

# Using Campus Development to Build Industry Partnerships & Dismantle Academic Silos

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gouldevans

**KU** THE UNIVERSITY OF  
KANSAS

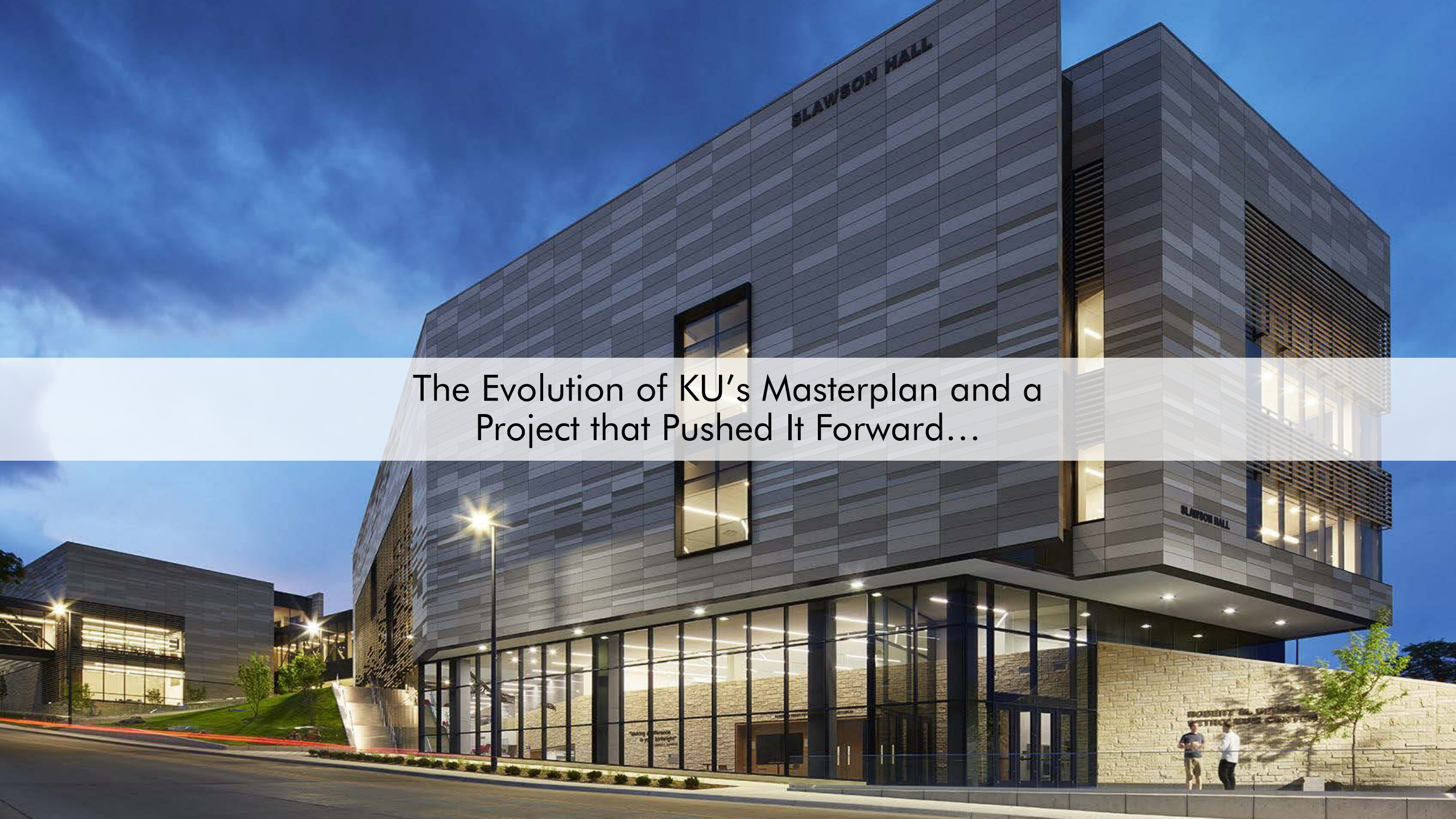


The Society for College  
and University Planning

# Learning Outcomes

- ***How inclusive strategic planning and development can lead to physically and culturally transforming a campus***
- ***How a guiding philosophy of 'integration' can permeate and help achieve goals of:***
  - Improved student learning
  - Improved faculty engagement with teaching
  - Breaking down silos to promote interdisciplinary research and learning
  - Bringing the public and industry to campus to enhance student and faculty experiences
  - Making a positive impact on the world
  - Resilience
- ***What a philosophy of integration looks like*** when put into practice - using The Earth Energy and Environment Center at KU as a case study





The Evolution of KU's Masterplan and a Project that Pushed It Forward...



# The first step in planning - *Bold Aspirations*

- **Address emerging and escalating global challenges** and societal issues where KU has special capabilities
- **Build scholarly communities** that challenge, engage, and inspire individuals from many disciplines around common themes
- **Enhance KU's national and international visibility** and impact
- **Engage and motivate funding agencies, foundations, state government, community, alumni, and friends** to provide much-needed resources
- **Provide our students with unique experiences** that will position them as highly recruited and valued drivers and innovators of social and technological change.



**BOLD ASPIRATIONS**  
HAS MADE US A  
**better university.**

**WE'RE STRONGER.**

**WE'RE EXPANDING.**

WITH OUR  
**CENTRAL DISTRICT  
REDEVELOPMENT**  
AND INFRASTRUCTURE UPDATES, KU IS INVESTING IN OUR  
**LARGEST EXPANSION PROJECT  
IN ALMOST 100 YEARS.**



# Four interdisciplinary research areas

1. **Promoting Well-being, Finding Cures**
2. **Building Communities, Expanding Opportunities**
3. **Harnessing Information, Multiplying Knowledge**
4. **Sustaining the Planet, Powering the World**

*...an economy vital for the long term demands of both a sustainable environment and the availability of affordable energy. Multidisciplinary research on climate change, renewable energy and chemicals, extraction of fossil fuels from unconventional formations, and environmental impacts is critical to achieve a secure future and protect a fragile global environment.*

## OUR HOPES FOR OUR WORLD

### WE WILL

Sustain the Earth, power the planet

- » Create a sustainable future by cultivating new sources of energy and materials and more efficient use of scarce resources
- » Understand the complex causes and consequences of environmental change
- » Benefit businesses and consumers through the commercialization of KU innovations in sustainability

### WE WILL

Promote well-being, discover cures

- » Enhance lifelong health and wellness — with preventive medicine, drug discovery and development, and acute care
- » Provide insight into human growth, language development, and cognition over the lifespan
- » Transform research into practical discoveries, therapies, and products that create jobs and save lives

### WE WILL

Build communities, expand opportunities

- » Assist people and communities around the world in realizing their full potential
- » Explore and develop research on comprehensive interventions, education, public policy, and best practices for problems facing America's children and families
- » Promote enhanced self-reliance and worth, stronger communities, and greater appreciation of the power of diversity and constructive discourse

