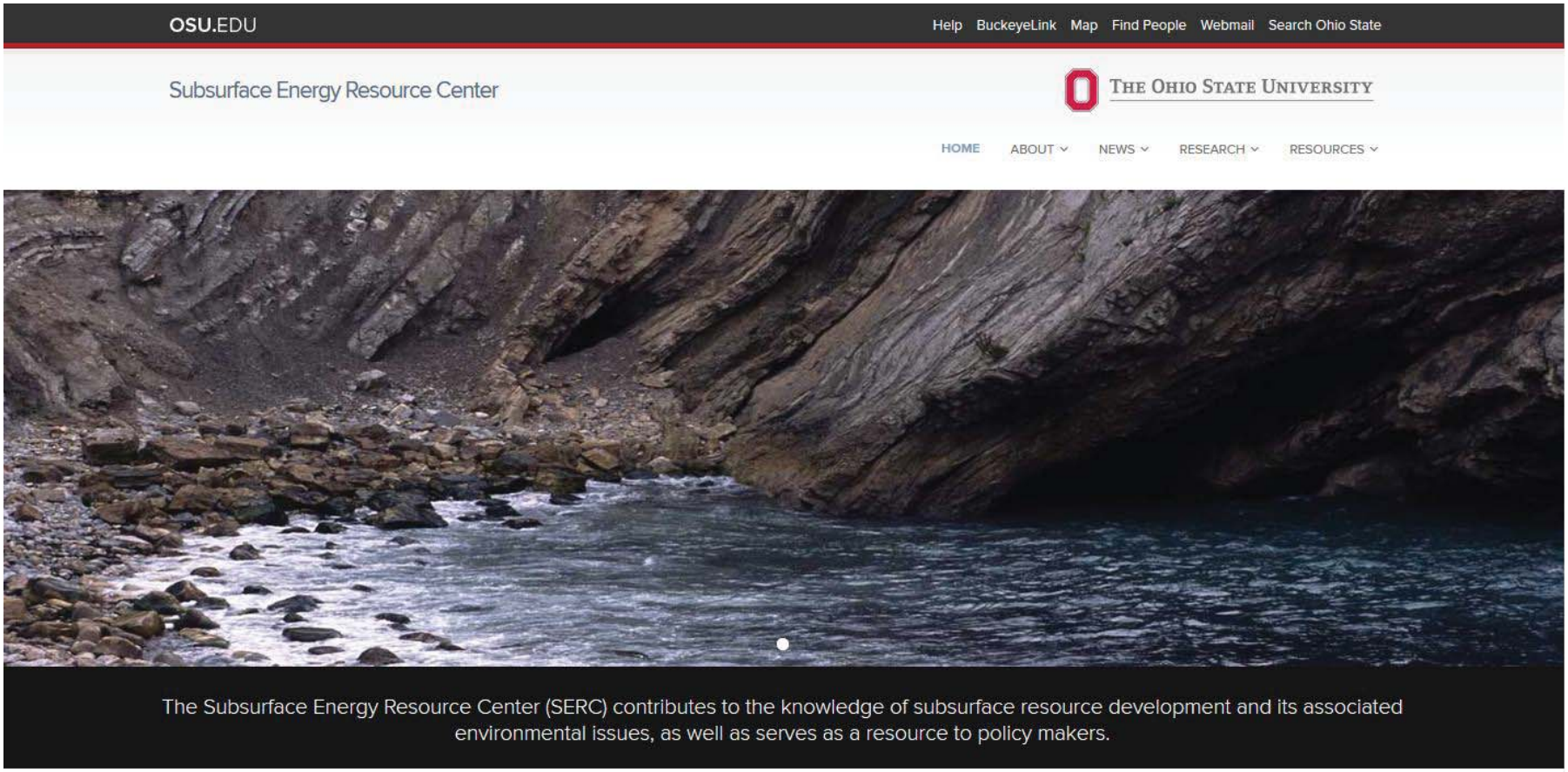
Reinventing SERC
Subsurface Energy Resource Center



Subsurface Energy Resource Center

The goal of the Subsurface Energy Resource Center is to contribute to the knowledge of subsurface resource development and its associated environmental issues.

