



**BII Regional OneHealth Aerobiome
Discovery Network**
(Lead PI: Sue VandeWoude)

PAGXXIX Exploring Phytobiomes Workshop
January 12, 2022

Our Vision for BROADN:

To Reframe our Understanding of the Atmosphere as a Biological System

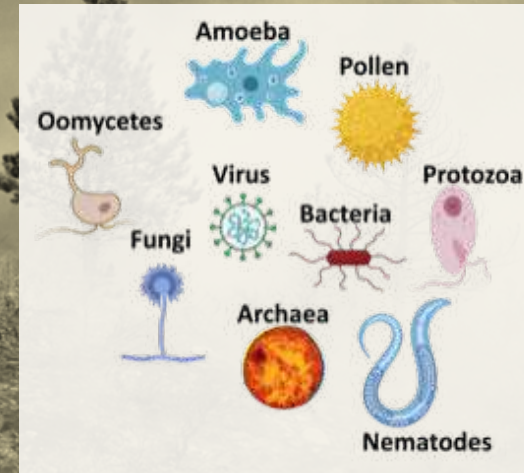


BROADN Vision:

To Reframe our Understanding of the Atmosphere as a Biological System

THE AEROBIOME:

The collection of microscopic organisms inhabiting the atmosphere



**BII Regional OneHealth
Aerobiome Discovery Network**

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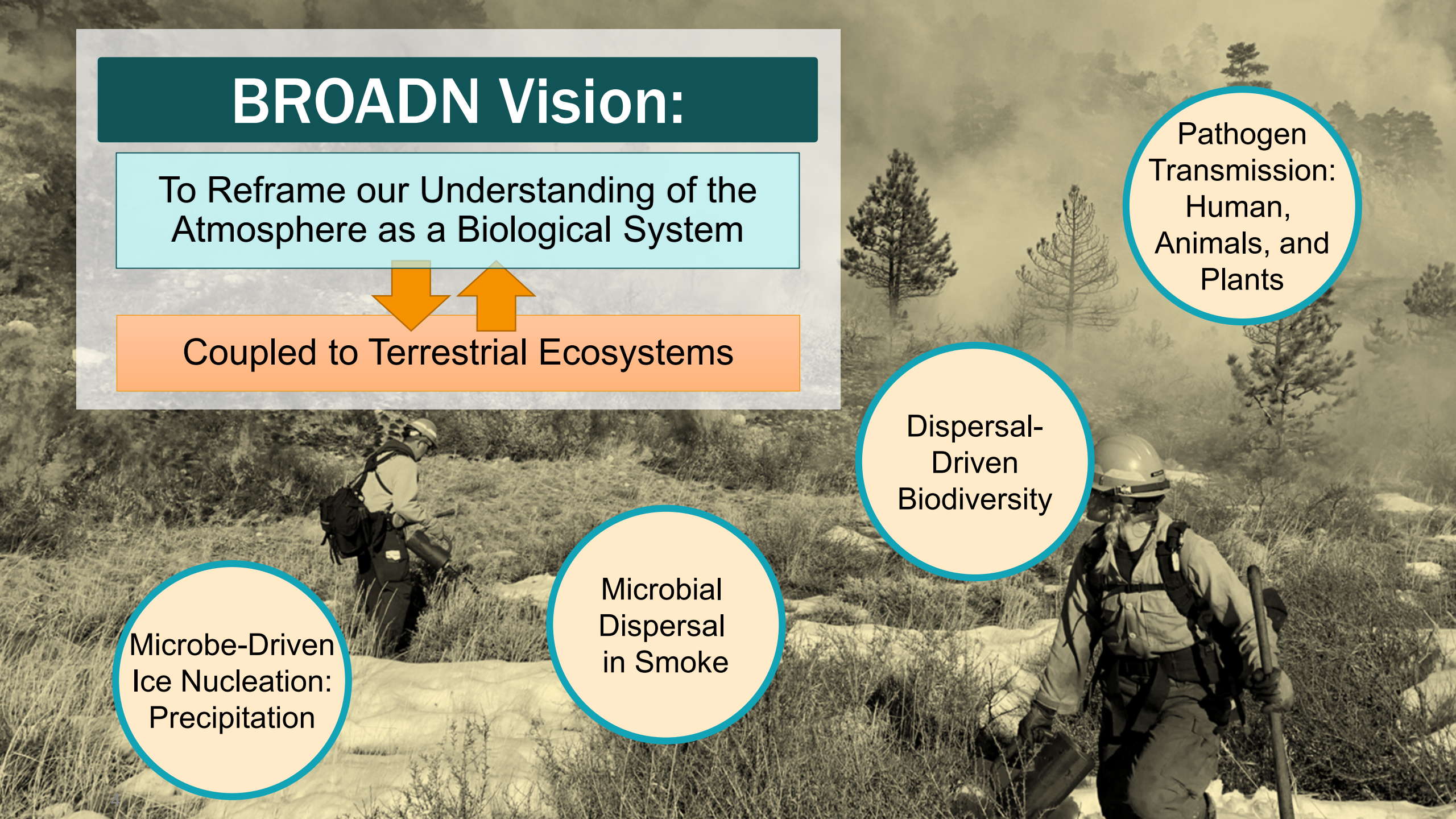
Coupled to Terrestrial Ecosystems