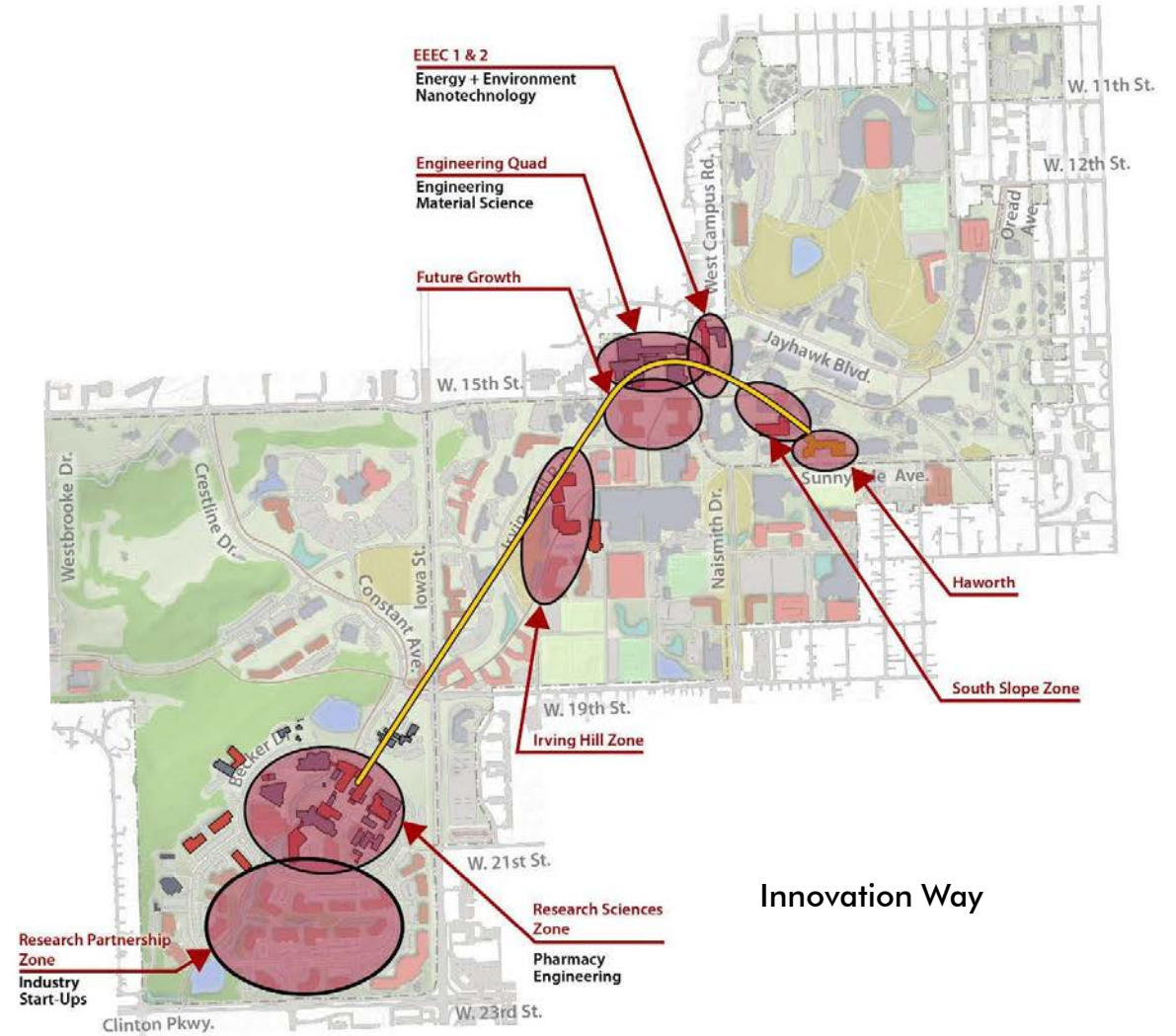
### WE WILL

Harness information, multiply knowledge

- » Revolutionize how we live and thrive by harnessing the enormous potential of information
- » Control matter and information at the quantum, atomic, and molecular scale
- » Spur economic development and innovations in health care, energy, education, national security, and well-being

# Next related step in planning – Strategic Plan for Facilities for the Sciences

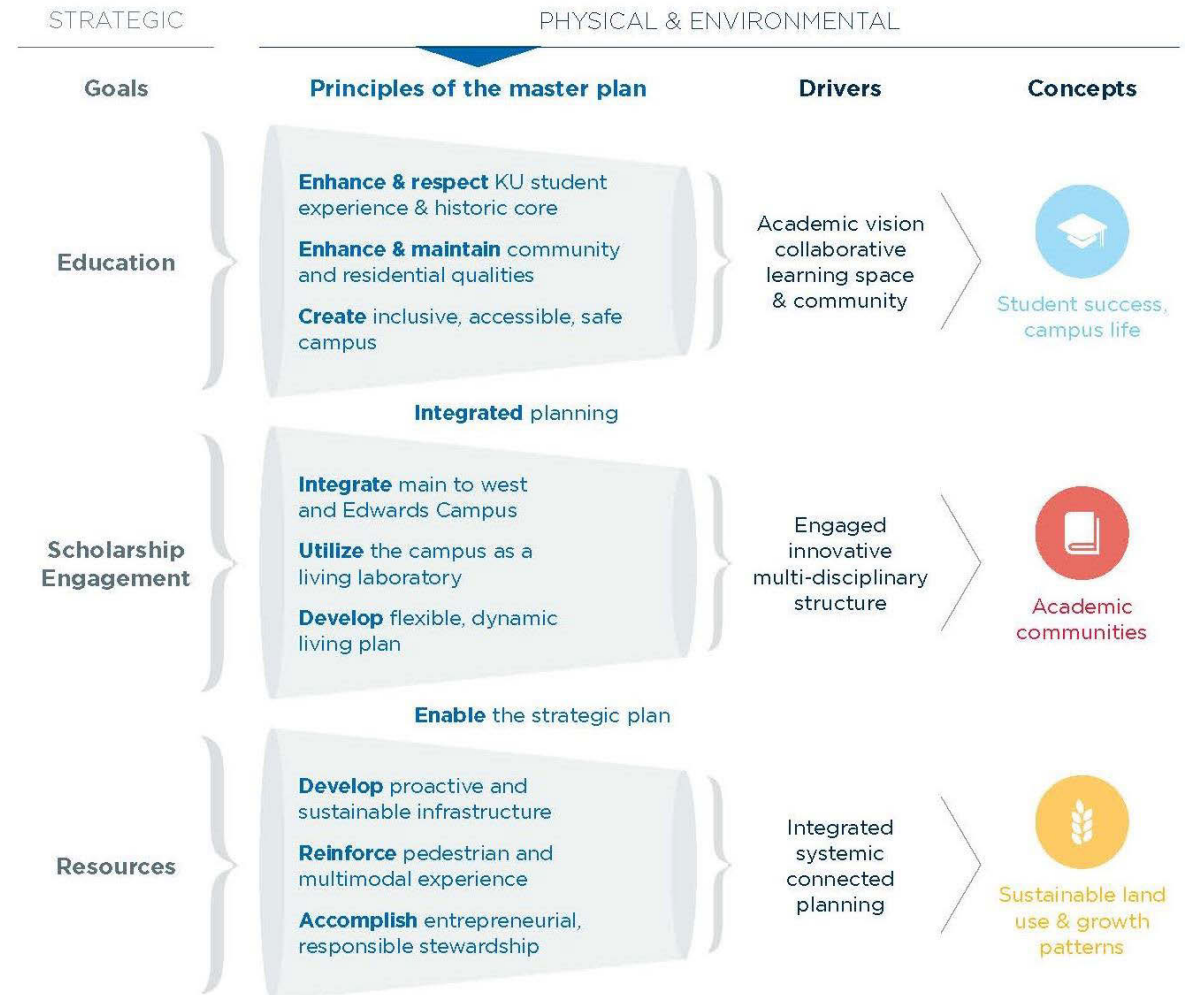
- 6 months of assessment and planning with a design firm, faculty and administrators
- Philosophy of **integration** to connect areas of the sciences and engineering and promote interdisciplinary collaboration
- Design and implement Earth Energy and Environment Center to support *Sustaining the Planet, Powering the World*
  - Raise funds from philanthropy, bonding, and University funds
- Design framework for Integrated Science Buildings to support the other strategic themes
  - Develop innovative mechanisms for financing, designing and building





# Next related step in planning – A Campus Master Plan

- **Integration**
- **Six goals of Bold Aspirations**
- **Attract and retain best faculty and students**
- **Provide safe labs for teaching and research**
- **Create engaged learning spaces**