Motivation for Reinventing SERC to CERTAIN

1. Awareness of the rapidly evolving domestic and global energy landscape involving renewables and non-renewables

2. Diversity of OSU faculty and staff interests in all forms of energy and related environmental issues

3. Opportunities presented to us by the Comprehensive Energy Management Project

4. Proposed merger of the Office of Energy & Environment and the Sustainable and Resilient Economy – SRE (an Energy and Environment Discovery Theme program)

5. Recognition that OSU needs a Center that can better connect faculty and staff in support of research program development, curricula development and outreach

OSU Comprehensive Energy Management Project

OSU.EDU

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Energy Management

THE OHIO STATE UNIVERSITY

Overview | News | Frequently Asked Questions | Campus Engagement | Sustainability Mission

Ohio State will utilize a public-private partnership to become an international leader in sustainability and provide new resources to advance teaching, learning and research.

The overview page details how the Comprehensive Energy Management Project will provide benefits to the university in four areas:

Conservation
Reduce energy use

Supply
Secure the best rates

Operations
Provide great service

Academics
Enhance resources

The Comprehensive Energy Management Project will modernize the university's 485-building Columbus campus, create substantial academic benefits and establish a major center for energy research and technology commercialization.

News

- OSEP launches website (April 17, 2018)
- Students brainstorm ideas to reduce energy use (March 28, 2018)
- Innovative partnership wins another top award (March 20, 2018)
- Trustees approve first energy conservation projects (Feb. 5, 2018)
- Distribution benefits 8,700 university staff (Nov. 15, 2017)
- Endowment supports financial aid expansion (Sept. 26, 2017)
- Partnership invests in 3 university programs (Aug. 29, 2017)

More news

Sustainability resources

- Sustainability Goals
- Commitment To Sustainability
- Office of Energy and Environment

OSU Comprehensive Energy Management Project

Elements of Academic Collaboration

- Scholarships: $25 million
  - $12.5 million for undergraduates
  - $12.5 million for graduates/professional students
- Faculty Endowments: $9.5 million
  - Five endowed positions
- Sustainability Endowment: $15 million
- Sustainability Curriculum and Staff Endowment: $5 million
- Philanthropic Support: $810,000 annually for 50 years
- Internships: $100,000 per year paid directly to interns (10 per year)
- Visionary Project: $50 million (Energy Advancement Innovation Ctr)
  - Building: $35 million
  - Operating for five years: $7.5 million
  - Research: $7.5 million

from Kate Bartter

SRE – OEE Merger (OSUS)

Highlights of Draft Strategic Plan

Ohio State University Sustainability

Become a premier land grant institution of sustainability science, technology and policy

- Recruit faculty leads, provide resources & support for interdisciplinary teams in key research areas
- Partner with existing research centers & academic units, provide platform for cross-unit collaborations

