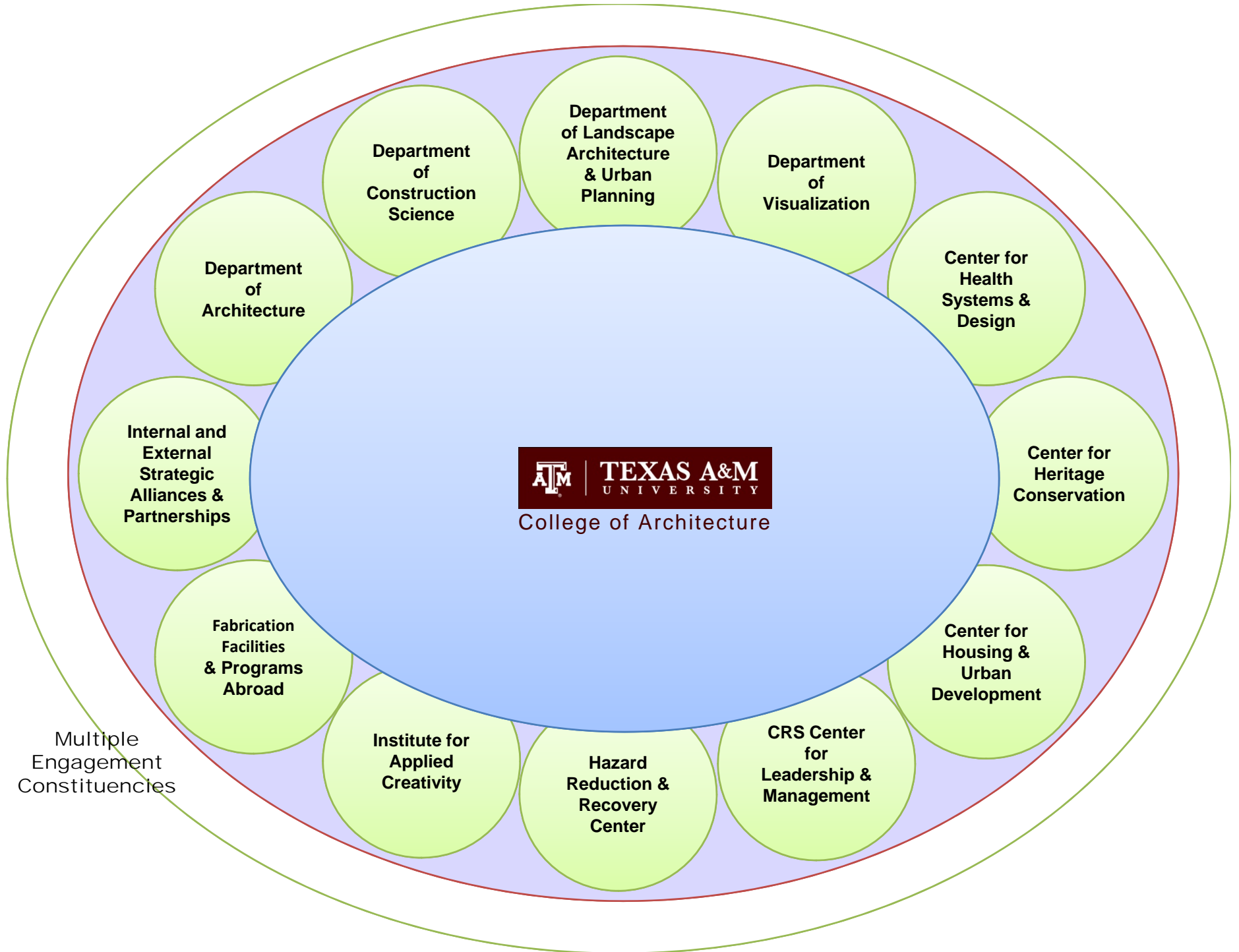CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

Valerian Miranda, Ph.D.
Director

TEXAS A&M
UNIVERSITY
College of Architecture

TEXAS A&M UNIVERSITY

College of Architecture

Multiple Engagement Constituencies

Department of Construction Science

Department of Landscape Architecture & Urban Planning

Department of Visualization

Department of Architecture

Center for Health Systems & Design

Internal and External Strategic Alliances & Partnerships

Center for Heritage Conservation

Fabrication Facilities & Programs Abroad

Center for Housing & Urban Development

Institute for Applied Creativity

Hazard Reduction & Recovery Center

CRS Center for Leadership & Management

CRS Center for Leadership, Management & Innovation in the Design & Construction Industries

Endowed by the architecture firm **Caudill Rowlett Scott**

1972 AIA Firm of the Year

Known for several innovations in the practice of architecture:

Architecture by Team
Problem Seeking method of programming
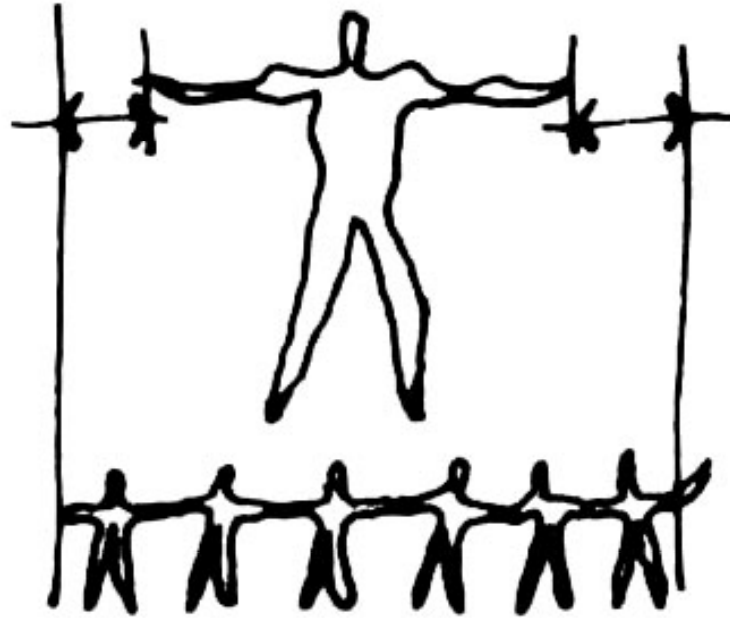Research in Architectural Practice
'Squatters' – user participation in design
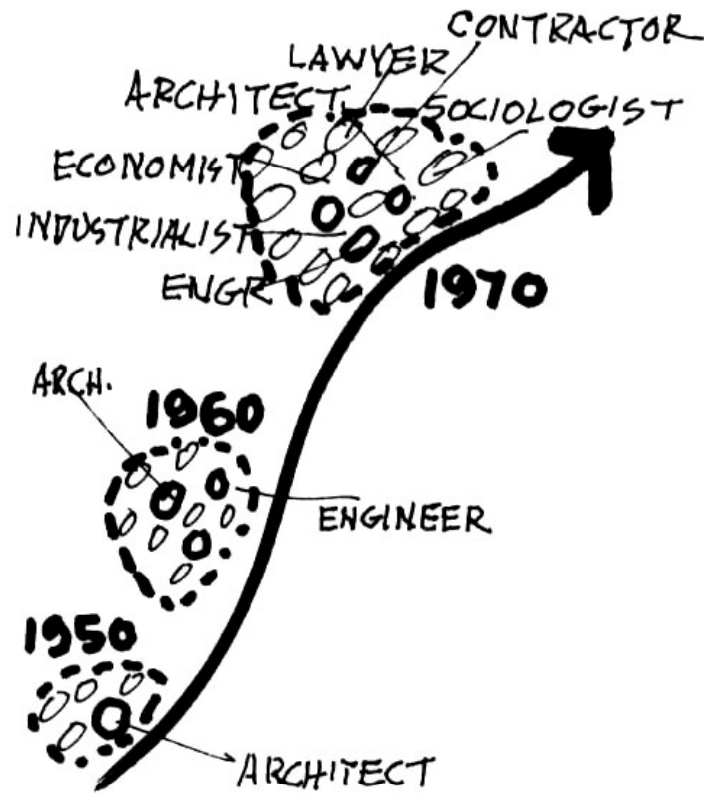'Fast-Track' design and construction
Energy conserving design

William Caudill, FAIA – 1985 AIA Gold Medalist (posthumously)
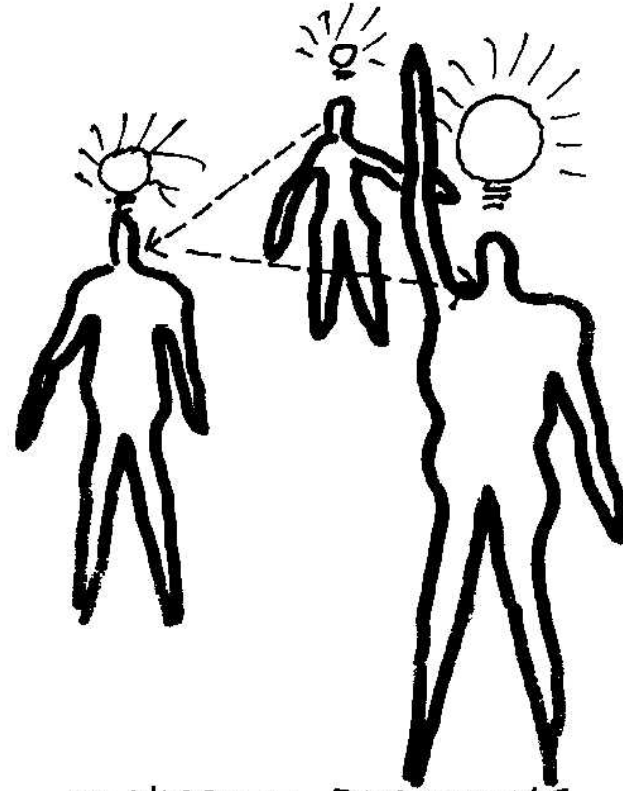
GENIUS PRIMA DONNA IS:

HE CANNOT COVER THE
AREAS NECESSARY TO
SOLVE THE COMPLEX
PROBLEMS OF URBANI-
ZATION. IT TAKES A
TEAM.

CONTRACTOR
LAWYER
ARCHITECT — SOCIOLOGIST
ECONOMIST
INDUSTRIALIST
ENGR.
1970

ARCH.
1960
ENGINEER

1950
ARCHITECT

JUXTAPOSITIONAL WITH THE
EXPANDED TEAM IDEA MAY
REQUIRE THE CONCEPT OF
THE **EXPANDED PROFESSION.**
THE AIA MAY HAVE TO OPEN
ITS GATES TO NON-ARCHI-
TECTS. I CONTEND, HOWEVER,
THAT IF OTHER PROFESSIONALS
CONTRIBUTE TO CREATING
THE PHENOMENON OF
ARCHITECTURE THEN THEY
SHOULD BE CALLED ARCHITECT.

THOUGHTS BOUNCING
AROUND FROM PERSON
TO PERSON,

GENERATE DIFFERENT
AND MORE DEVELOPED
IDEAS.