Principals, Drivers & Concepts

# Next related step in planning – *A Campus Master Plan*

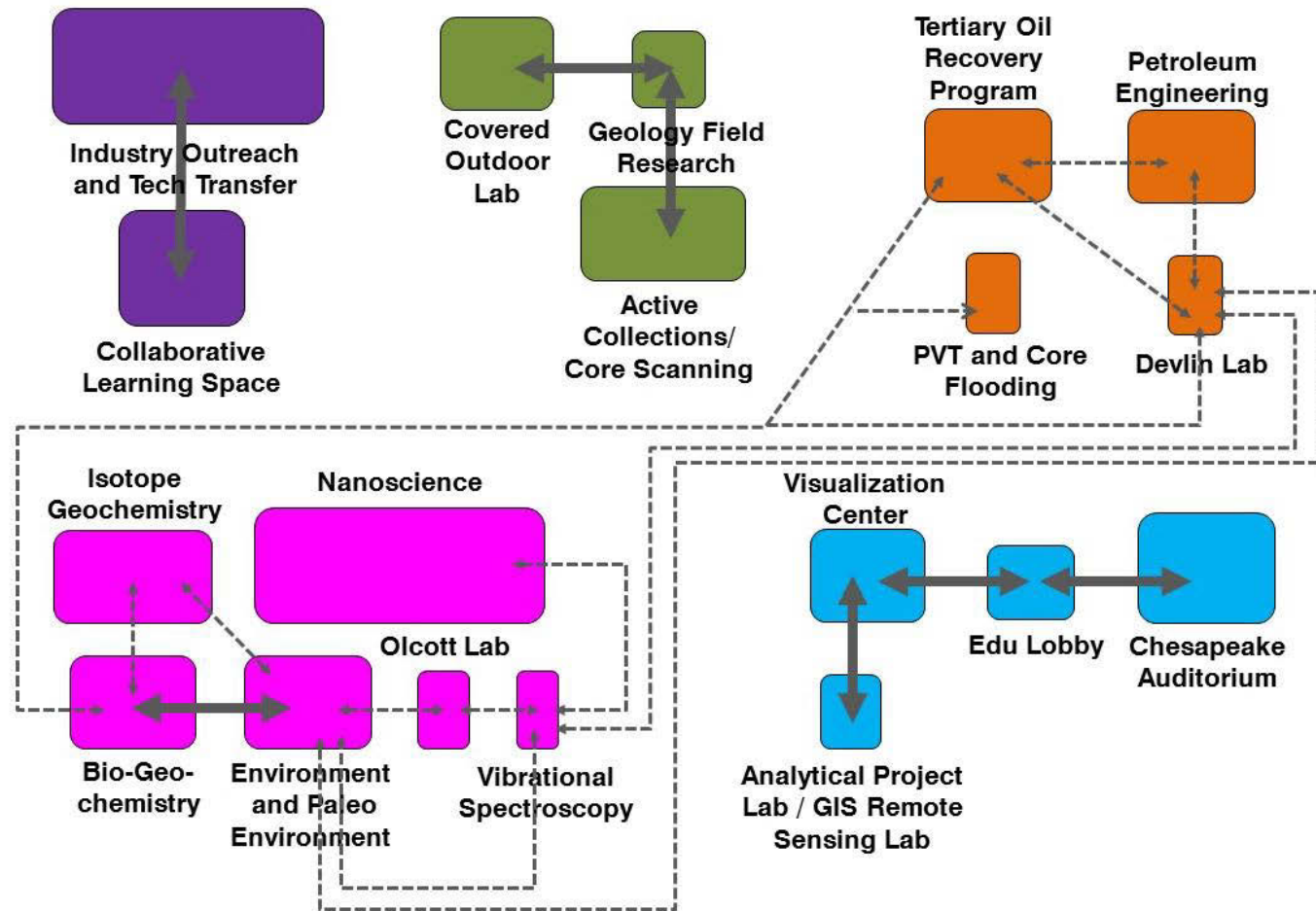
- **Co-locate research labs with undergraduate teaching spaces** to enhance student experience
- **Organize research spaces thematically** around a few umbrella research institutes to increase interdisciplinary collaboration and competitiveness
- **Develop a connected campus**, where new science buildings are integrated with School of Engineering spaces and Pharmacy School spaces
- **Eliminate liabilities in older science buildings** as much as possible



Master plan working session



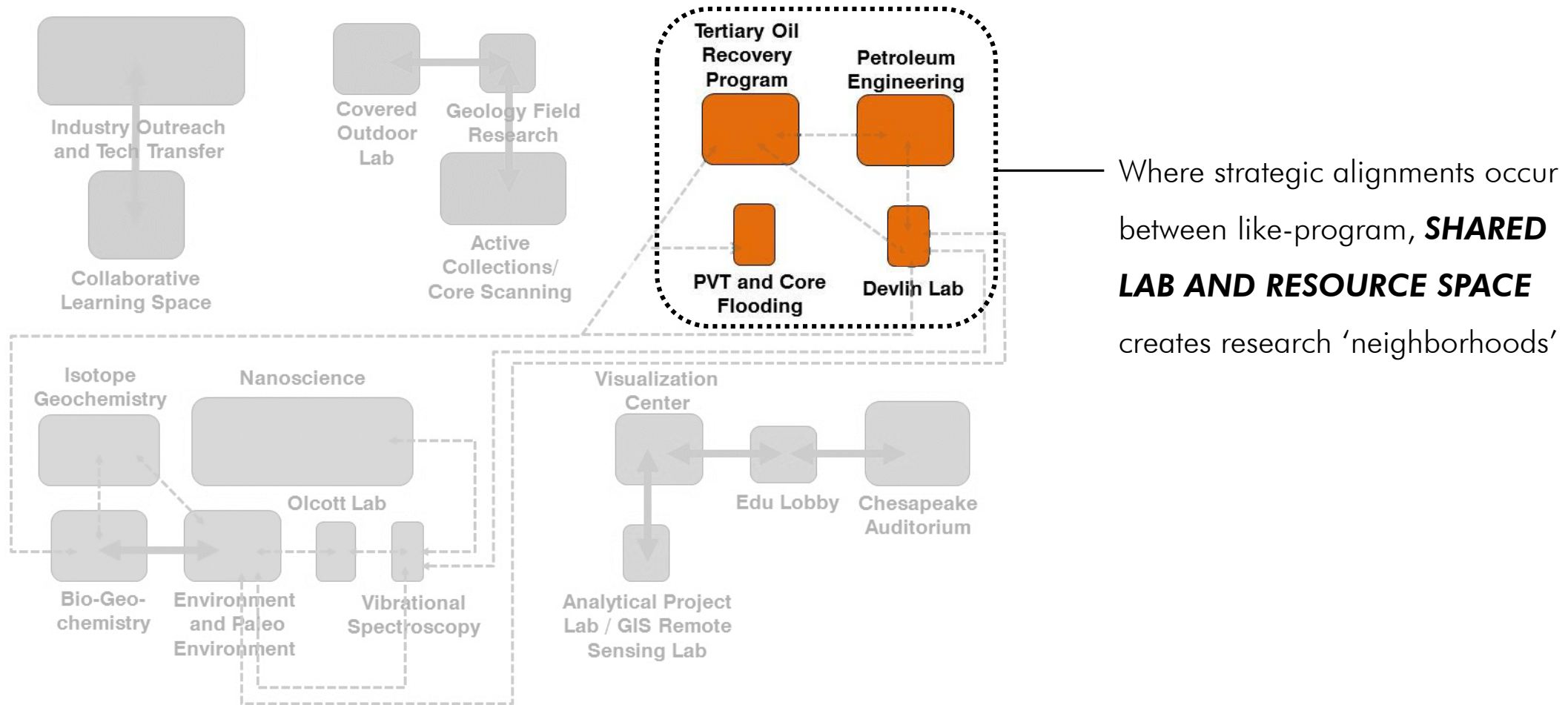
# Breaking Down Academic Silos to Improve Learning and Post-Graduate Readiness



- **EEEC integrates disciplines that tend not to talk to one another in academia but work closely in the real world.** It starts to accomplish this by co-location of Chemical and Petroleum Engineering (School of Engineering) and Geology (College of Liberal Arts and Sciences) faculty and students