from Elena Irwin

CERTAIN may play a role here

and perhaps here

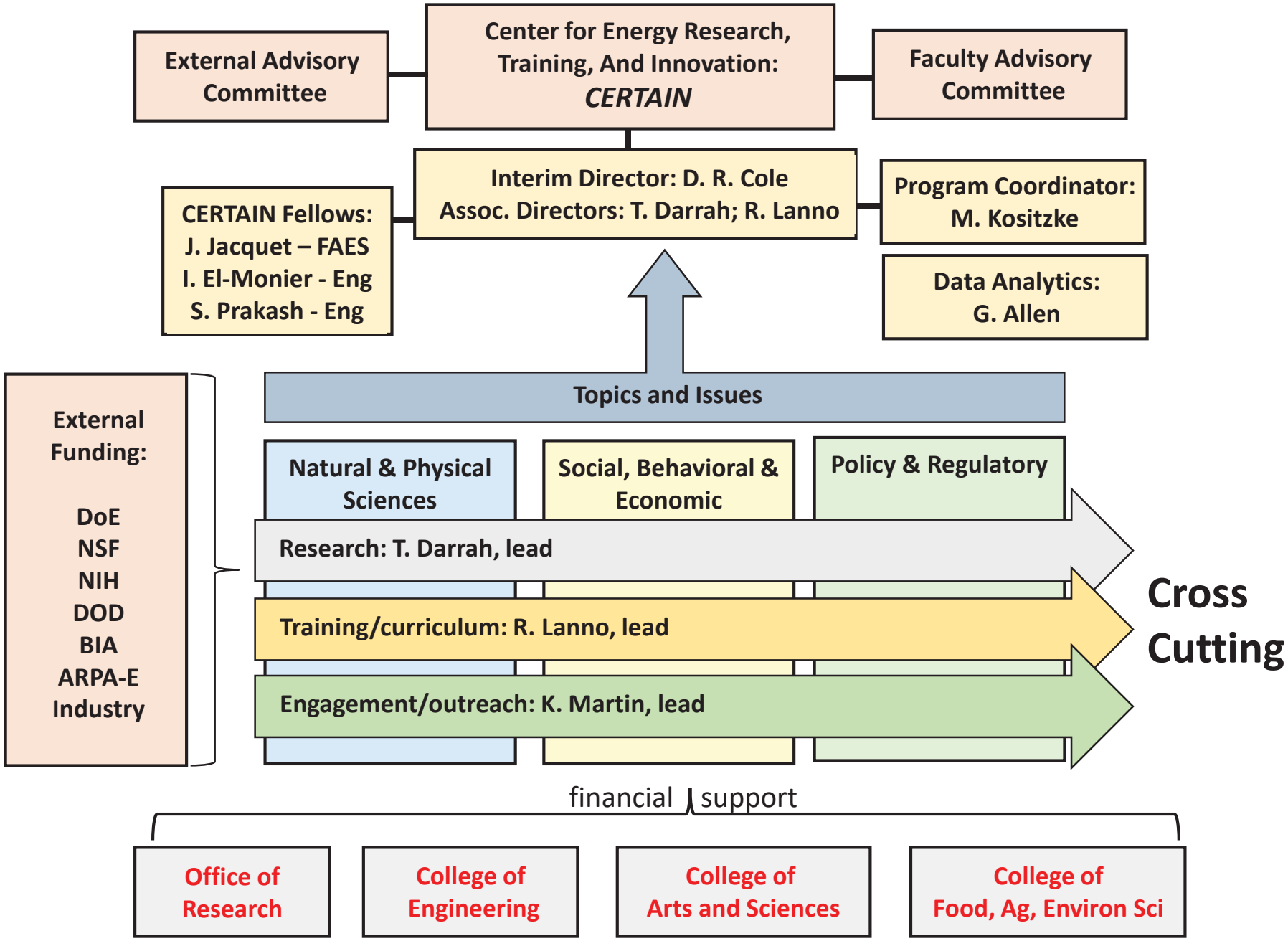
Center for Energy Research, Training, And Innovation: CERTAIN

Vision: Establish a premier center known worldwide for conducting research, education and outreach that promotes environmentally responsible, economically feasible and sustainable best practices for developing and managing renewable (RE) and non-renewable energy resources (NRE).

Mission: Catalyze transformative research, education and outreach that addresses society's grand challenges related to *both* meeting rapidly growing global energy demands in an environmentally responsible and sustainable manner and balancing the importance of robust economic growth and resiliency.

Technical Goals: Become Ohio State's STEM-focused loci of technically-sound, data-driven energy-and environmental science that leads to:

- knowledge generation, dissemination, and public outreach;
- technical innovation related to all forms of energy (renewables, fossil fuels, nuclear, and CO_2 management)
- decision-making geared toward responsibly developing, managing, and transforming the future of energy resource utilization from carbon-intensive fossil fuels (coal) to lower carbon-emitting fuels (nuclear, natural oil and gas) or renewables (wind, geothermal, solar, biofuels)
- guidelines for industry best practices


External Advisory Committee
Center for Energy Research, Training, And Innovation: CERTAIN
Faculty Advisory Committee
Interim Director: D. R. Cole
Assoc. Directors: T. Darrah; R. Lanno
CERTAIN Fellows:
J. Jacquet – FAES
I. El-Monier - Eng
S. Prakash - Eng
Program Coordinator: M. Kositzke
Data Analytics: G. Allen
External Funding:
DoE
NSF
NIH
DOD
BIA
ARPA-E
Industry
Topics and Issues
Natural & Physical Sciences
Social, Behavioral & Economic
Policy & Regulatory
Research: T. Darrah, lead
Training/curriculum: R. Lanno, lead
Engagement/outreach: K. Martin, lead
Cross Cutting
financial support
Office of Research
College of Engineering
College of Arts and Sciences
College of Food, Ag, Environ Sci

CERTAIN Management Team

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Gerald Allen, Data Analytics, allen.694@osu.edu

CERTAIN Faculty Advisory Committee (CFAC)