EVERY **COMPLEX** PROBLEM
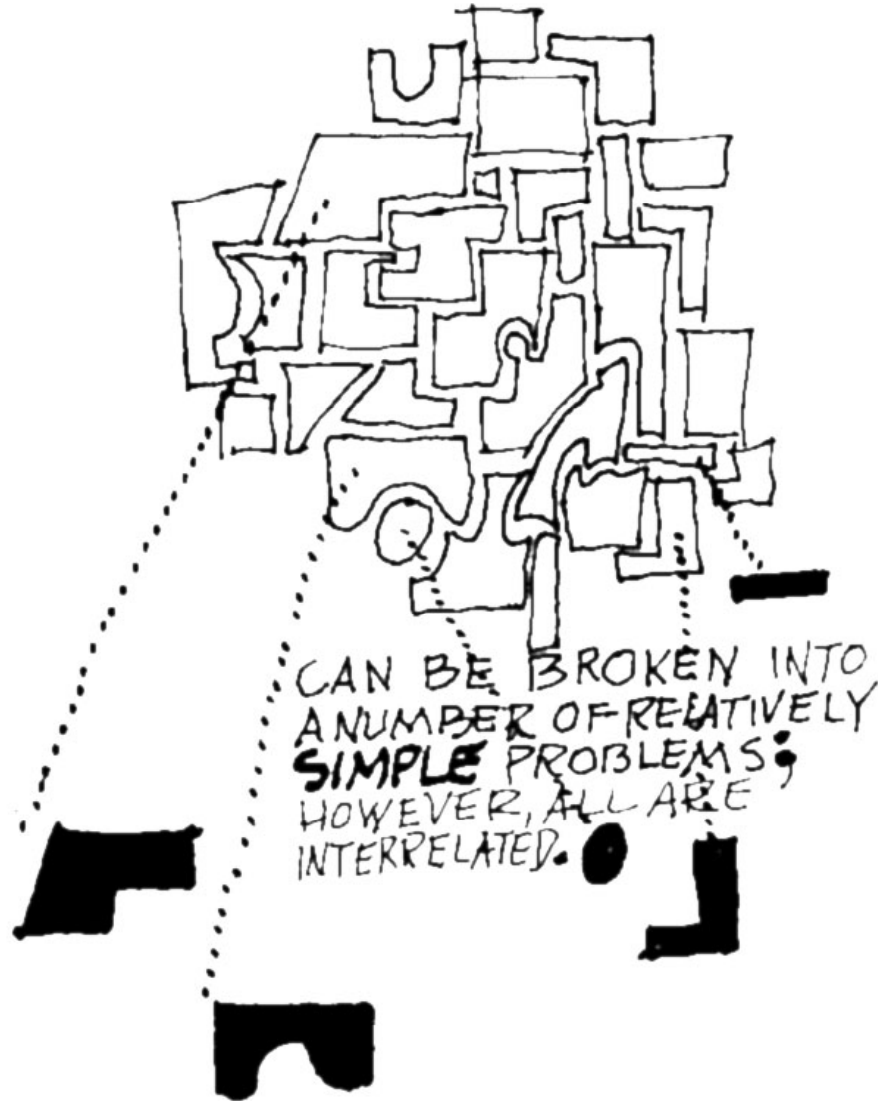
CAN BE BROKEN INTO
A NUMBER OF RELATIVELY
SIMPLE PROBLEMS;
HOWEVER, ALL ARE
INTERRELATED.

IDDS

CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

Valerian Miranda, Ph.D.
Director

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IDDS
Breaking Barriers

CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

Valerian Miranda, Ph.D.
Director

TEXAS A&M
UNIVERSITY
College of Architecture

IDDS
Breaking Barriers Building Bridges

CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

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IDDS
Breaking Barriers Building Bridges

CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

Valerian Miranda, Ph.D.
Director

ĀĪM | TEXAS A&M
UNIVERSITY
College of Architecture

IDDS
Breaking Barriers Building Bridges

CRS Center for Leadership, Management & Innovation
in the Design & Construction Industries

Valerian Miranda, Ph.D.
Director

TEXAS A&M UNIVERSITY
College of Architecture

Integrated Design and Delivery Solutions use **collaborative** work processes and **enhanced skills** with **integrated** data, information, and **knowledge** management to **minimize** structural and process **inefficiencies** and to enhance the **value** delivered during design, build, and **operation**, and across projects.
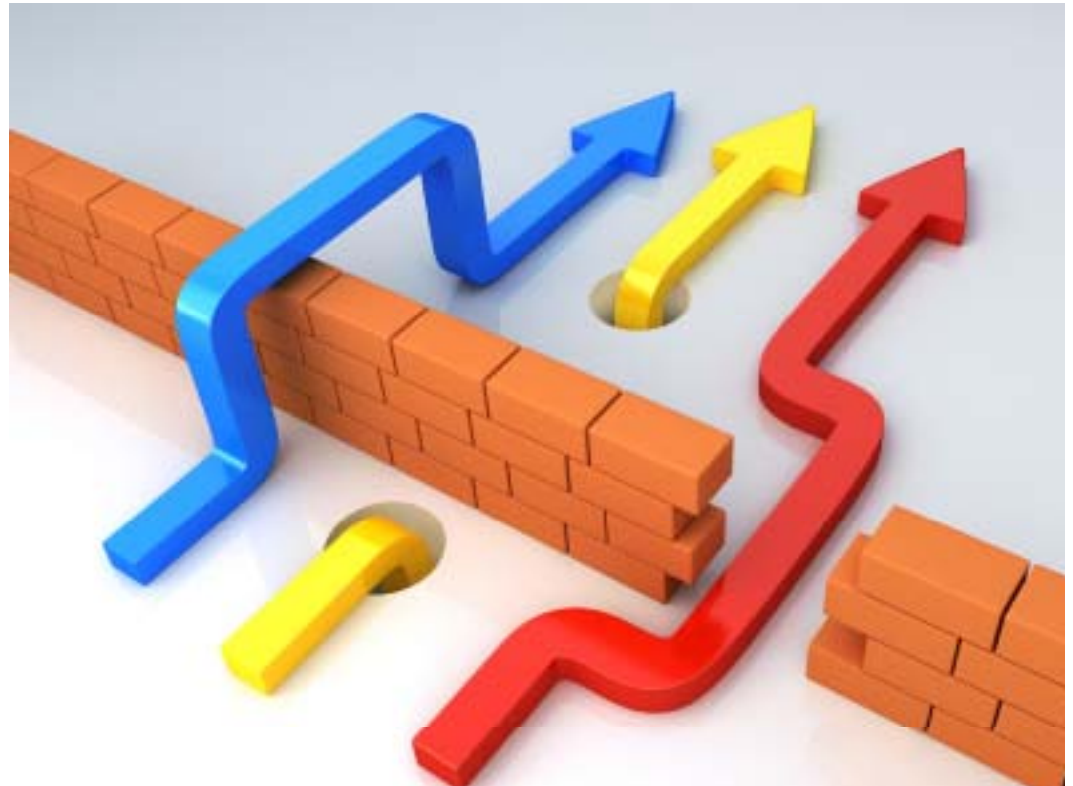
Barriers to break:
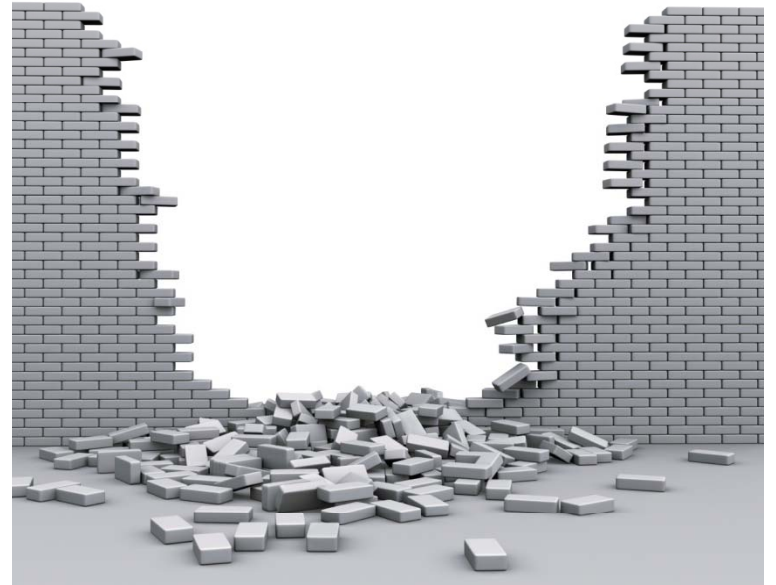
People

Narrow mindedness, litigious (lawyers?), lethargy, motivation, 'practice-oriented ' universities, lobbies, financial gain (profit?)

Barriers to break:

Processes
Current roles, rules, contracts (lawyers?), tools, practices (profits?) understanding (ignorance?)…

Barriers to break:

Technologies
Commercial interests (profits?), proprietary (lawyers?)seniority rules (if its old its good… or its bad… or just throw it out!), technology rules….

Barriers to break**:**

People
Narrow mindedness, litigious (lawyers?), lethargy, motivation, 'practice-oriented ' universities, lobbies, financial gain (profit?)

Processes
Current roles, rules, contracts (lawyers?), tools, practices (profits?) understanding (ignorance?)…

Technologies
Commercial interests (profits?), proprietary (lawyers?)seniority rules (if its old its good… or its bad… or just throw it out!), technology rules….

Bridges to build:

People
between users and professionals, between profession specific
cultures, mentality of individual gain to collective benefit,
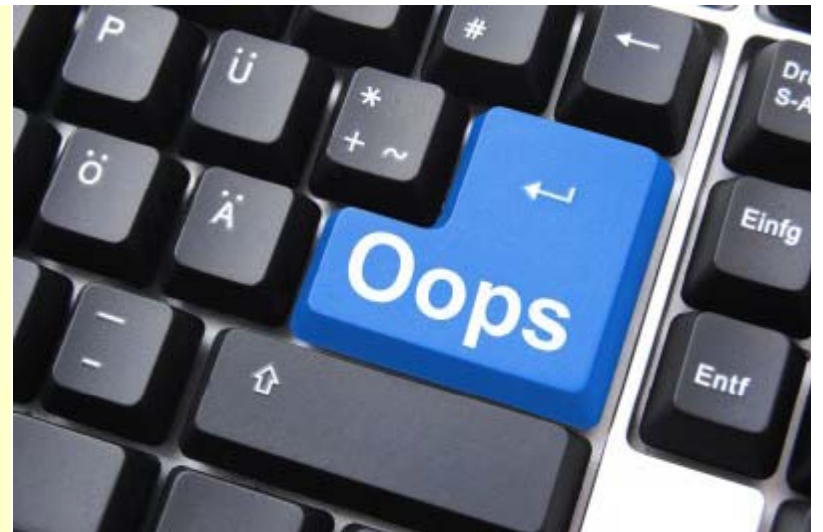from a hierarchical, linear mindset to one of lateral, mutual respect

Bridges to build**:**

Processes
from project planning to financing to architectural to permitting
to engineering to supply to construction to operation

Bridges to build**:**

Technologies

between knowledge domains, between discipline and task specific tools, between design and manufacturing/fabrication and installation

Bridges to build**:**

People

between users and professionals , between profession specific cultures, individual gain to collective benefit, from a hierarchical, linear mindset to a lateral, mutual respect