Pathogen Transmission:
Human,
Animals, and
Plants

Dispersal-
Driven
Biodiversity

Microbe-Driven
Ice Nucleation:
Precipitation

Microbial
Dispersal
in Smoke



BROADN Vision:

To Reframe our Understanding of the Atmosphere as a Biological System

Coupled to Terrestrial Ecosystems

1
WHAT microbes
are in the air?

2
WHAT influences
composition?

3
HOW does it get
there?

4
WHAT
is it doing?

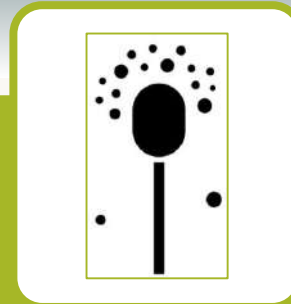
BROADN Themes



Theme 1
Discovery and
Characterization



Theme 2
Anthropogenic
and Complex
Disturbances



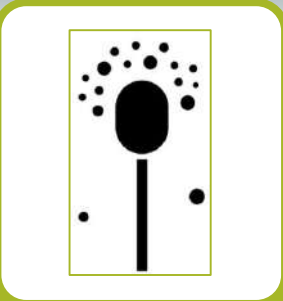
Theme 3
Emissions and
Processes



Theme 4
Mechanisms
and Functions

Education and Outreach

BROADN Research Themes



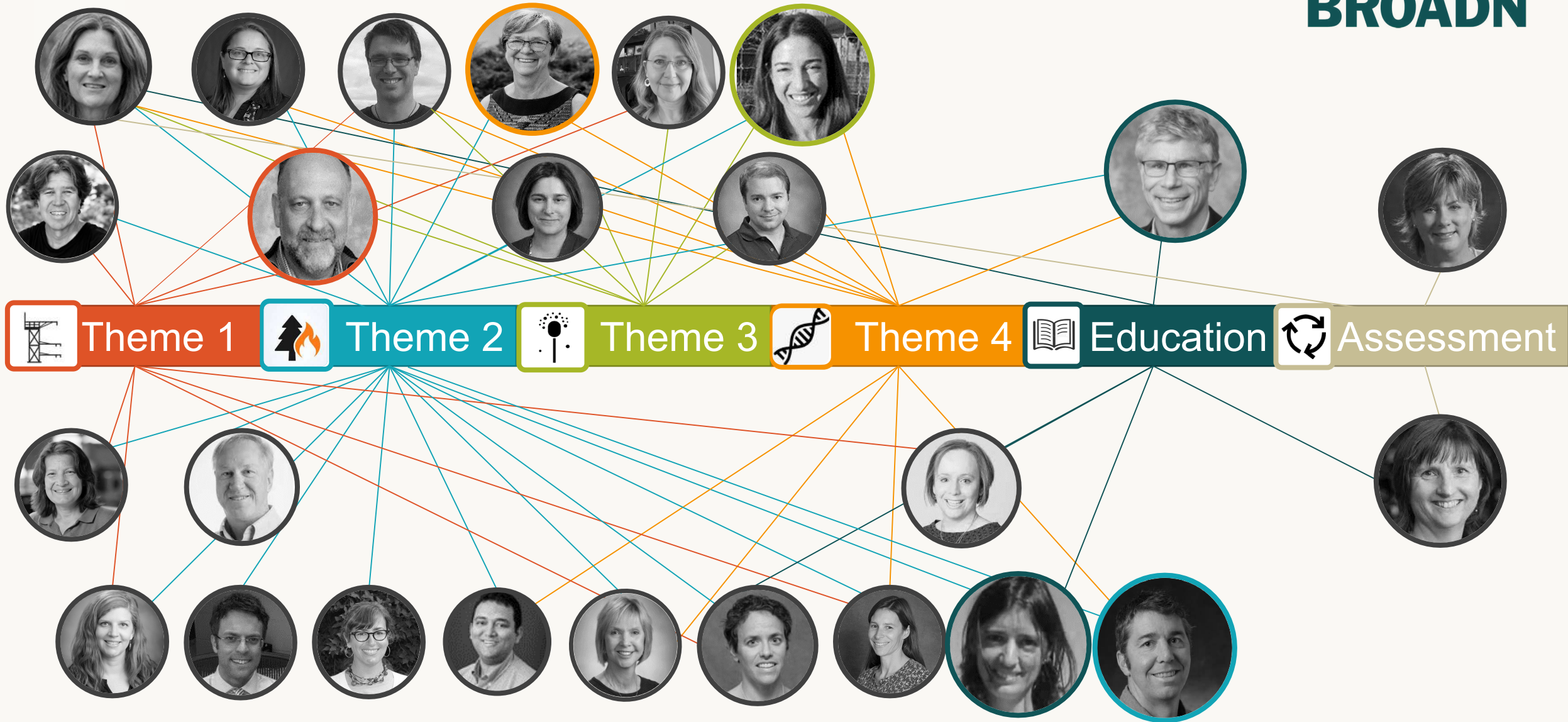
microbiology
atmospheric
science
aerosol physics