Aligning collaboratively-beneficial program

# Breaking Down Academic Silos to Improve Learning and Post-Graduate Readiness



Aligning collaboratively-beneficial program





*The 'FLIPPED LAB'*

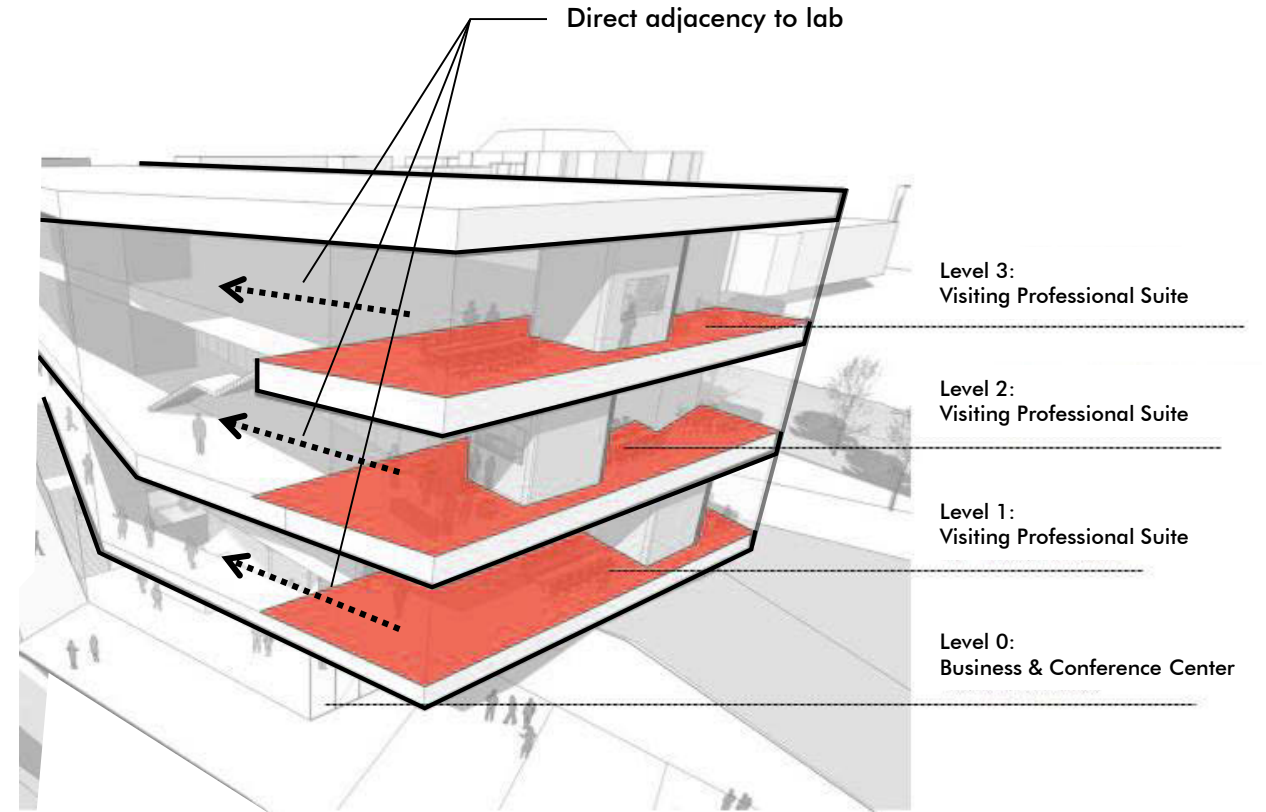




*Work space – lab continuity*



# Breaking Down Academic Silos to Improve Learning and Post-Graduate Readiness



Vertical outreach – integrating industry partners with their researchers/labs





*Active-learning, EVERYWHERE*

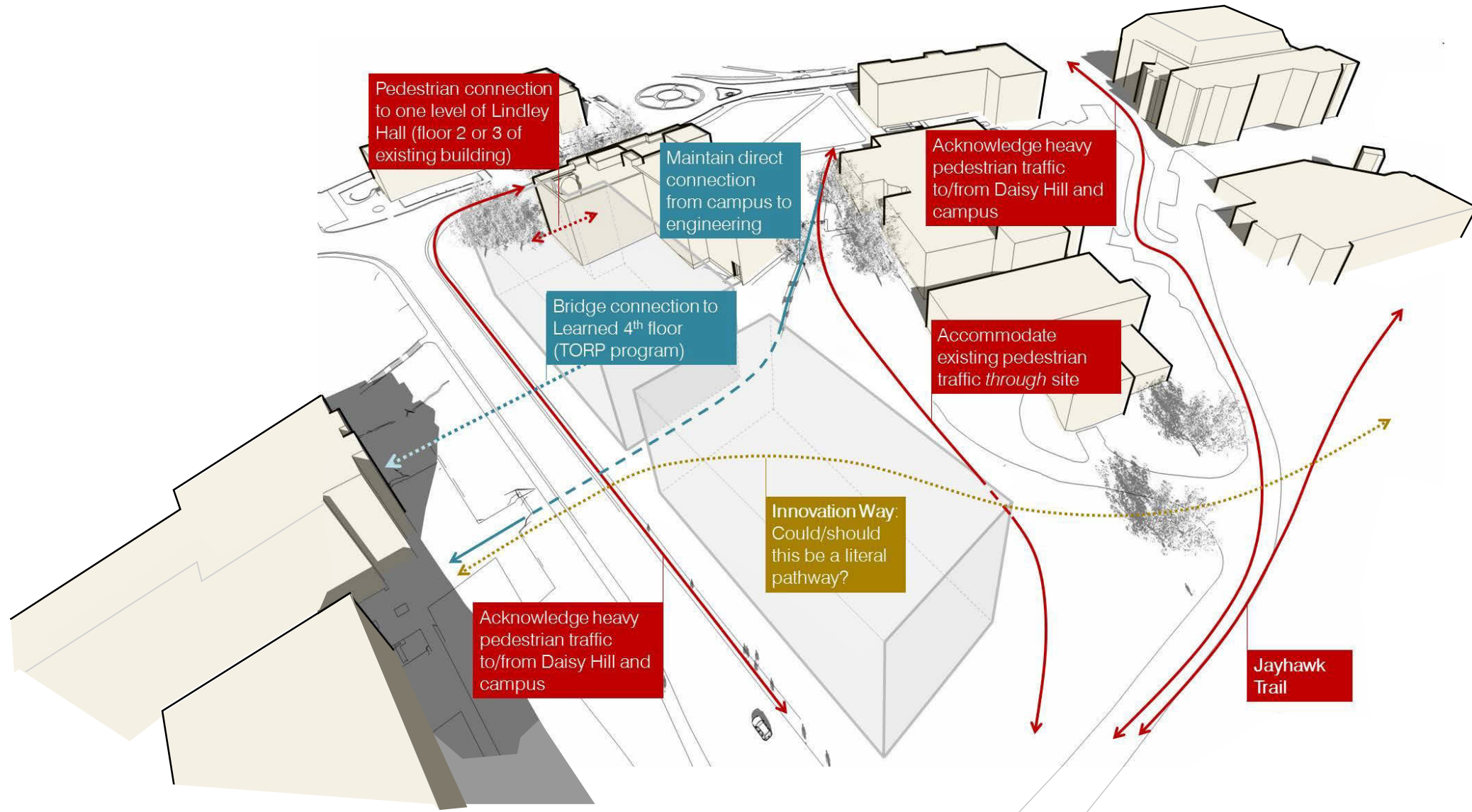




*Learning on display*



# Breaking Down Academic Silos to Improve Learning and Post-Graduate Readiness



# Breaking Down Academic Silos to Improve Learning and Post-Graduate Readiness

*Jayhawk Boulevard (Main Campus Thoroughfare)*

(elevation 1013'-0")