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College of Architecture

Integration

Pursue the elusive goal of integration
(a) in Academia
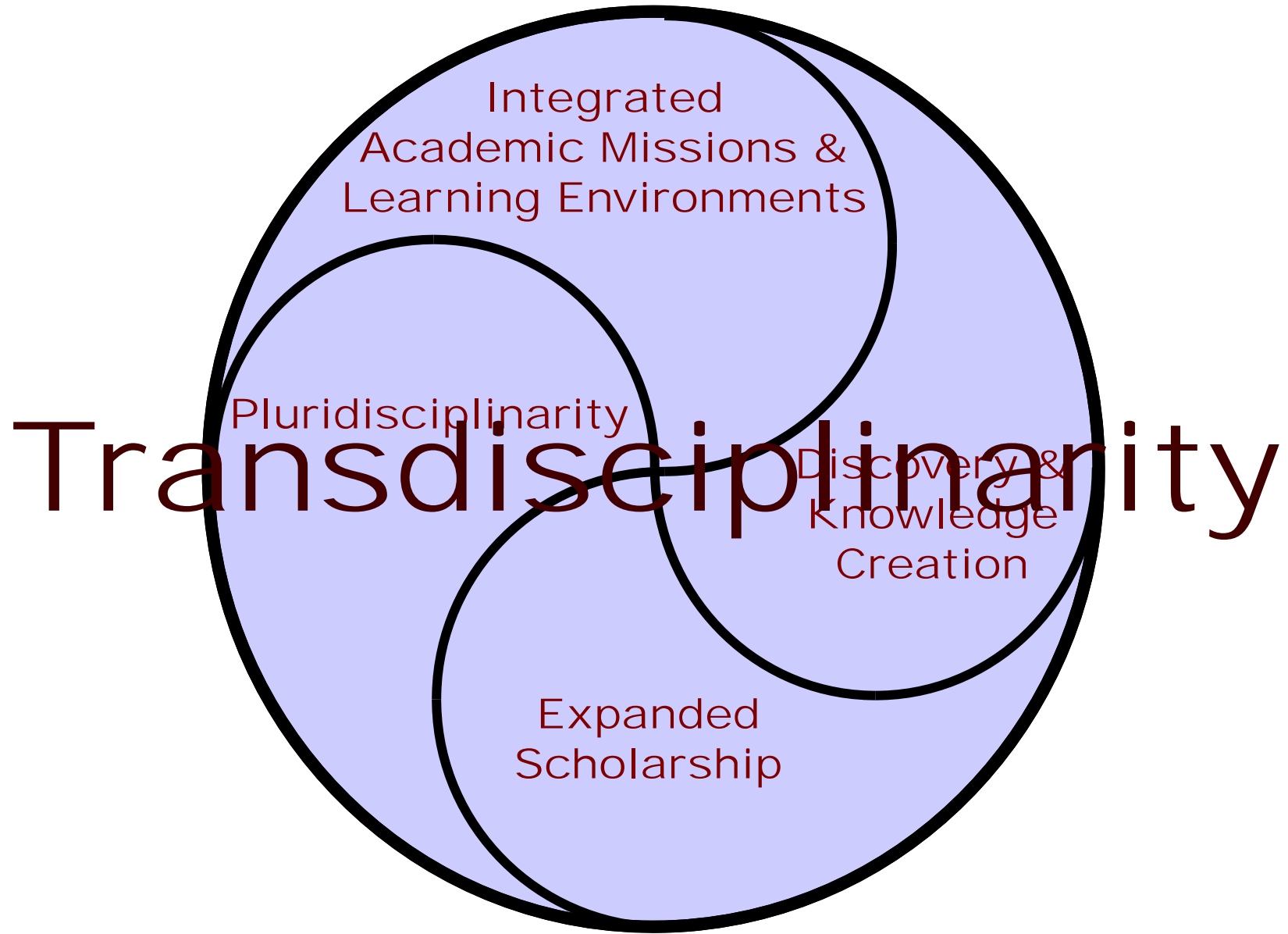*(b) in Theory*
(c) in Practice...

Integration

Integration in Academia...

Integrated
Academic Missions &
Learning Environments

Pluridisciplinarity

Discovery &
Knowledge
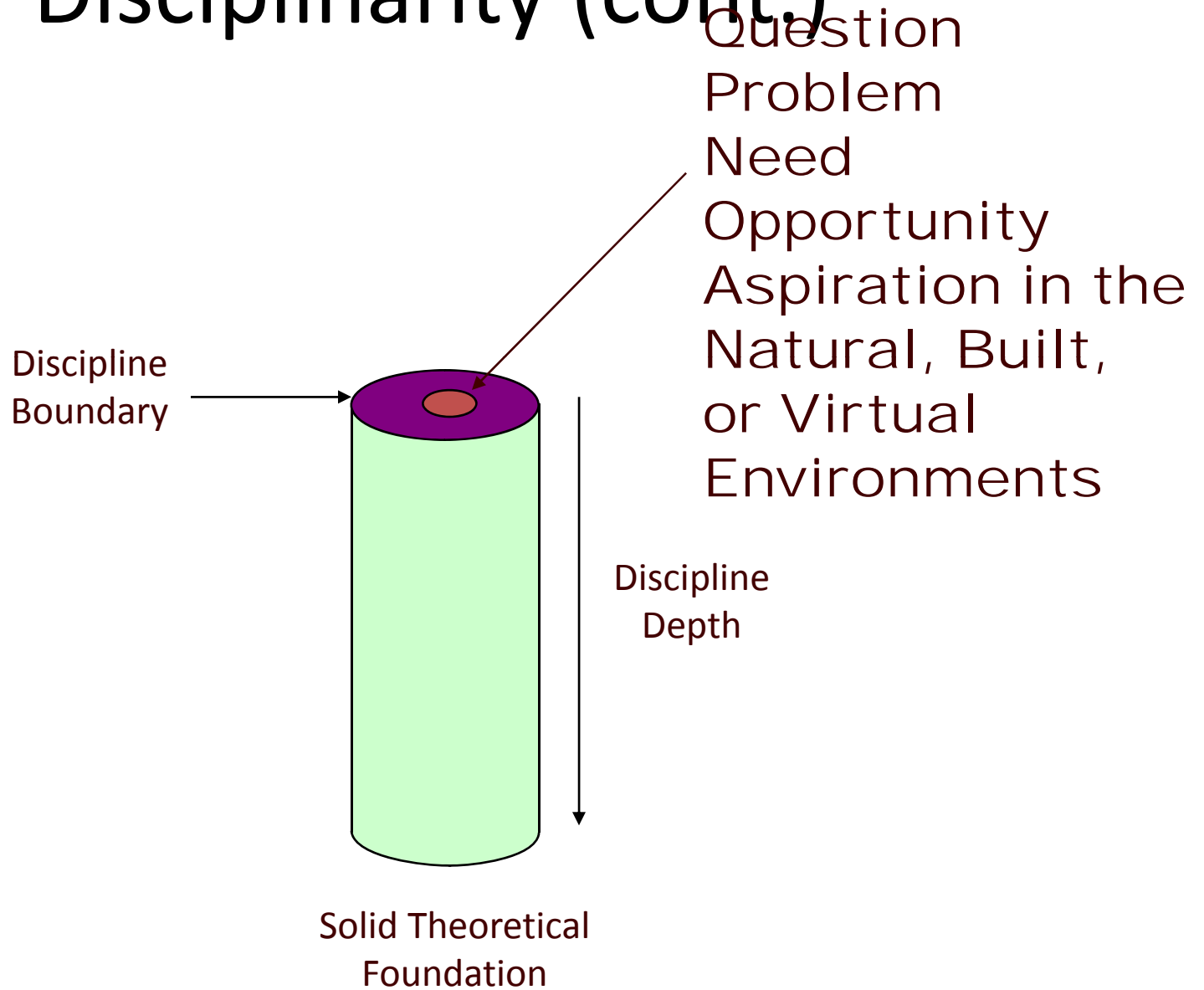Creation

Expanded
Scholarship

Transdisciplinarity

First:

follow a *paradigm of pluridisciplinarity*…

Disciplinarity, multidisciplinarity, interdisciplinarity, crossdisciplinarity, and transdisciplinarity are like five arrows shot from but a single bow: **knowledge**
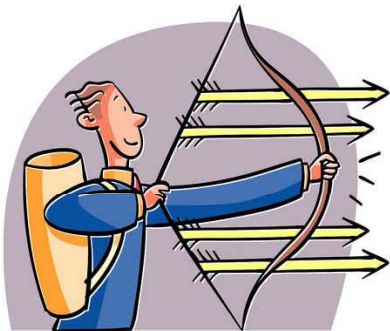
Disciplinarity is concerned with the study of a topic within only one discipline.

Disciplinarity (cont.)

**Question
Problem
Need
Opportunity
Aspiration in the
Natural, Built,
or Virtual
Environments**

Discipline
Boundary

Discipline
Depth

Solid Theoretical
Foundation

Pluridisciplinarity is concerned with the study of a topic, not in only one discipline, but in several at the same time.

(a)

Multidisciplinarity is with the study of a topic within one discipline, with support from other disciplines, bringing together multiple dimensions, but always in the service of the driving discipline.

Multidisciplinarity (cont.)

Question
Problem
Need
Opportunity
Aspiration in the
Natural, Built, or Virtual
Environments