1. Katherine Jenkins, Knowlton School of Architecture, jenkins.1060@osu.edu
2. Ilham El-Monier*, Chemical and Biomolecular Engineering, el-monier.1@osu.edu
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6. Ken Martin, OSU Extension, martin.1540@osu.edu
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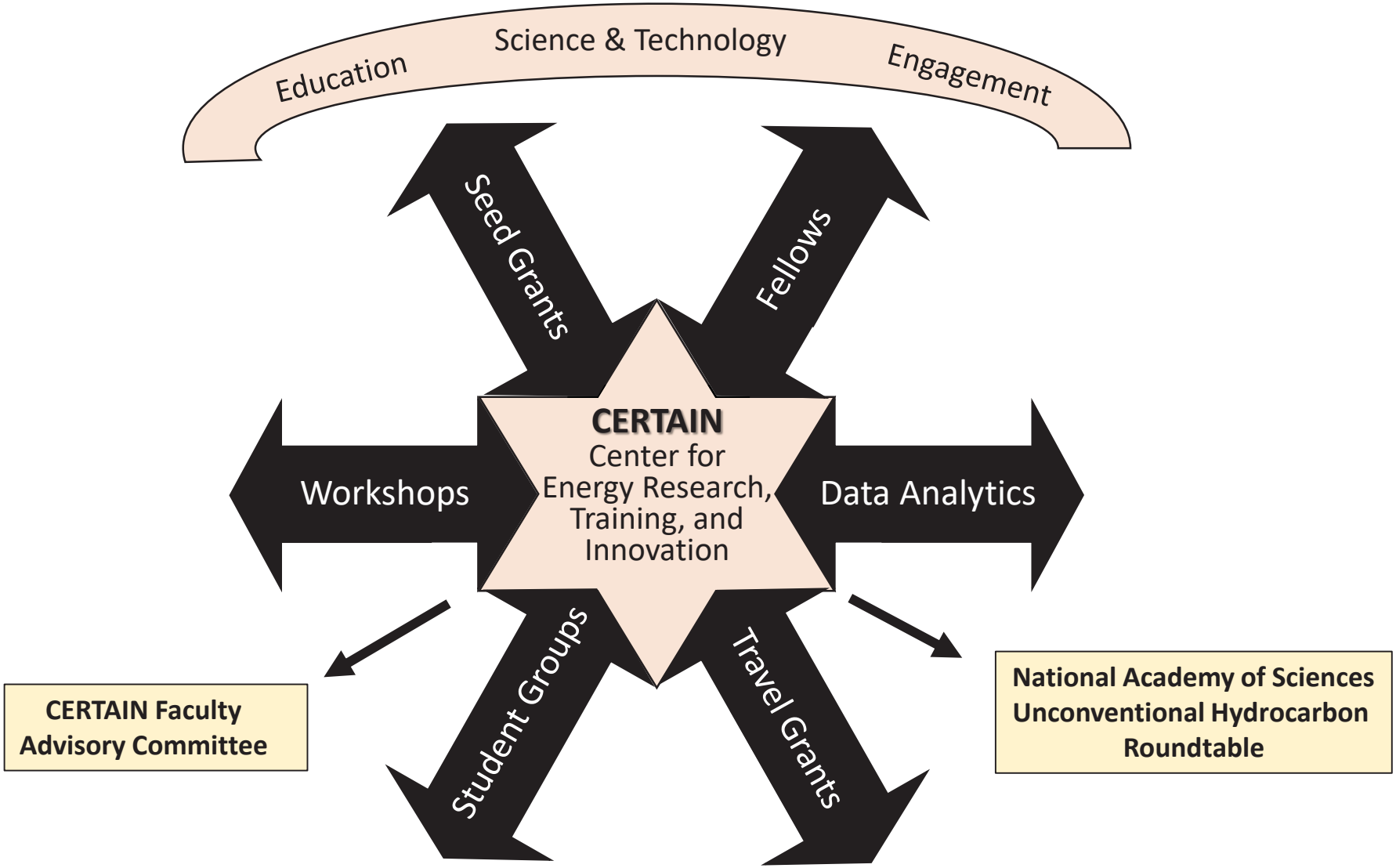
8. Anne Co, Chemistry and Biochemistry, co.5@osu.edu (*pending*)
9. Sudhir Sastry, Food, Ag and Biological Engineering, sastry.2@osu.edu