ACTIVE-  
LEARNING

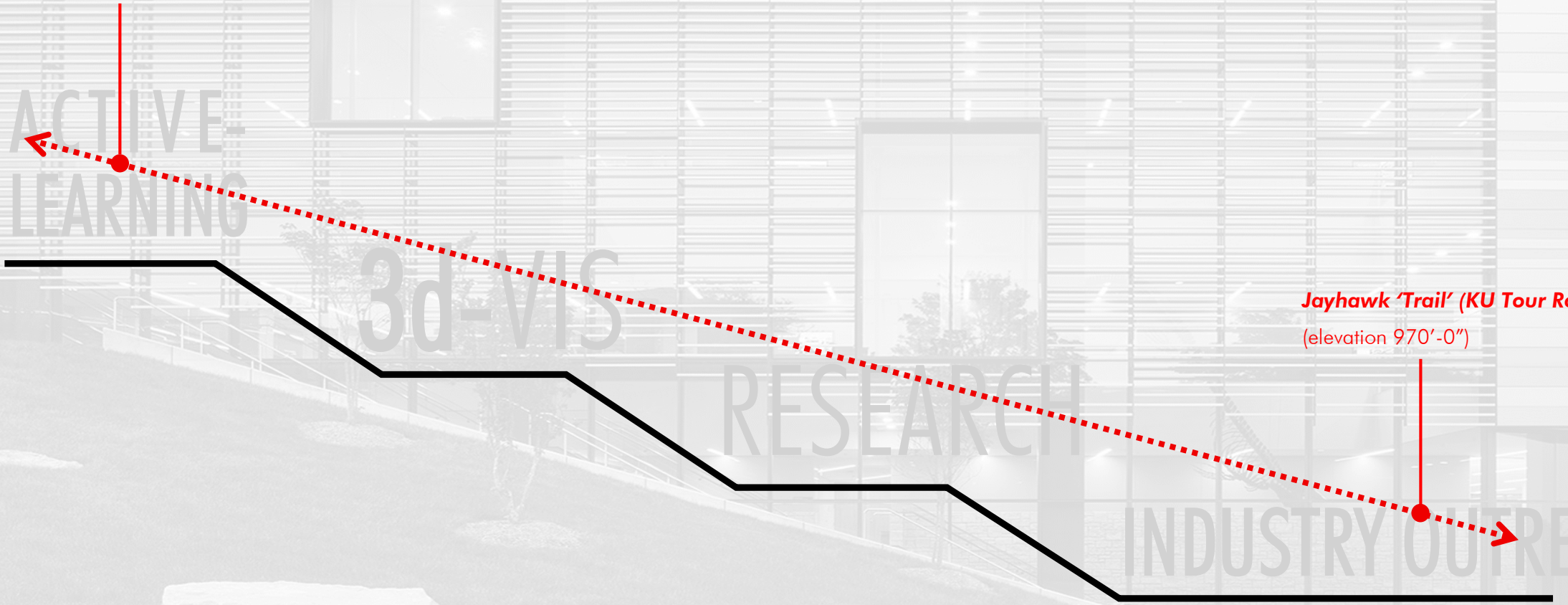
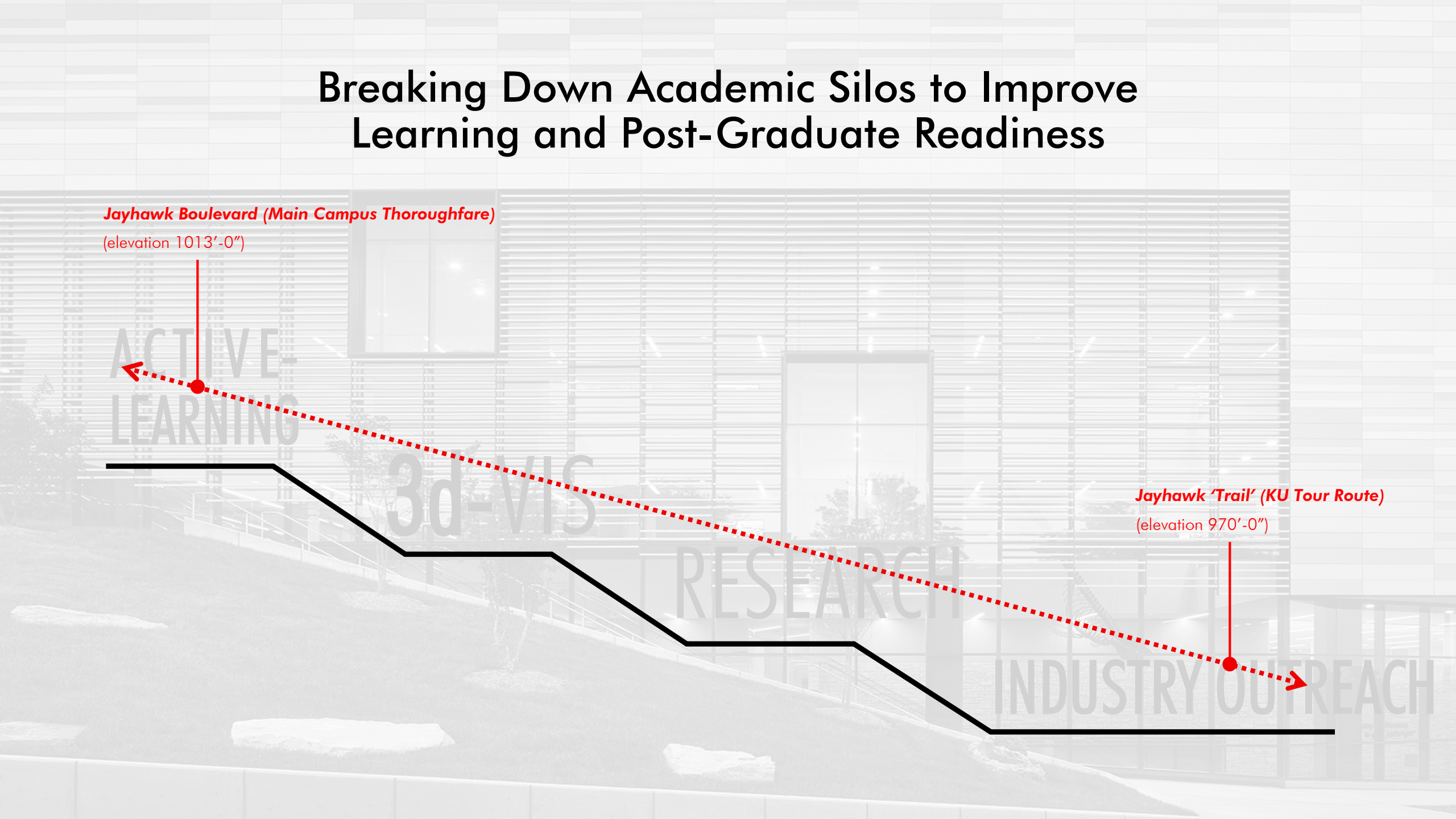
3d-VIS

RESEARCH

INDUSTRY OUTREACH

*Jayhawk 'Trail' (KU Tour Route)*

(elevation 970'-0")











*Connection to community*





*Interdisciplinary connectivity*



[ Engineering and science professionals almost always work together in the real world, despite coming from different schools in the university. Engineering and science students, however, typically do not learn together and faculty typically do not teach together. Can we expect our students to be prepared for what awaits them? ]

***What would you do?***

*... to make your students more competitive  
by breaking down these barriers?*

*(Take a minute to discuss with your neighbor)*



# Here's what we did...

- Formulated courses that are taught and attended by both scientists and engineers that use **real-world problems** as their basis (simulate the real world)
- Developed **degree programs that cut across schools**
- **Share facilities** in EEEEC
- **Feedback from employers and graduates** about what makes people successful, and include that in the curriculum
- **Clusters of interdisciplinary faculty hires**



# Here's what we did...

- **Developing cross-school curricula** (courses; degrees; competitions; minors; industry partners)



**AAAPG EXPLORER** GEOSCIENCE EDUCATION

*University of Kansas mature fields course*

**Industry, Engineering, Geology Converge**



# Here's what we did...

- *Clusters of faculty hires*



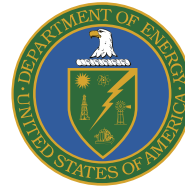
Water Quality and Resources Cluster



Enhancing Energy Cluster

# Here's what we did...

- **Incentivizing interdisciplinary research**  
through grants and common goals



U.S. DEPARTMENT OF  
**ENERGY**

**KICC**  
Kansas Interdisciplinary Carbonates Consortium

**TORP**



**BOLD ASPIRATIONS**



**CReSIS**  
Center for Remote Sensing of Ice Sheets



[ Faculty understand what they learned in school and what is in the literature. They typically teach that, but that is not necessarily best practice in the industries where students are working. ]

## ***What would you do?***

*...to break down the barriers between academia and the outside world to improve faculty and student preparedness?*

*(Take a minute to discuss with your neighbor)*

# Here's what we did...

- *Teach the faculty through sabbaticals in industry*
- *Make industry partners welcome on campus*
- *Teach the faculty through joint industry projects and industry feedback about research*
- *Offer workshops and training for industry and get industry feedback*
- *Invite industry leaders to offer workshops for students and faculty on campus*

  
ConocoPhillips

  
Chesapeake  
ENERGY

  
KINDER MORGAN  
INC.





[ Many students disengage from learning in the STEM disciplines because of the way classroom time is allocated toward delivery of lectures. ]

***What would you do?***

*...to transform the way faculty teach so that student learning can be improved?*

*(Take a minute to discuss with your neighbor)*

# Here's what we did...



- **Hire PhD teaching fellows in all of the STEM disciplines as **AGENTS OF CHANGE**** to aid faculty in transforming courses away from lecture toward active approaches



## Here's what we did...

- **Develop a culture of course transformation** through learning community and networking model



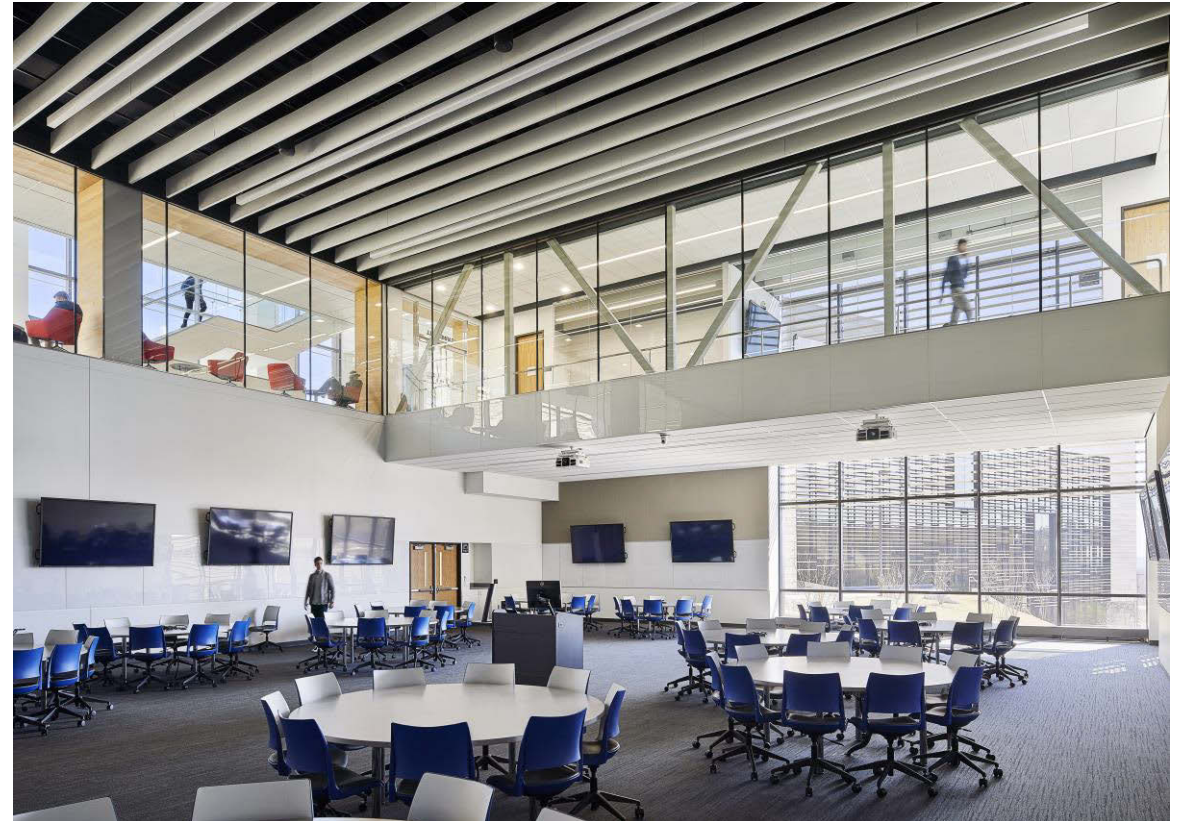
# Here's what we did...