Discipline
B

Discipline
A
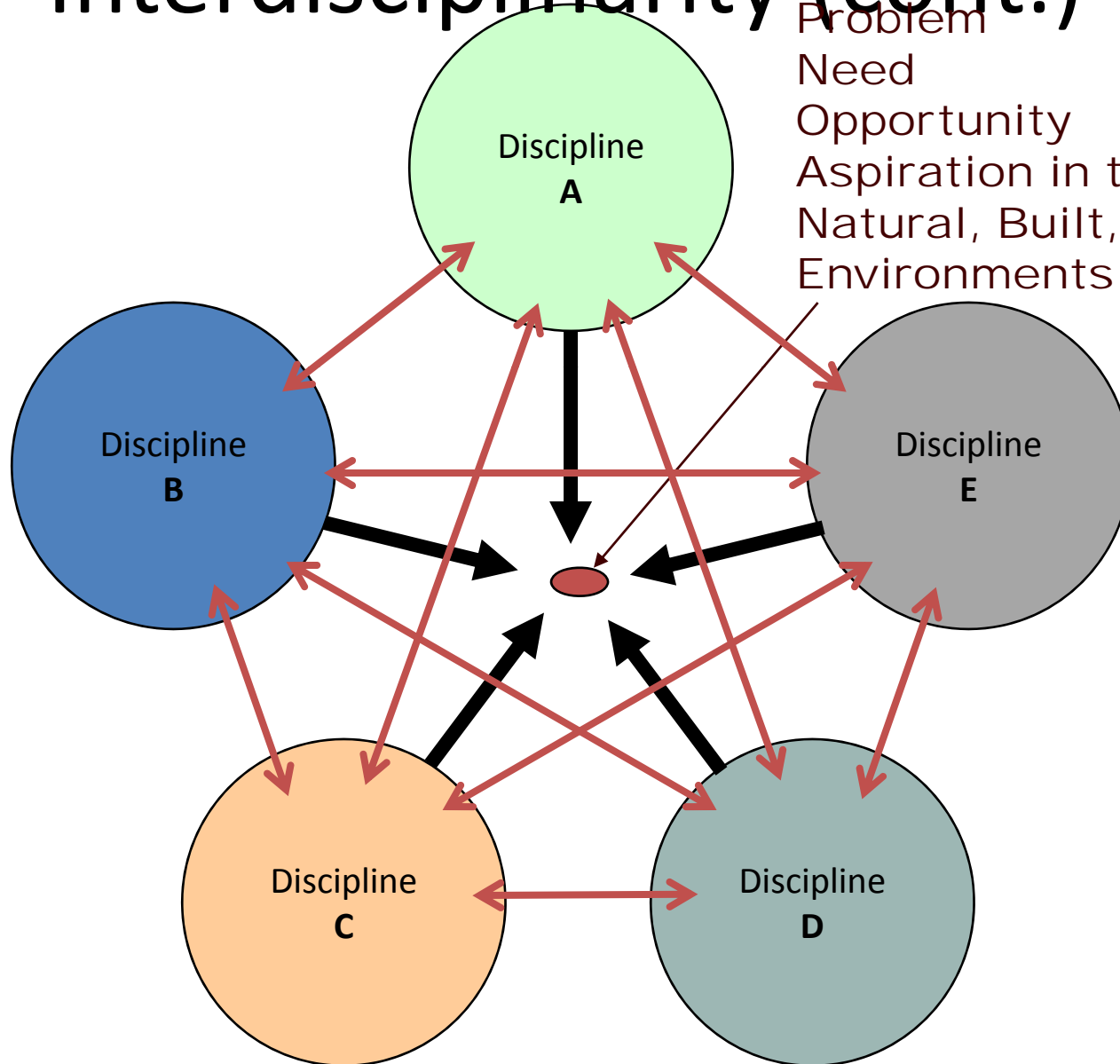
Discipline
E

Discipline
C
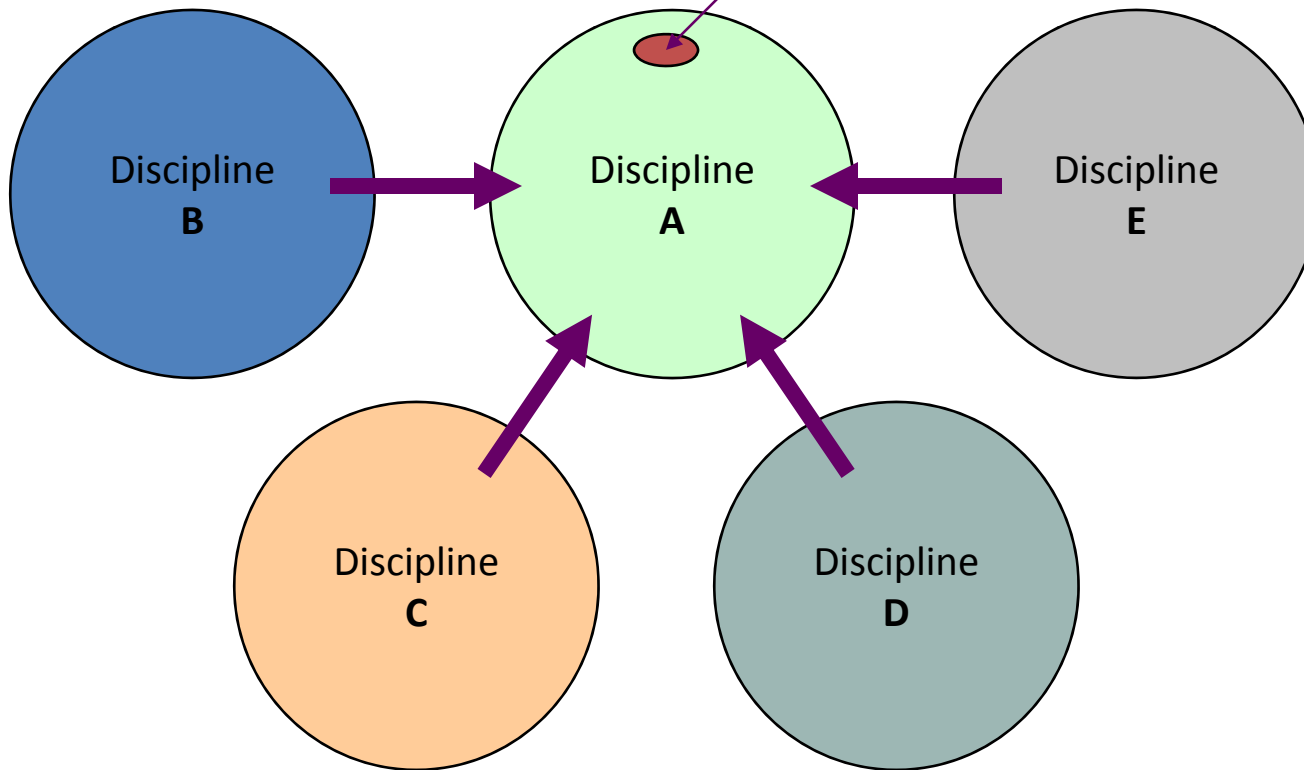
Discipline
D

(b)

Interdisciplinarity is

concerned with the study of a topic within multiple disciplines, and with the transfer of methods from one discipline to another.

Interdisciplinarity (cont.)

Discipline
A

Discipline
B

Discipline
E

Discipline
C

Discipline
D

Question
Problem
Need
Opportunity
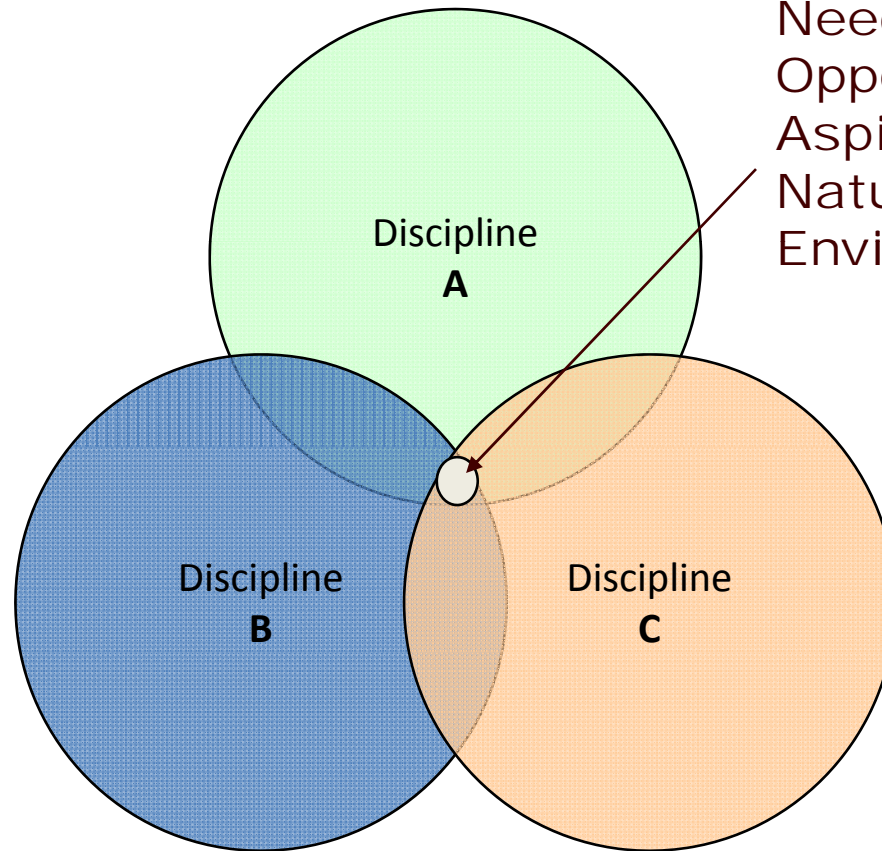Aspiration in the
Natural, Built, or Virtual
Environments

(c)

Crossdisciplinarity is concerned with the study of a topic at the intersection of multiple disciplines, and with the commonalities among the disciplines involved.

Crossdisciplinarity (cont.)

(d)
Transdisciplinarity is
concerned, at once, with what is:

✔ *__Within__ the disciplines*

✔ *__Between__ the disciplines*

✔ *__Across__ the different disciplines*

✔ *__Beyond__ all disciplines.*

Its goal is the understanding of the present world under an imperative of unity of knowledge.

Transdisciplinarity (cont.)

Question Problem Need Opportunity Aspiration in the Natural, Built, or Virtual Environments