* CERTAIN Fellow

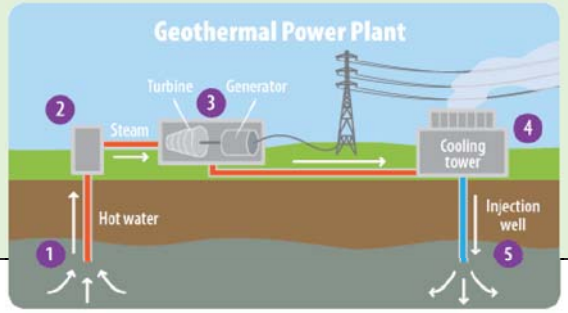
CERTAIN Financial Investments



Summary of Expanded Interests

CERTAIN includes a diverse suite of globally recognized technical experts in *not only* fossil fuel extraction, but also *other forms of energy* and energy-related disciplines and the environment.

- Bridge Fuels (natural gas, nuclear)
- Renewables (solar, wind, geothermal)
- Renewable Critical Resources (Li, REEs, helium)
- Energy Storage (batteries, fuels cells, subsurface)
- Waste Storage (CO_2, brine, radioactive waste)
- Water resource acquisition and management
- Environmental impacts of Energy Extraction
- Policy, Economics & Law
- Public Health
- Extension/outreach