- ***EVERY new classroom space built with layout, furniture and technology for active learning***





# Here's what we did...

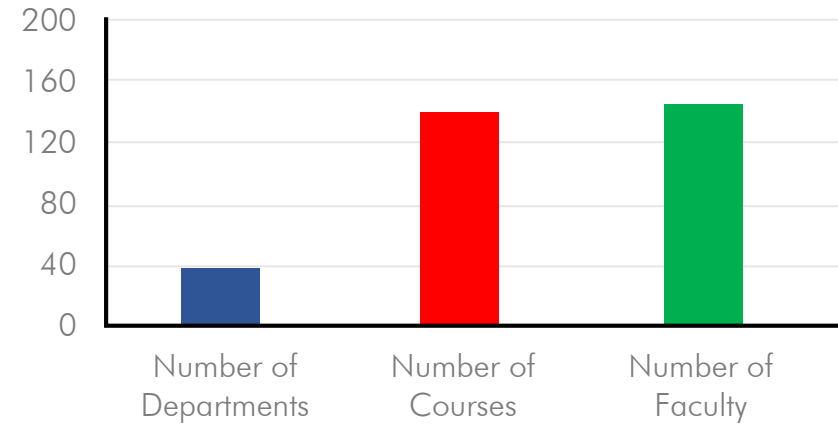


- **Incentivize faculty** to do the work and make it visible

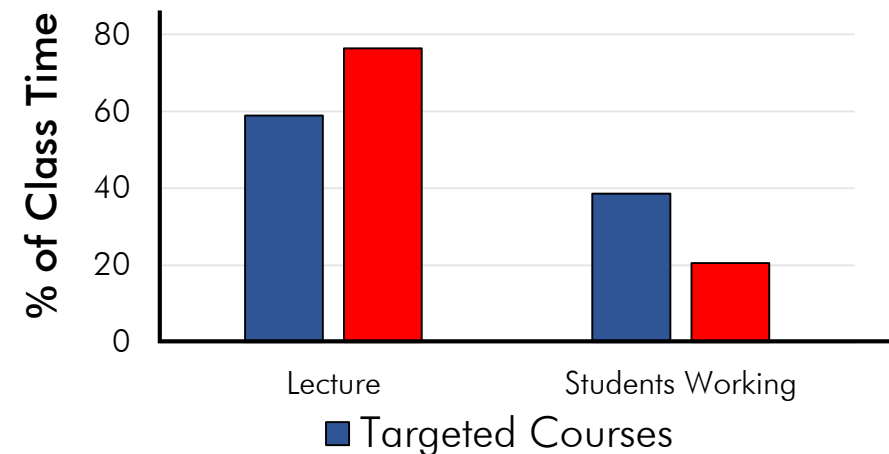
# Here's what we did...

- Large Scale of Course and Faculty Transformation
  - **170 unique faculty members**
  - **43 departments**
  - **9 different schools**
  - **166 unique courses** (half of them are in STEM)

### Course Transformation Activity Since 2012



### Changes in Classroom Practices

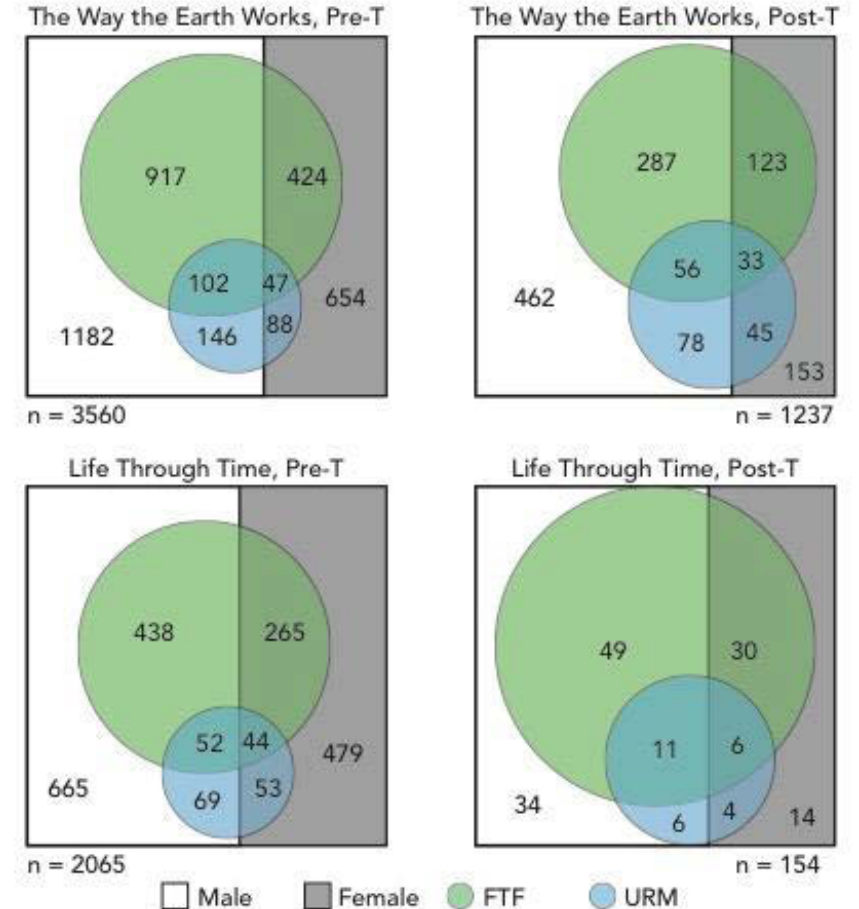




# Here's what we did...

## Active learning results in a systematic decrease in %DFW...

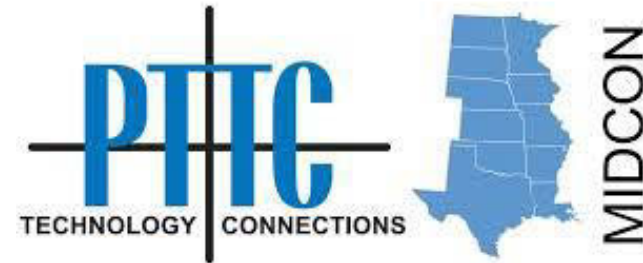
- The Way the Earth Works
  - Female students decrease %DFW by 9.5% (enrollment remained ~30%)
  - URM students %DFW decreases by 5.6%
  - URM student enrollment increases from 10.8% to 17.1%
  - URM in Geology Major increases by 11.1%.
- Life Through Time
  - First-time freshman students decrease %DFW by 7.6%
  - First-time freshman student enrollment increases by 23.6%



# Strategies to Integrate Research & Academics with Industry Partners

- ***EEEC is designed to partner with industry...***

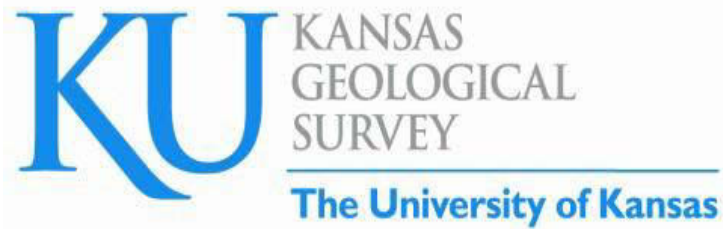
- Workshops and training for industry from Tertiary Oil Recovery Program (PTTC) and Kansas Geological Survey
- National and regional meetings