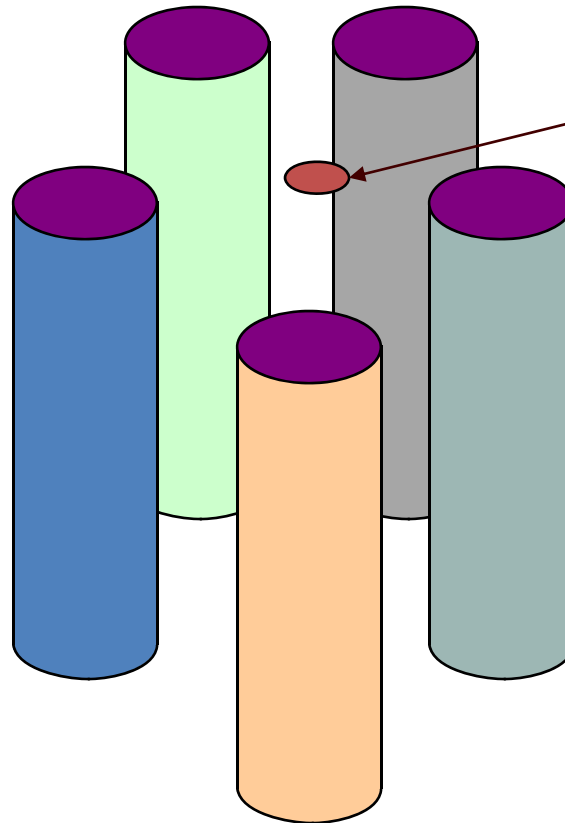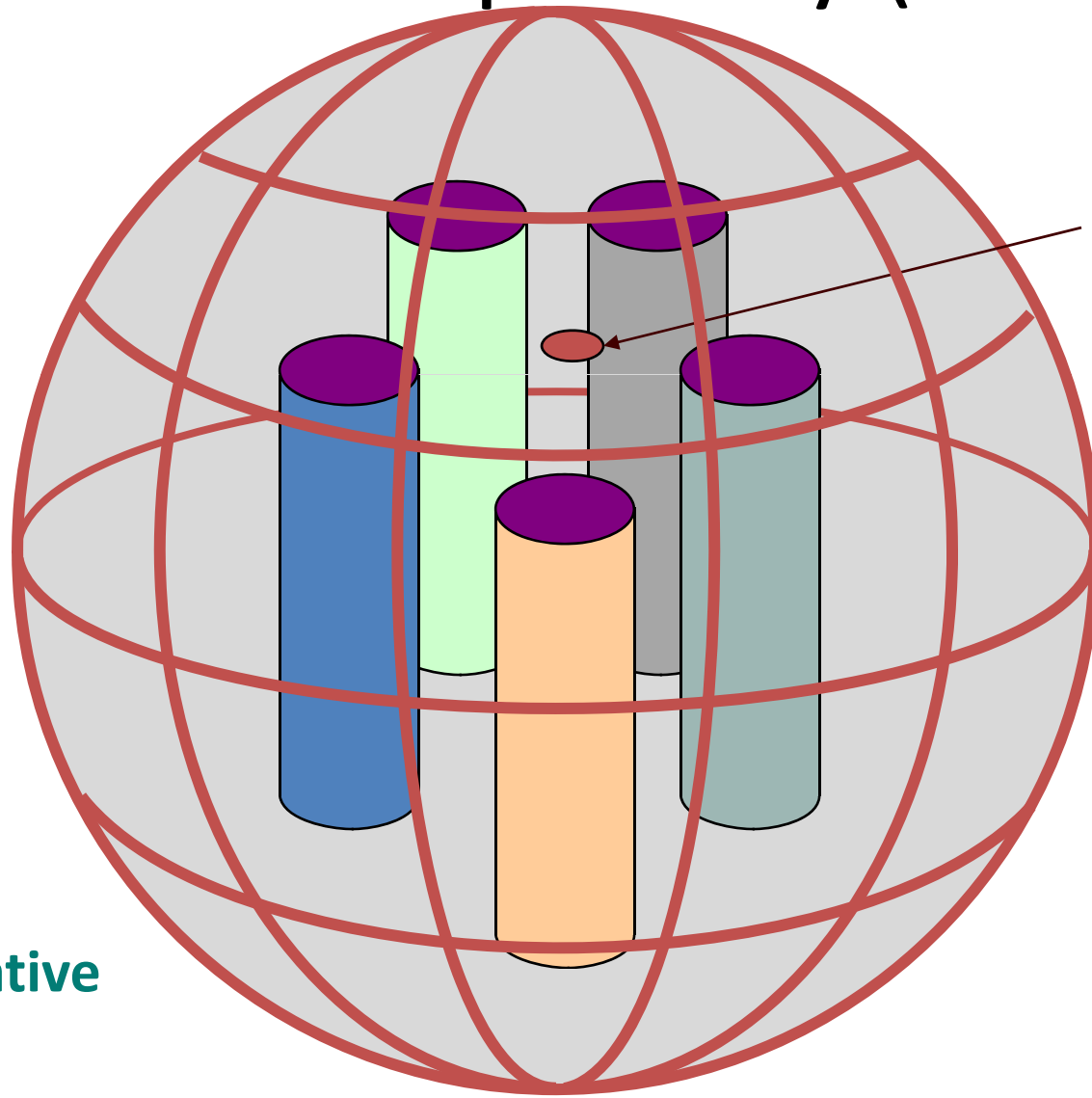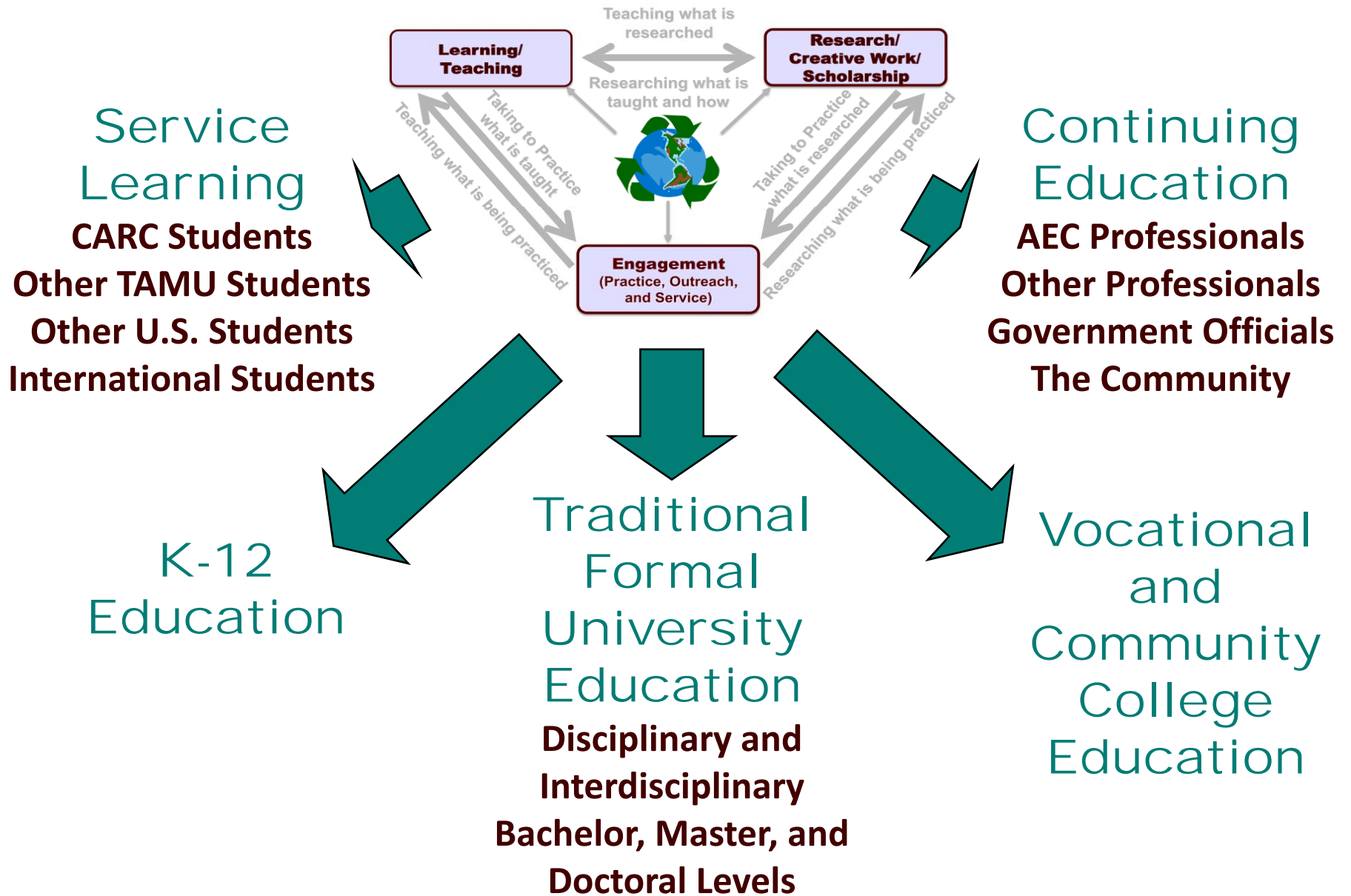# Transdisciplinarity (cont.)

Question Problem Need Opportunity Aspiration in the Natural, Built, or Virtual Environments

...an imperative of unity of knowledge...

Second:

follow a *paradigm of integrated academic missions and integrated learning environments*, built upon a *foundation of transdisciplinarity*…

Service Learning

CARC Students
Other TAMU Students
Other U.S. Students
International Students

Continuing Education

AEC Professionals
Other Professionals
Government Officials
The Community

Teaching what is researched

Learning/ Teaching

Research/ Creative Work/ Scholarship

Researching what is taught and how

Taking to Practice what is taught

Teaching what is being practiced

Taking to Practice what is researched

Researching what is being practiced

Engagement
(Practice, Outreach, and Service)

K-12 Education

Traditional Formal University Education

Disciplinary and Interdisciplinary
Bachelor, Master, and Doctoral Levels

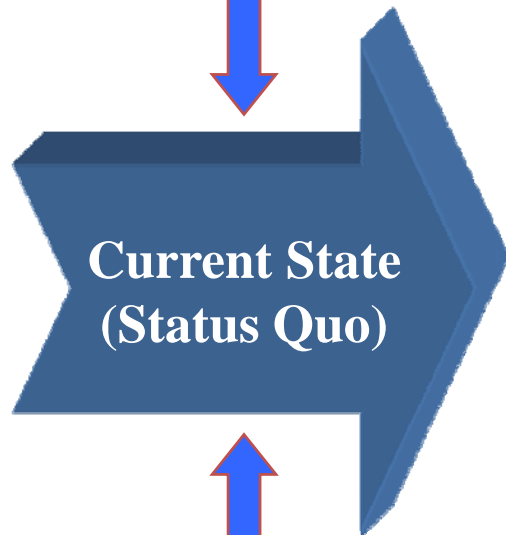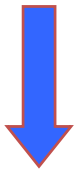**Vocational and Community College Education**

Third:

follow a *paradigm of discovery and knowledge creation* to move from the Baseline of what is, to a Vision of what can be, built upon a *foundation of transdisciplinarity*…

From what is...

DRIVERS

External Context

Current State (Status Quo)

Internal Context

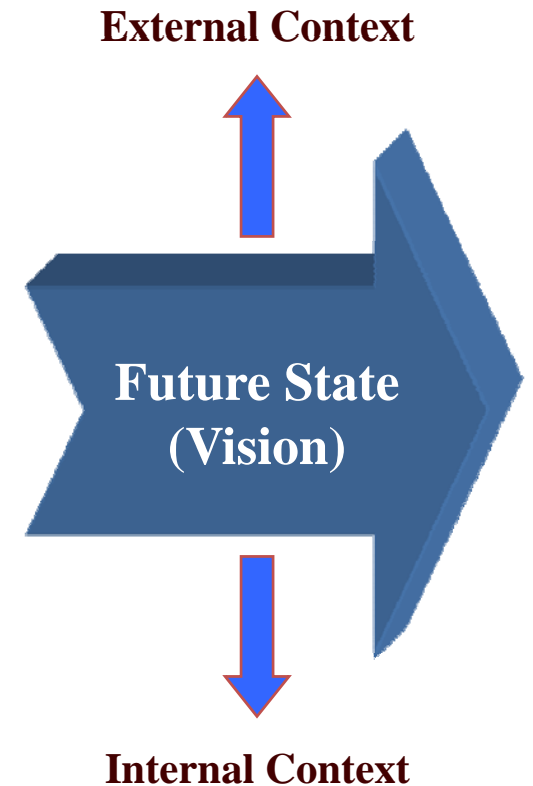**Questions,**

Problems,

Needs,

Opportunities,

Aspirations...

Transdisciplinarity

To what can be...

OUTCOMES

Answers,

Solutions,

Satisfaction,

Realization,

Fulfillment...

External Context

**Future State
(Vision)**

Internal Context

Transdisciplinarity

Through...