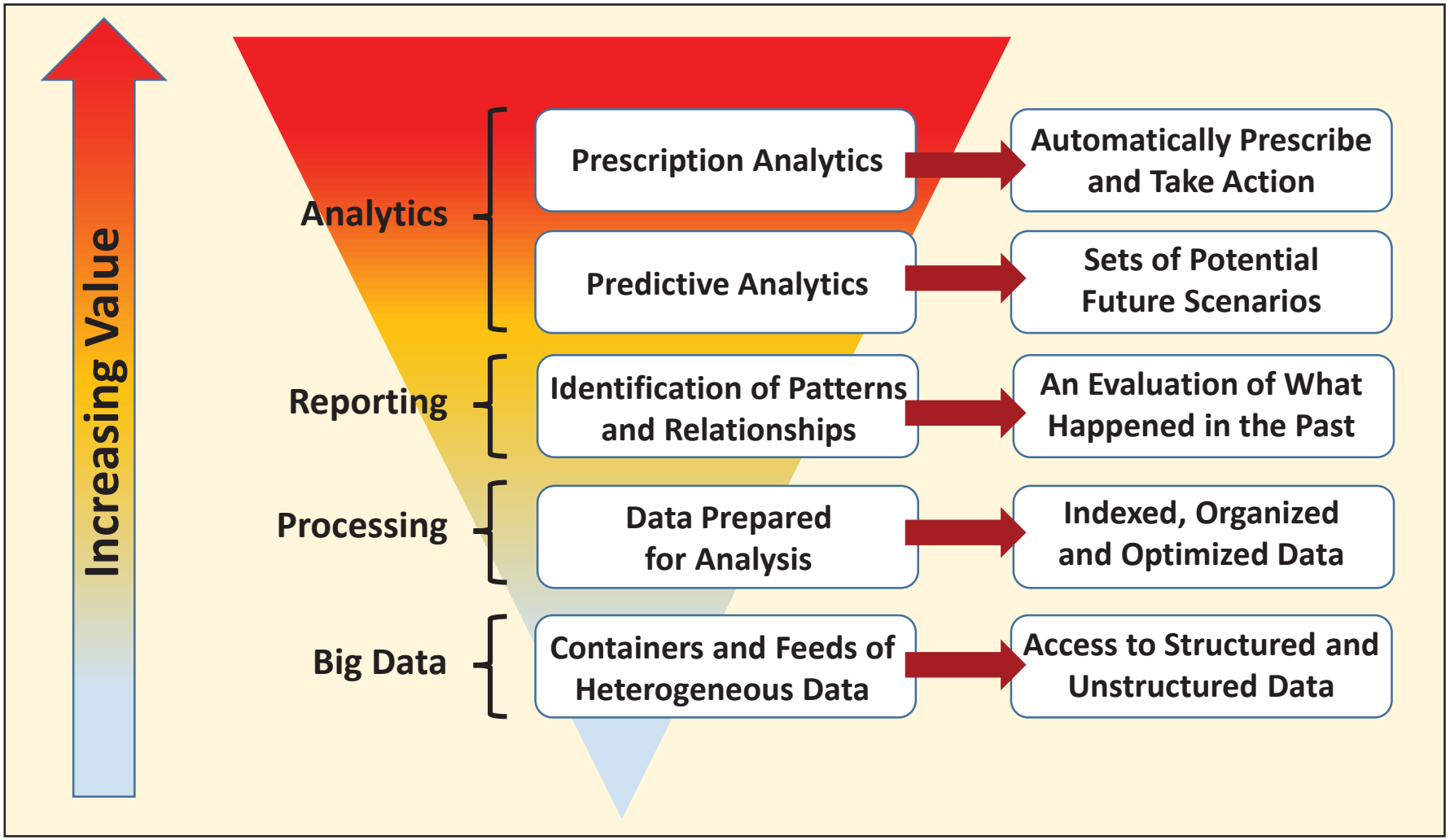
CERTAIN will expand its role in

Science & Technology: Support team building for program development in renewables, energy storage, water use – i.e., sustainability science
Lead or co-lead new proposal efforts to build programs in renewables, non-renewables, energy storage, environmental impact and risk assessment

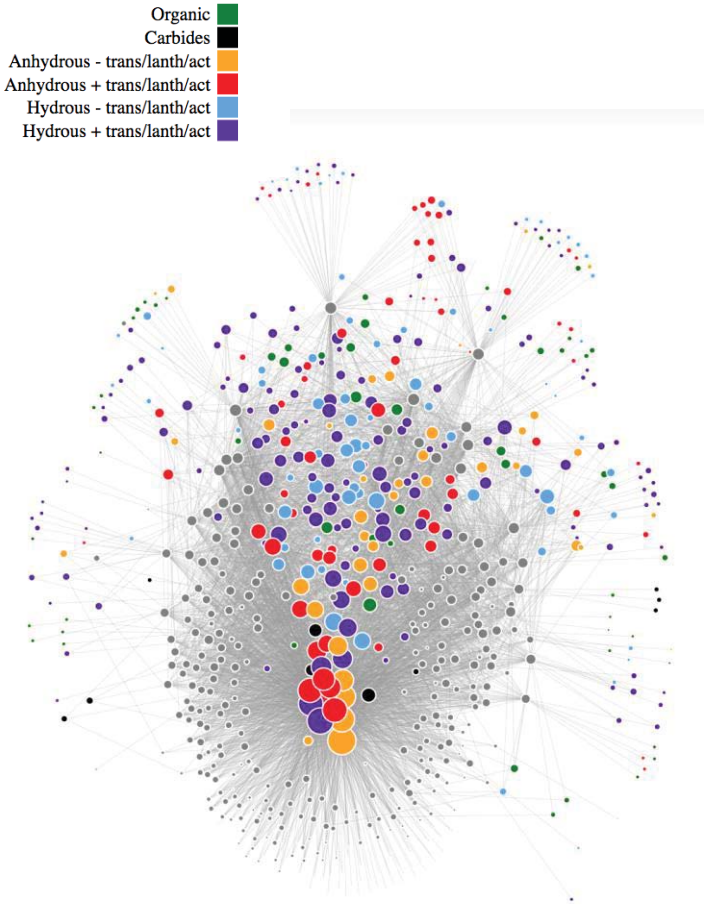
Curriculum Development: Add Energy track to Environmental Sciences Graduate Program
Explore STEM-based Energy and Environment course development, new certificate programs, tracks, minors, and majors
Revitalize and Expand the Professional Masters program in SES
Participate in and contribute to OSUS Education initiative