# Strategies to Integrate Research & Academics with Industry Partners

- *EEEC is designed to partner with industry...*
  - Industry partners on DOE grants



# Strategies to Integrate Research & Academics with Industry Partners

- ***EEEC is designed to partner with industry...***
  - Industry consortia:
    - Kansas Interdisciplinary Carbonates Consortium
    - Center for Environmentally Beneficial Catalysis





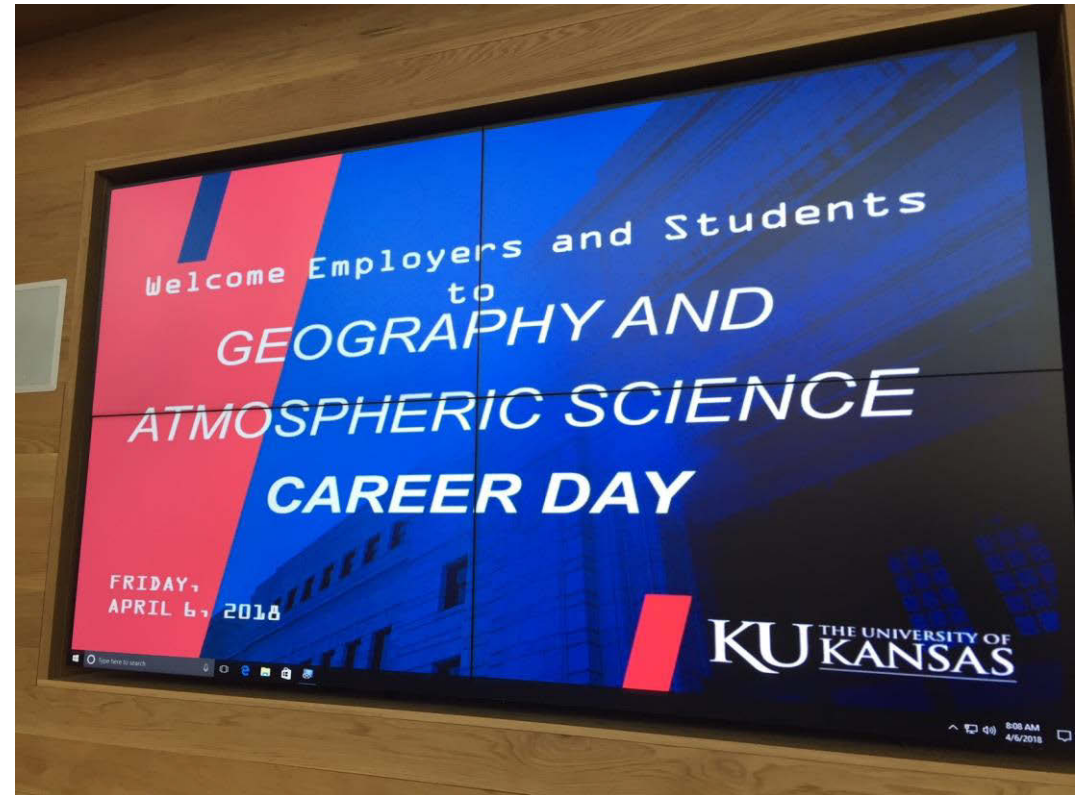
# Strategies to Integrate Research & Academics with Industry Partners

- ***EEEC is designed to partner with industry...***
  - Core labs that serve industry needs
  - A welcome environment with office and meeting space for industry partners



# Strategies to Integrate Research & Academics with Industry Partners

- **Engaging with industry partners to help students and faculty learn the state of a discipline in the real world**
  - Employment and internship opportunities for students



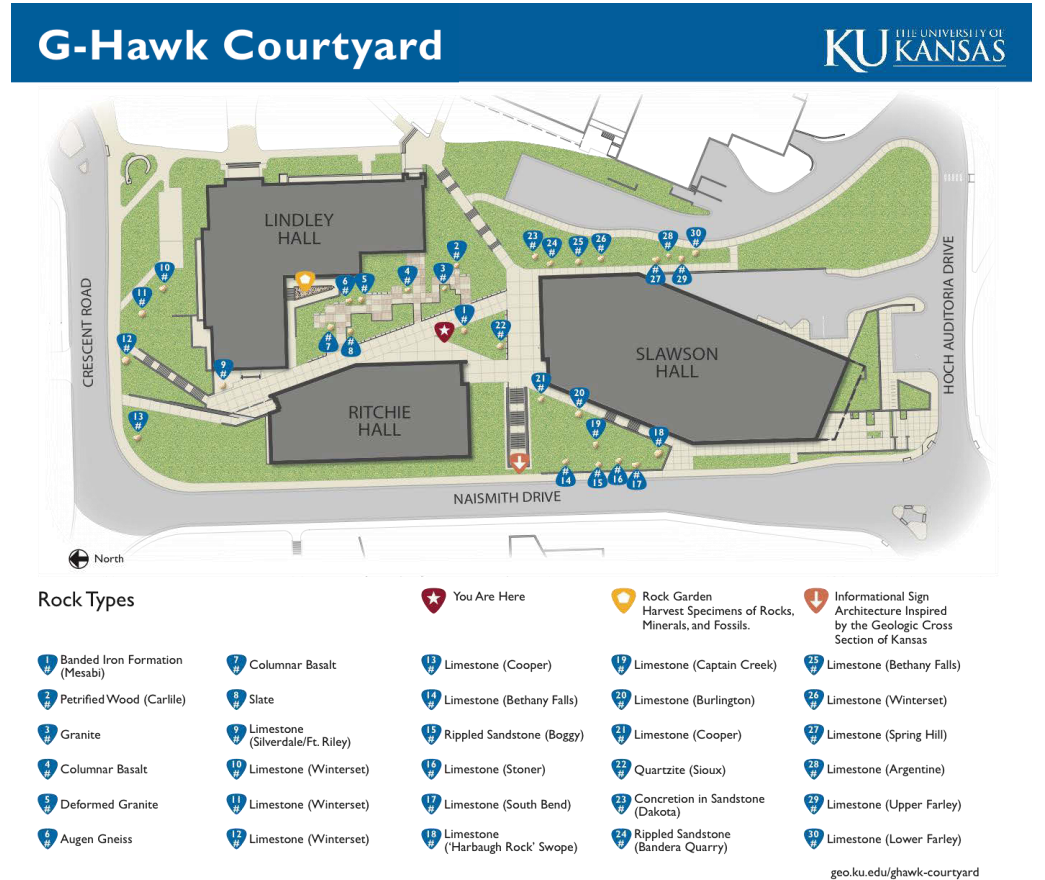


# Strategies to Integrate Research & Academics with Industry Partners

- ***Engaging with industry partners to help students and faculty learn the state of a discipline in the real world***
  - Joint degree program – partnering with world’s largest technology company for the oil and gas industry – catering to students supported by industry

The logo for Schlumberger, featuring the word "Schlumberger" in a bold, blue, sans-serif font.The logo for NEXT, featuring the word "NEXT" in a bold, blue, sans-serif font, with the tagline "A Schlumberger Company" in a smaller, grey, sans-serif font below it.

# Proactive Efforts with Public Integration



G-Hawk Courtyard made possible by a gift from Christopher W. Holien





Connecting public and program



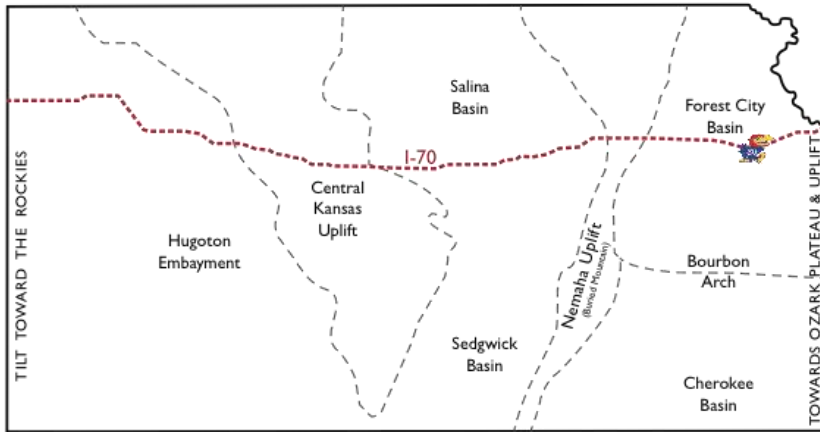
# Proactive Efforts with Public Integration



