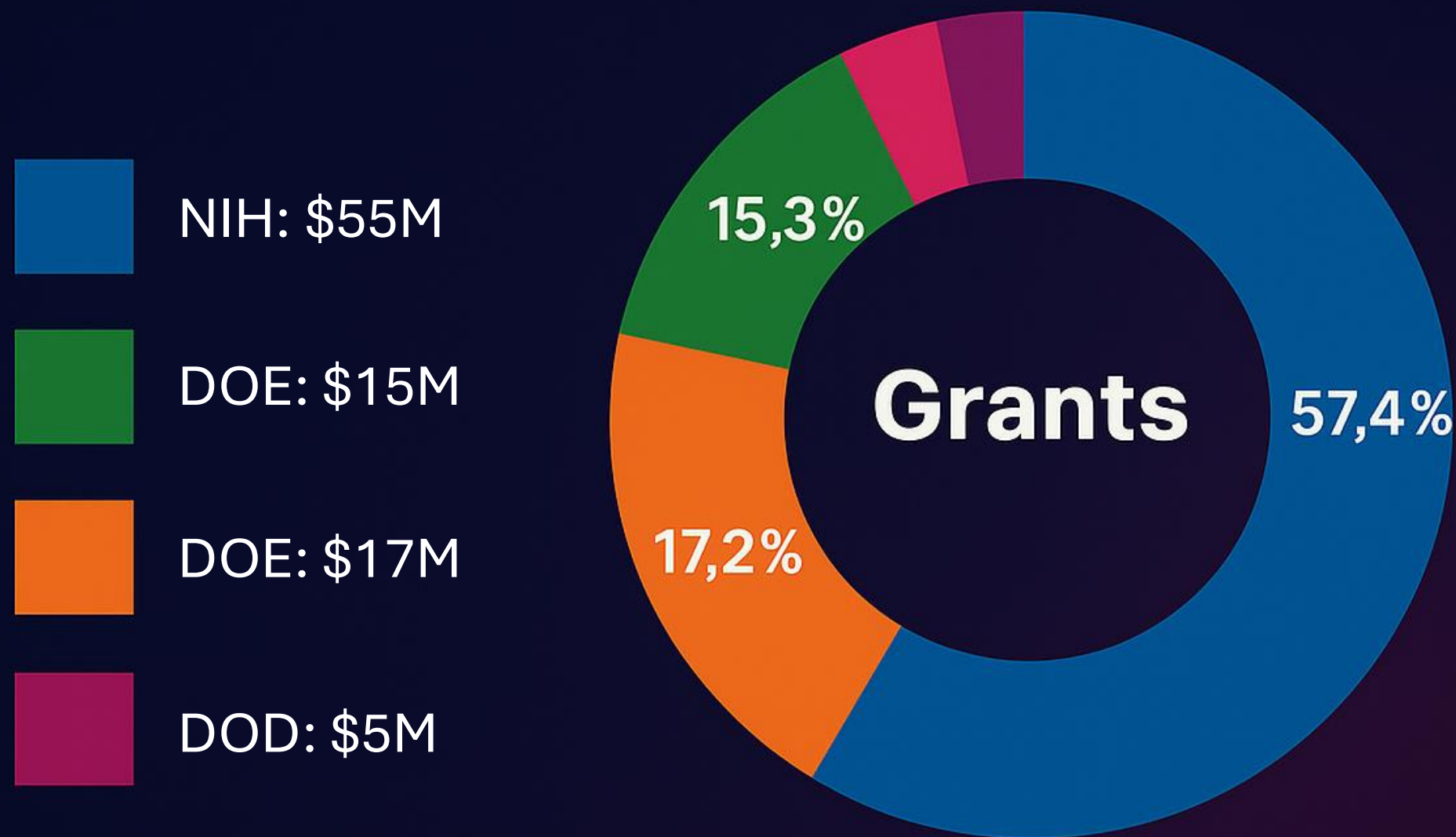
On average 17 are taught each year.

Avg of 15 Workshops taught with 220 students per year

Avg of 15 CARC Workshops taught with 220 students per year on diverse topics from Quantum Computing to Crystallography and Artificial Intelligence.

Education = CARC Supported  
Regularly offered classes

# Grants self reported by CARC Primary Investigators



Total: \$97M