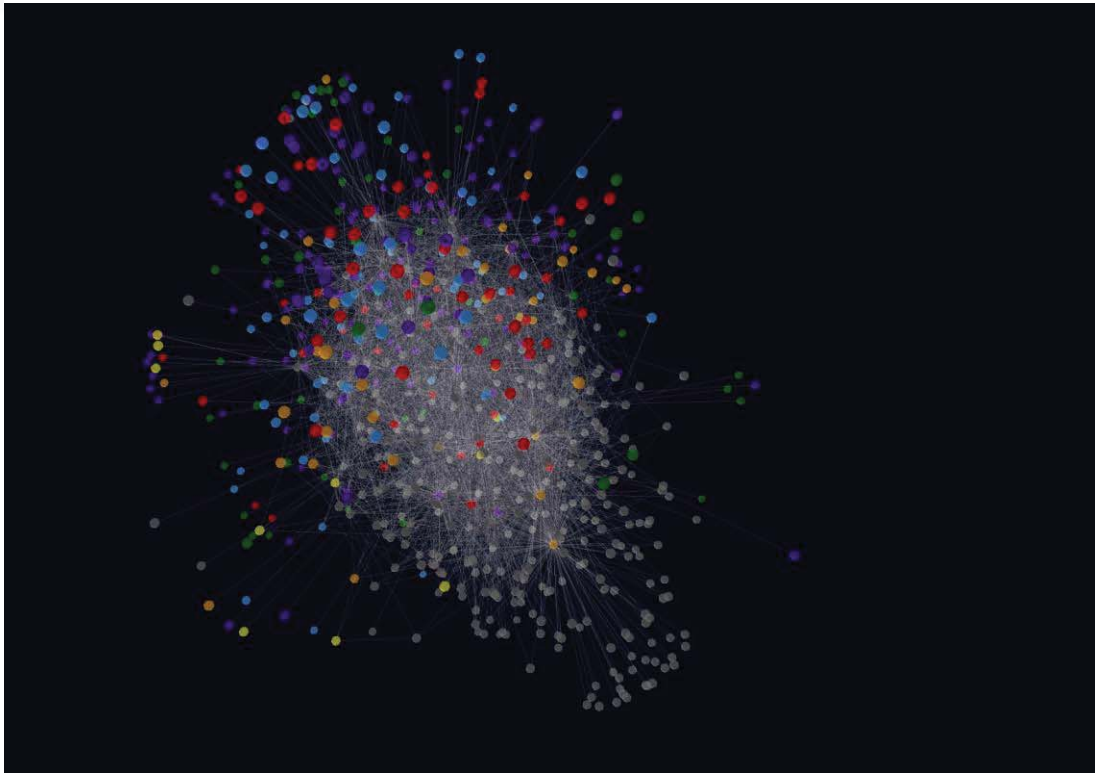
Outreach & Engagement: Provide fact-based information on technical aspects of renewables and energy storage to OSU Extension
Assist Extension with development of new RE specialize course materials required to educate extension field agents
Support engagement workshops and town halls

Data Analytics:
The nature of the opportunity and challenge



Data Analytics Example: Carbon Network Geometry





Recent Examples of Research Program Development

Department of Energy:

Basic Energy Sciences:

"Nanosphere Energy and Water Research (NEWR-EFRC) – Wash U. - D. Giammar PI
(4 years - $16 million; OSU part - $1.1 million)

Office of Fossil Energy/ NETL:

"Integrated Chemical, Physical, and Biological Methods for the Evaluating Fracture Related Fluid Migration in Shales" OSU – T. Darrah PI (2 years, $1,812,005)

National Science Foundation:

"Collaborative Research: Tectonic and glacial controls on the source, pathways and dynamics of fluid movement through sedimentary basins to the Critical Zone" OSU T. Darrah – PI (2 year, $685,831)

Major Research Instrumentation (MRI)

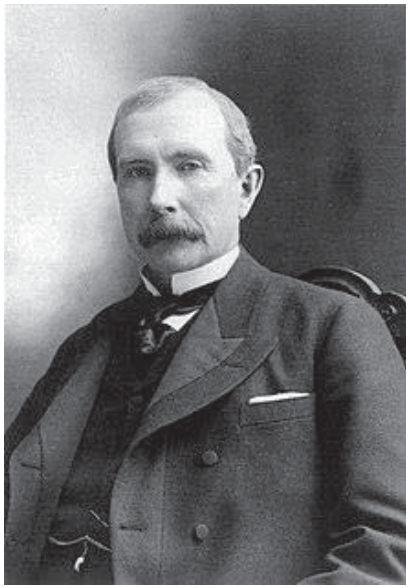
"Acquisition of a Laser Ablation Multicollector Inductively Coupled Plasma Mass Spectrometer for Geoscience Research and Education at Ohio State University L. Griffith PI ($792,904)

Ohio Coal Research and Development Program:

"Sequestration of CO_2 and Co-Contaminants into Geological Formations in Ohio" D. Cole – PI
(2 year, $160,000)

A More *CERTAIN* Future

J.D. Rockefeller



Edward Orton, Jr.