ecology
biophysics
epidemiology

systems biology
soil science
plant, animal science
engineering

bioinformatics
genetics
computer
science
physiology
evolution

The aerobiome has no walls...
We will integrate between themes, educational goals across all disciplines.





- ❑ What are the components of the aerobiome, as a function of ecosystem, season, and other factors?
- ❑ What sampling and analysis strategies assure representative data for the aerobiome?





- From where does life in the aerobiome come?
- How does the aerobiome respond to disturbances and other ecosystem changes?



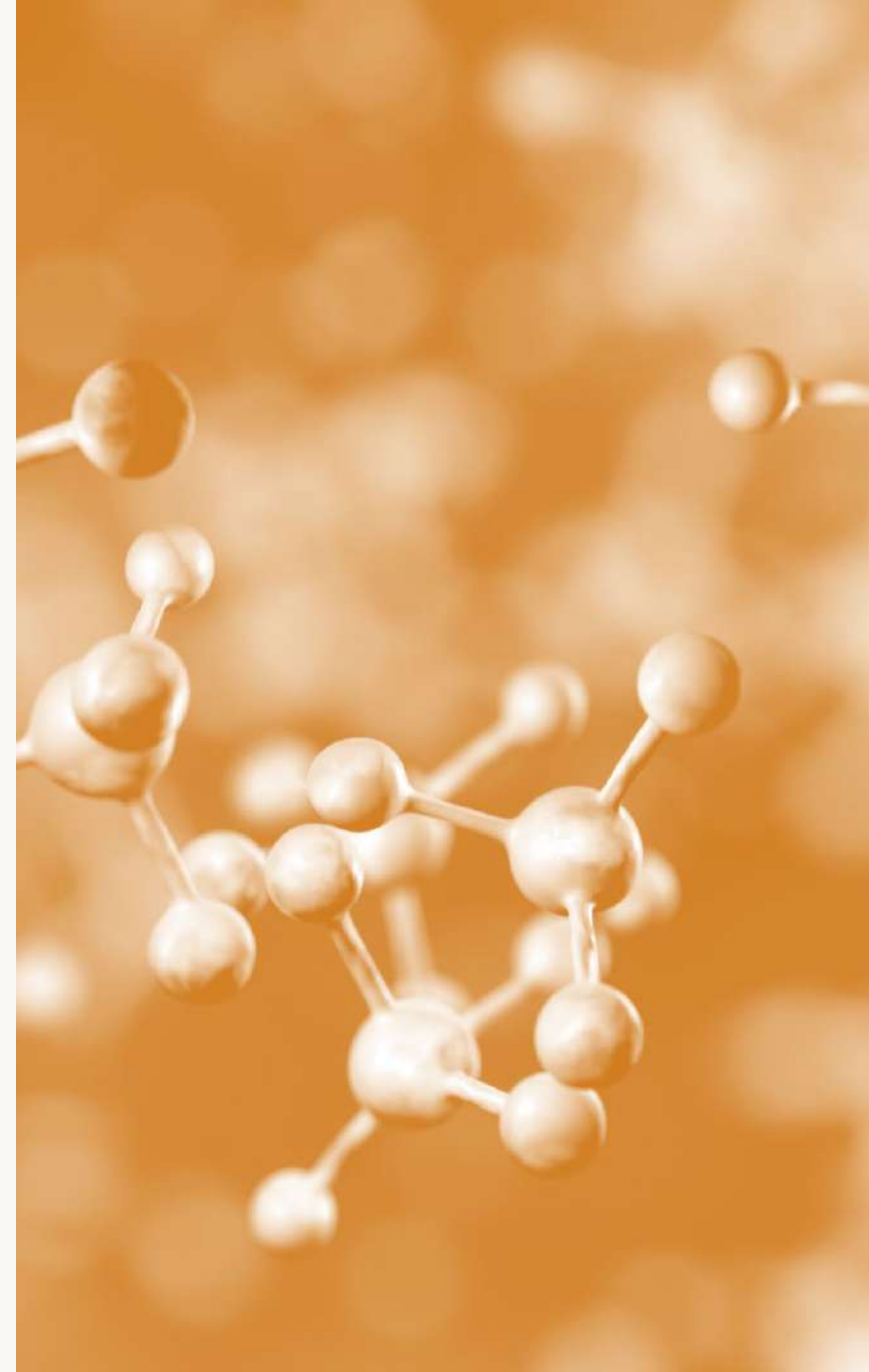


- ❑ What are the drivers of emissions into the aerobiome?
- ❑ How do the biotic and abiotic components of the terrestrial microbiome influence aerobiome composition?





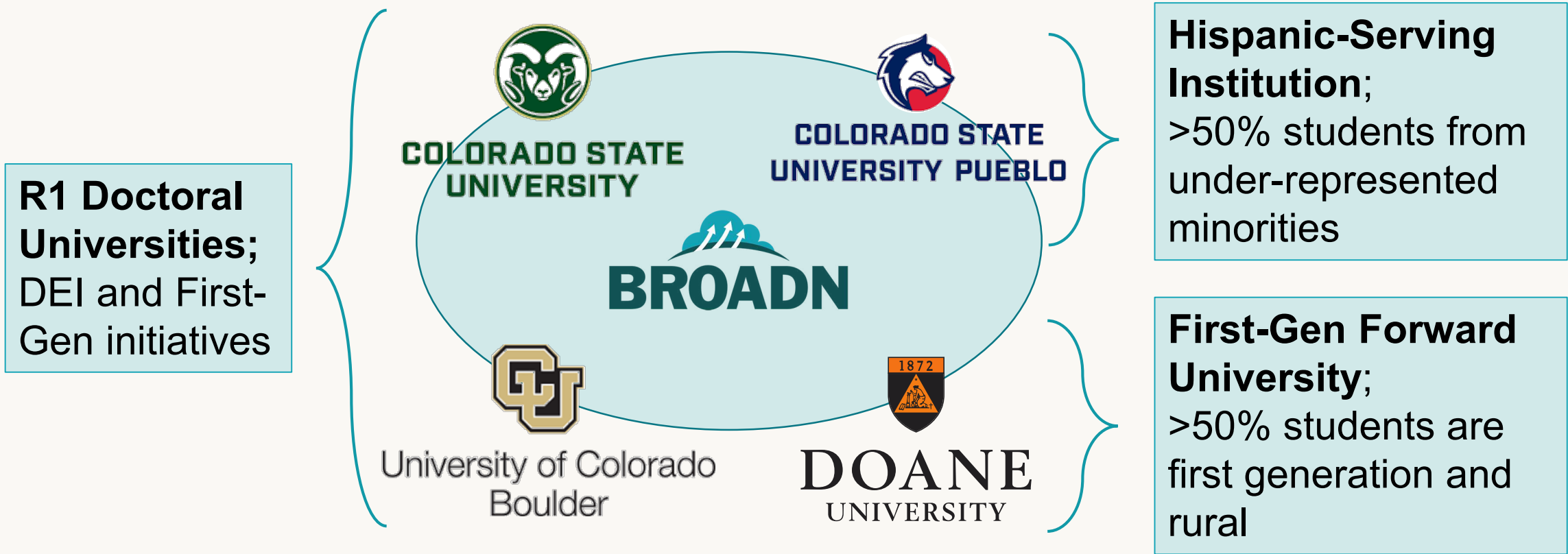
- ❑ Which genetic traits allow microscopic organisms to become aerosolized and transported, and result in ecosystem impacts?



Educating the next generation of scientists with interdisciplinary skills and integrated training



BROADN is an academic ecosystem



Our universities serve key communities

BROADN'S Transformative Legacy



Food security, safety, and sustainability

Pathogen outbreak prediction, management & mitigation

Aerobiome-informed climate change strategies

Global microbiome

The next generation of transdisciplinary scientists to solve “one health” problems



BROADN



Theme 1
Discovery and
Characterization



Theme 2
Anthropogenic
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Disturbances



Theme 3
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Education and Outreach