DRIVERS

External Context

Current State
(Status Quo)

Internal Context

RD⁴E

OUTCOMES

External Context

Future State
(Vision)

Internal Context
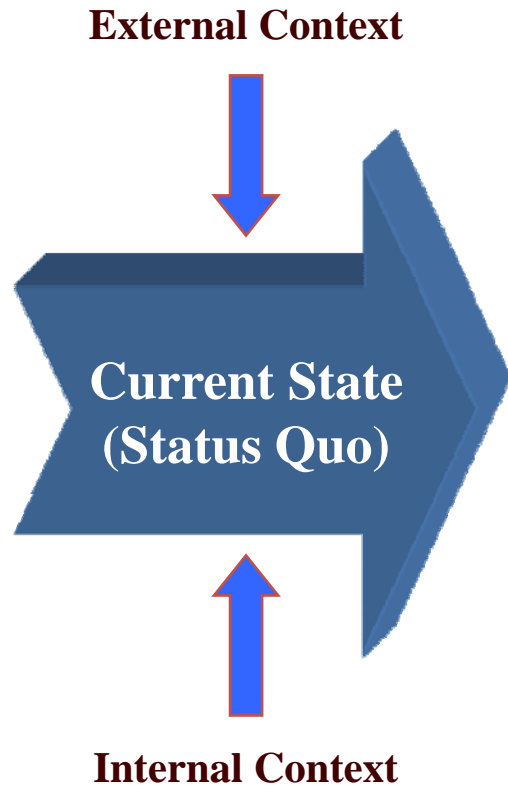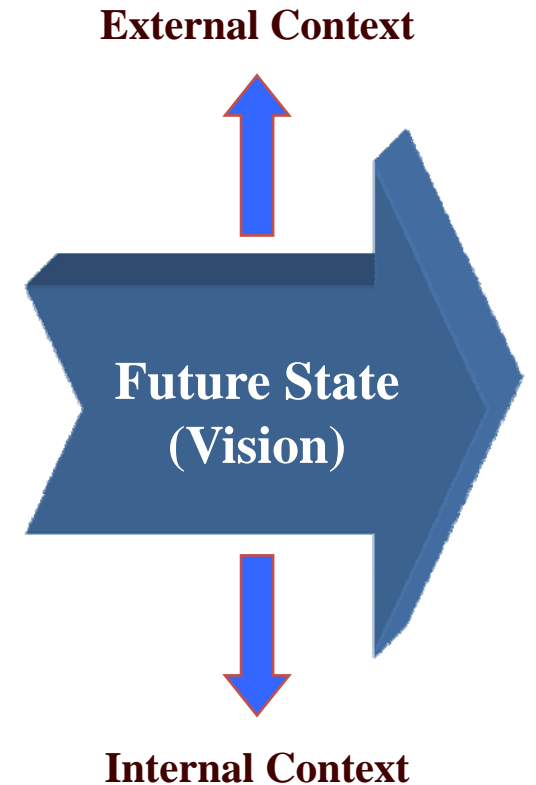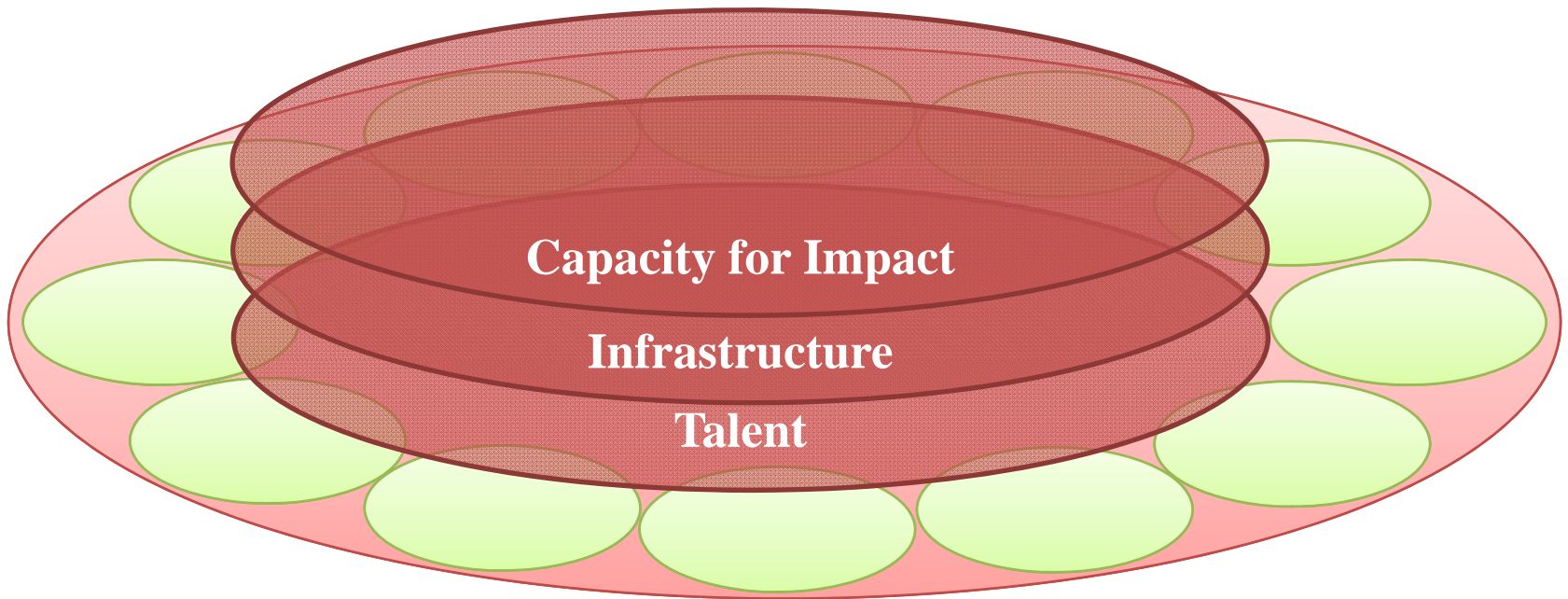
Transdisciplinarity

Fourth:

follow a *paradigm of expanded scholarship*, also built upon a *foundation of transdisciplinarity*...

Foundation of Scholarship in CARC

Capacity for Impact

Infrastructure

Talent

Departments, Centers & Institutes, and Other Sources of Scholarship within the College (Well Rounded Foundation)

Transdisciplinarity

Expanded Vision of Scholarship in CARC
Adapted from E. Boyer

Teaching (contextual)

Application (contextual)

Discovery (disciplinary)

Engagement (contextual)

Integration

Discovery (pluridisciplinary)
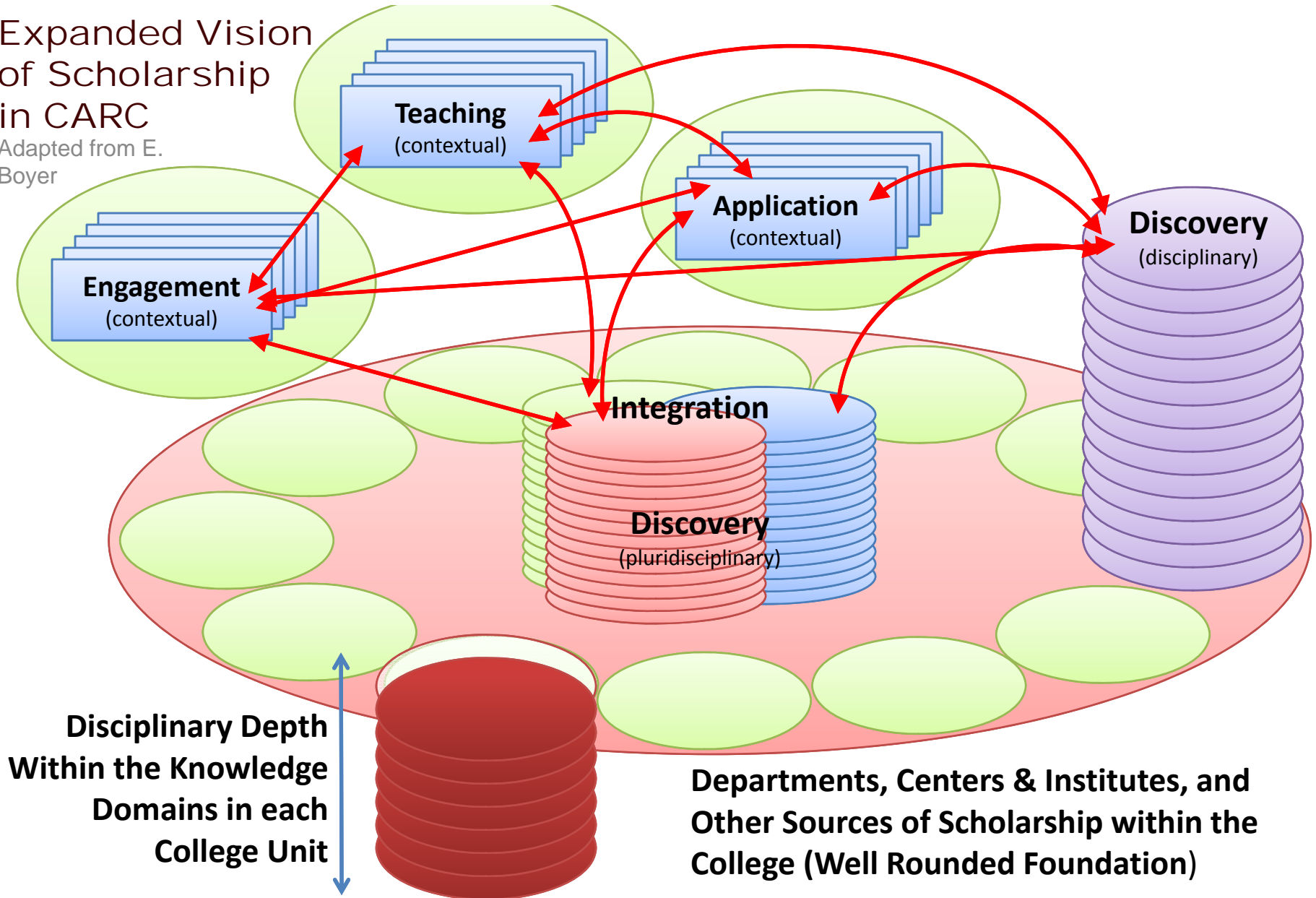
Disciplinary Depth Within the Knowledge Domains in each College Unit

Departments, Centers & Institutes, and Other Sources of Scholarship within the College (Well Rounded Foundation)

Transdisciplinarity

Integration

Integration in *Theory*...

Integrated Regional Planning

Integrated Urban Planning and Design

Integrated Land and Property Development

Integrated Facility Delivery
(Planning, Design, and Construction)

Integrated Facility Management

Integrated Technologies

Integration

Integration in Practice...