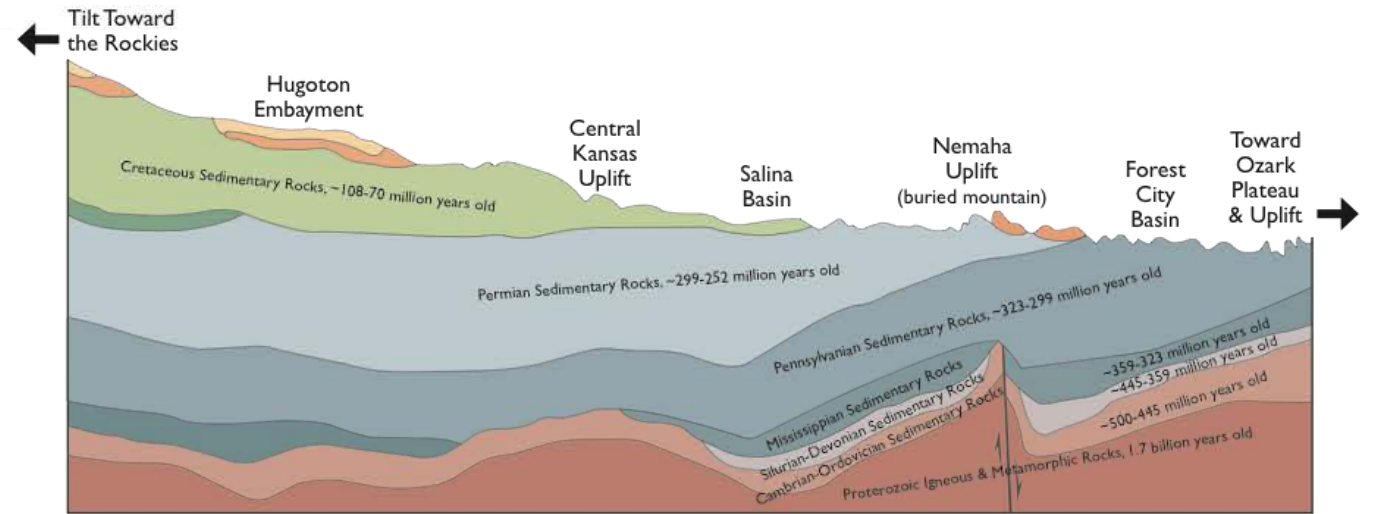
- *Open houses, events in auditorium space, legislative tours...*



# Proactive Efforts with Public Integration

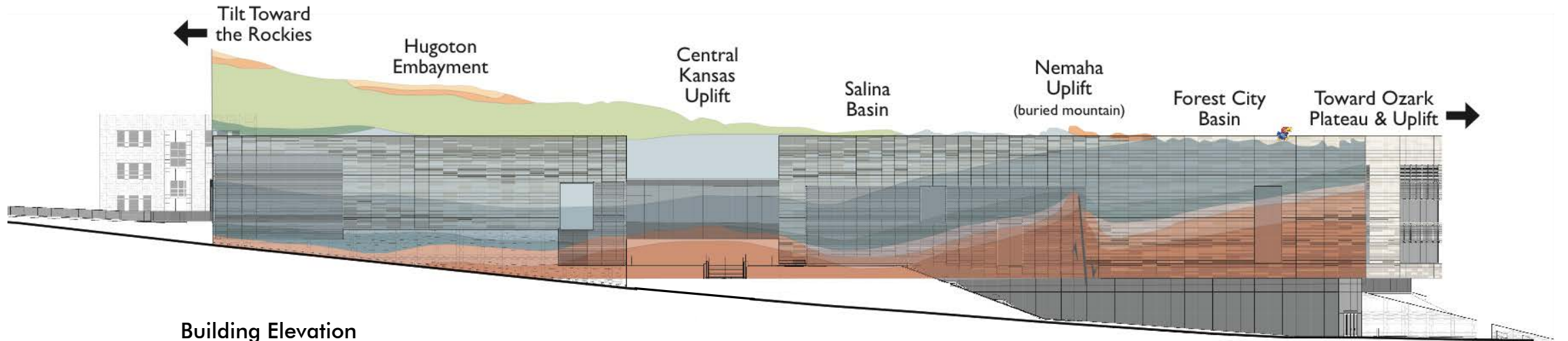
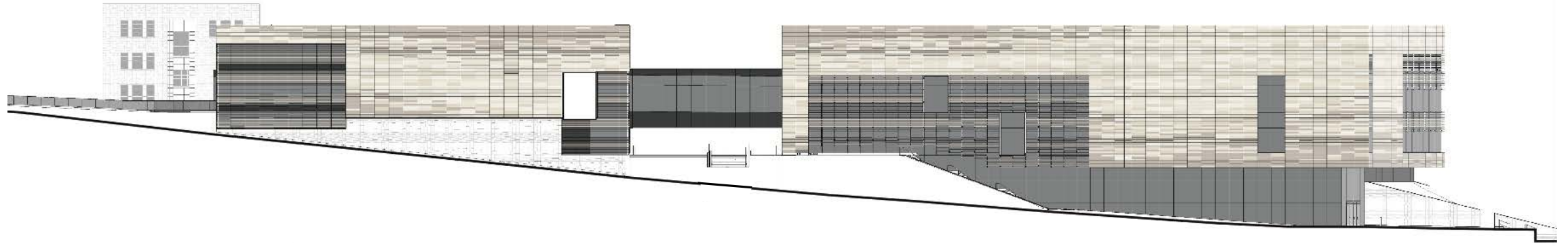


Major Geologic Structures of Kansas  
(Adapted from Kansas Geological Survey)



Geologic Cross Section of Kansas (East - West)  
(Adapted from Kansas Geological Survey)

# Proactive Efforts with Public Integration



Building Elevation



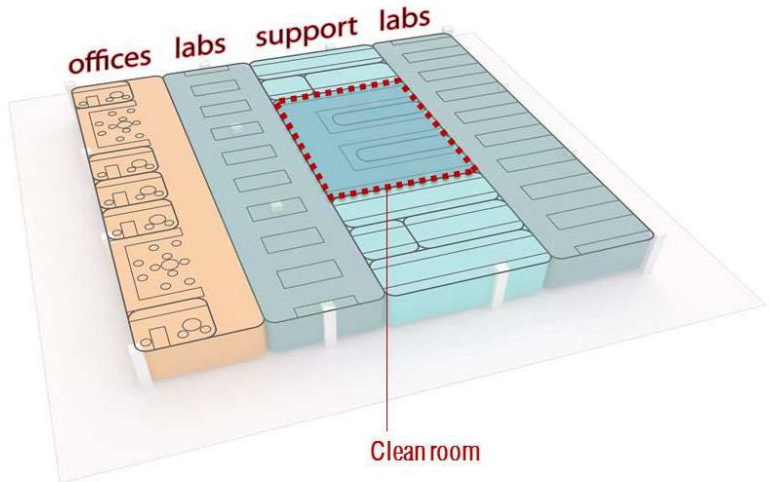


SLAWSON HALL

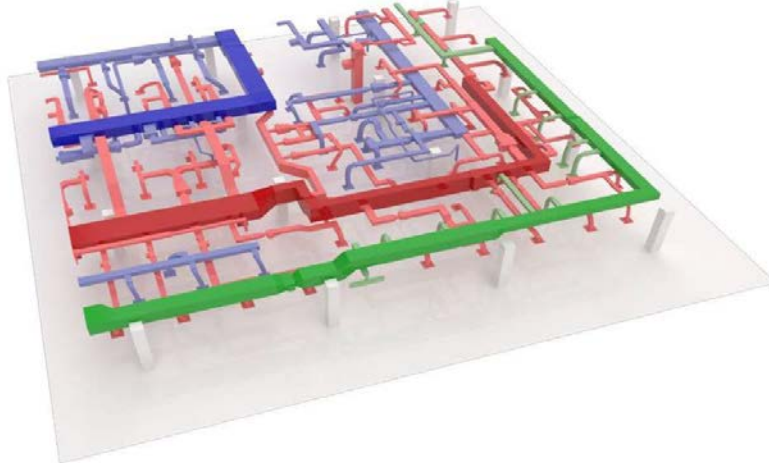
ROBERT M. BEREN  
PETROLEUM CENTER

Connecting public and program

# Remaining Relevant – Today's Conditions and Those Forecasted for Tomorrow



Universal Grid\*



Integrated Systems\*



- making an impact by having the ***flexibility to be relevant***



# Learning Outcomes

- ***How inclusive strategic planning and development can lead to physically and culturally transforming a campus***
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- ***What a philosophy of integration looks like*** when put into practice - using The Earth Energy and Environment Center at KU as a case study



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