Integrated Business Practice

Integrated Project Delivery

Integrated High Performance Team

Integrated Design Process

Integrated Procurement/Construction Process
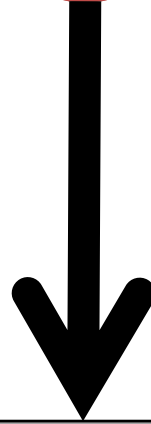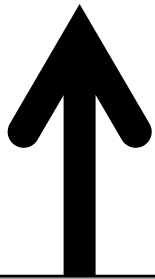
Integrated
Technologies

Technology

development of technologies that support integration in theory, in practice, and in academia, and also, the implementation of interoperability within them.
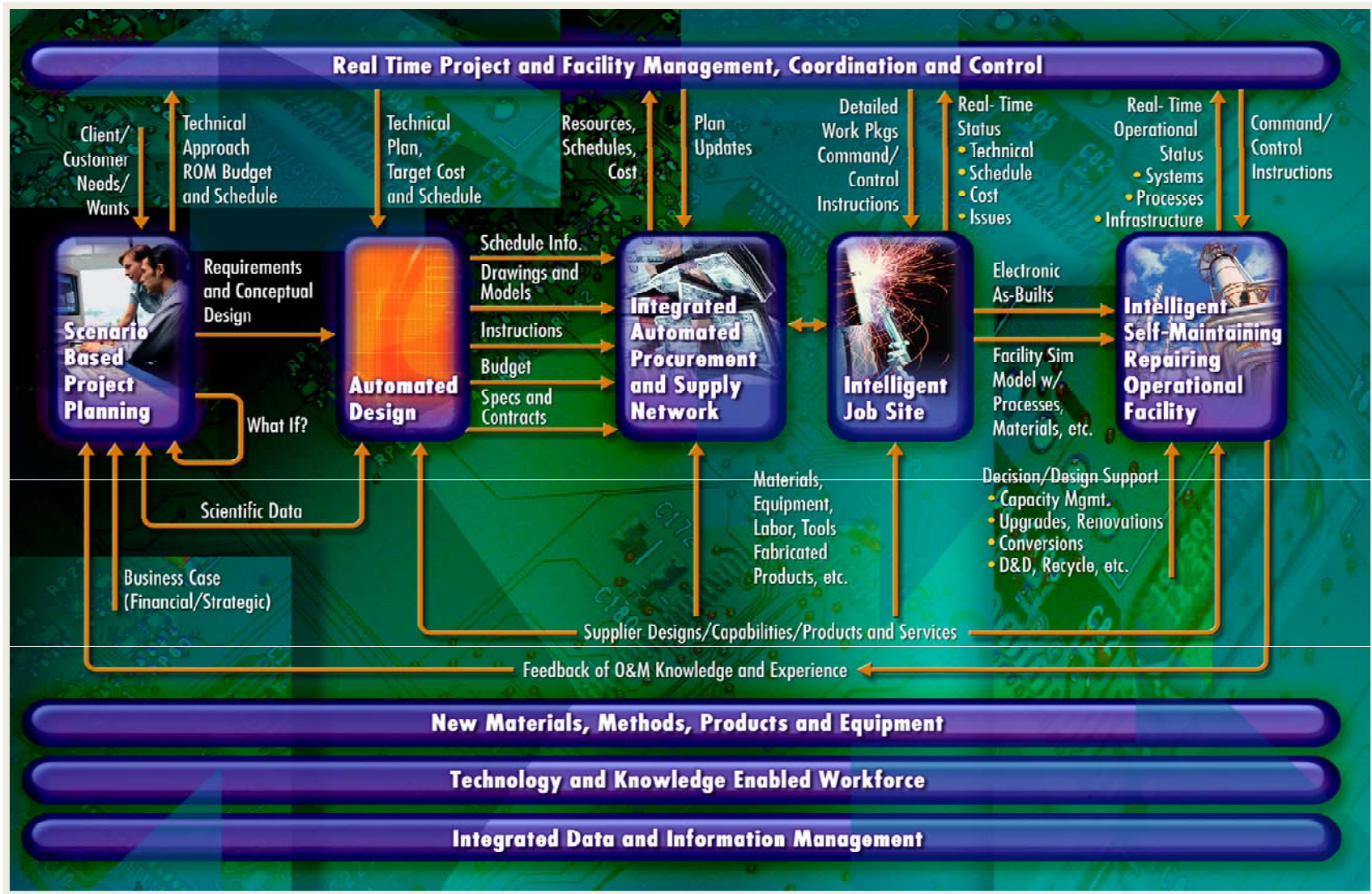
Theory

Practice

Technology

Real Time Project and Facility Management, Coordination and Control

Client/Customer Needs/Wants

Technical Approach ROM Budget and Schedule

Technical Plan, Target Cost and Schedule

Resources, Schedules, Cost

Plan Updates

Detailed Work Pkgs Command/Control Instructions

Real-Time Status
• Technical
• Schedule
• Cost
• Issues

Real-Time Operational Status
• Systems
• Processes
• Infrastructure

Command/Control Instructions

Scenario Based Project Planning

Requirements and Conceptual Design

What If?

Automated Design

Schedule Info.

Drawings and Models

Instructions

Budget

Specs and Contracts

Integrated Automated Procurement and Supply Network

Intelligent Job Site

Electronic As-Builts

Facility Sim Model w/ Processes, Materials, etc.

Intelligent Self-Maintaining Repairing Operational Facility

Scientific Data

Business Case (Financial/Strategic)

Materials, Equipment, Labor, Tools Fabricated Products, etc.

Decision/Design Support
• Capacity Mgmt.
• Upgrades, Renovations
• Conversions
• D&D, Recycle, etc.

Supplier Designs/Capabilities/Products and Services

Feedback of O&M Knowledge and Experience

New Materials, Methods, Products and Equipment

Technology and Knowledge Enabled Workforce

Integrated Data and Information Management

SOURCE: FIATECH; http://www.fiatech.org

Culture & Environment of Transdisciplinarity

At the core of…

CARC's Academic Mission:
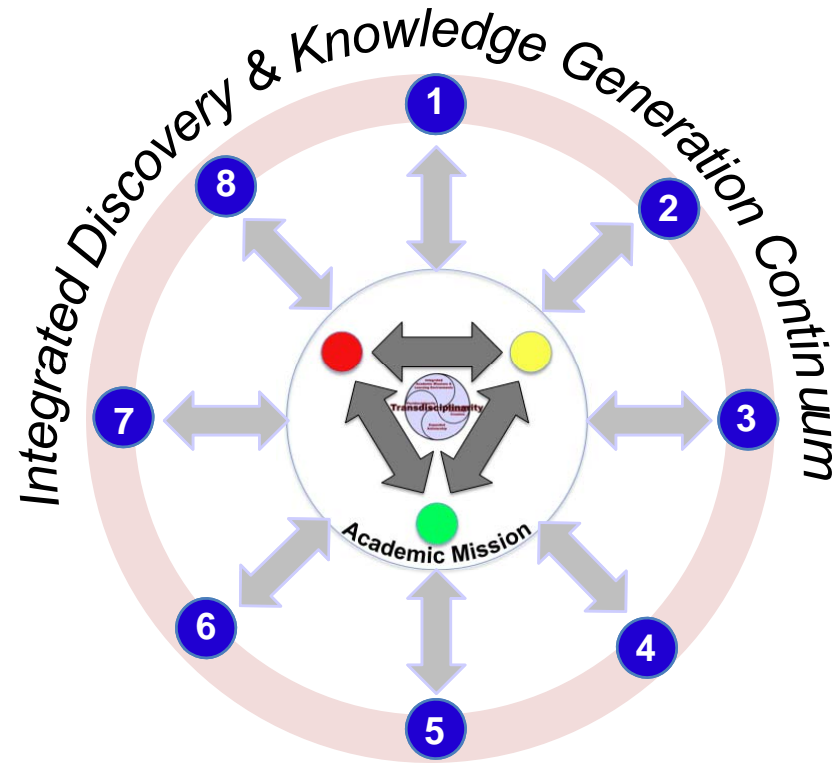
- ■ Learning/Teaching
- ■ Research, Creative Work, and Scholarship
- ■ Engagement (Practice, Outreach, & Service)

Embedded within…

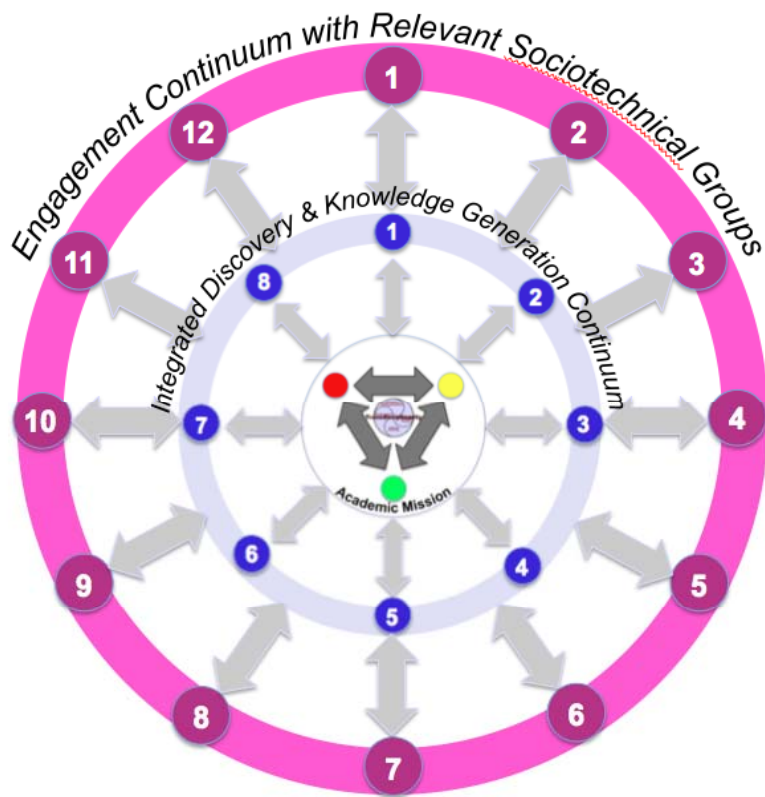**An Integrated Discovery & Knowledge Generation Continuum:**

(1) Benchmarks & Baselines; (2) Visions & Desired Outcomes; (3) Research; (4) Development; (5) Demonstration; (6) Deployment; (7) Dissemination; and (8) Evaluation…

In turn embedded within...

Engagement Continuum with Relevant Sociotechnical Groups

Integrated Discovery & Knowledge Generation Continuum

Academic Mission
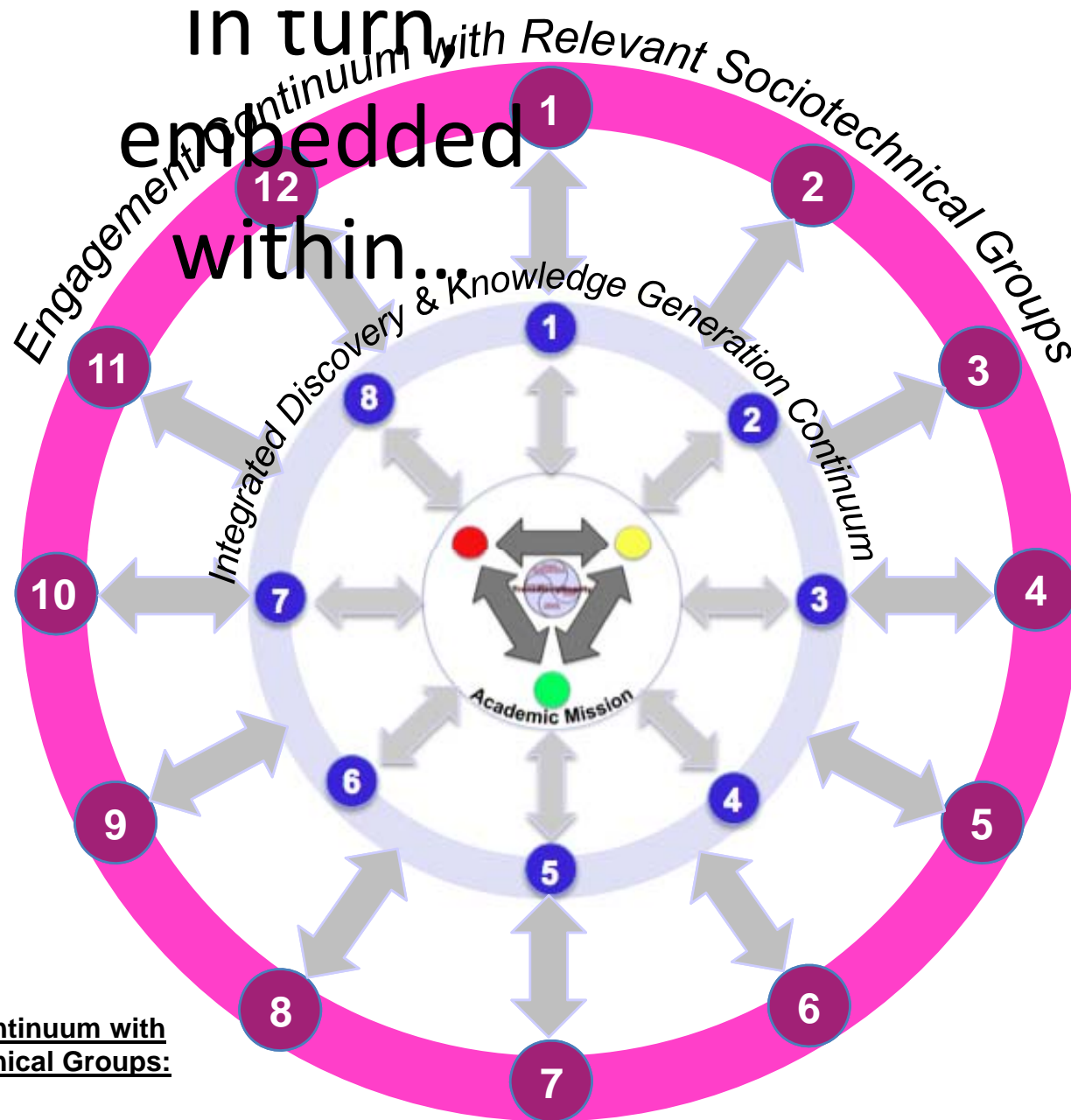
An Engagement Continuum with Relevant Sociotechnical Groups:

(1) Building science investigators; (2) Social science investigators; (3) Land & real estate development specialists; (4) Planning & AE design specialists; (5) General contractors & specialty subcontractors specialists; (6) Facility managers specialists; (7) Visualization specialists; (8) Policy/Code-makers; (9) Utilities/Service providers; (10) Technology, equipment, products, and materials manufacturers; (11) Financial institutions; and (12) Educational institutions…
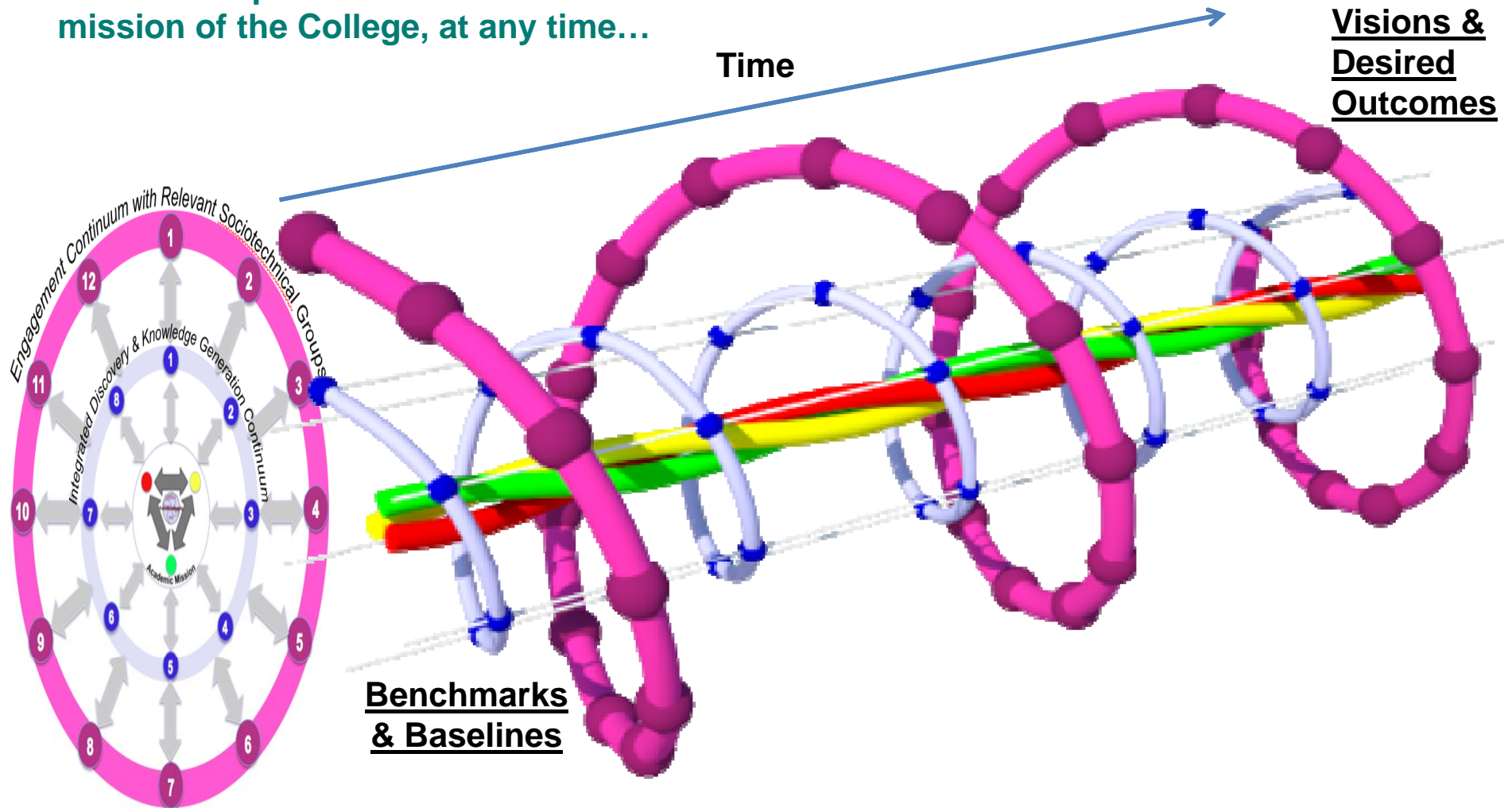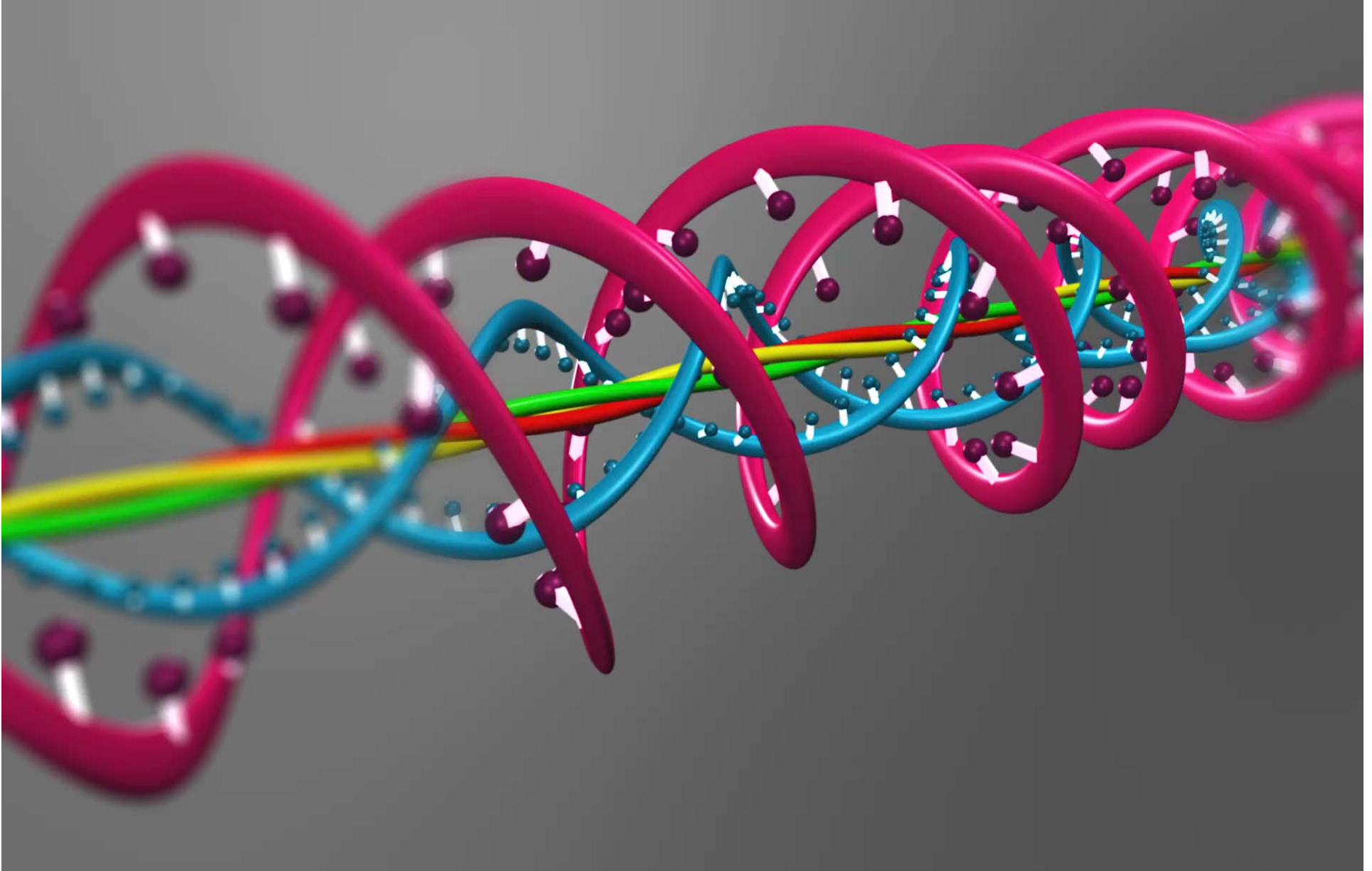
Creating over time…

A dynamic continuum of transdisciplinary interactions…

…Where any of the sociotechnical groups can engage in any of the discovery and knowledge generation stages, within any of the three pillars of the academic mission of the College, at any time…
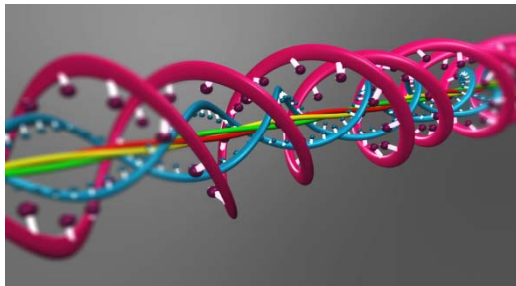

Time

Visions & Desired Outcomes

Benchmarks & Baselines

Continuously evolving…

With the intent of delivering...

(1) Innovative Sustainable Products for the Natural, Built, and Virtual Environments

(2) Innovative Sustainable Processes for the Natural, Built, and Virtual Environments

(3) Innovative Sustainable Services for the Delivery of Innovative Products and Processes for the Natural, Built, and Virtual Environments

(4) Innovative Sustainable Business Models for the Delivery of Innovative Products and Processes for the Natural, Built, and Virtual Environments

(5) Innovative Barrier Breakers, Obstacle Removers and, Bridges and Enablers for the Implementation of Innovative Sustainable Products, Processes, and Business Models for the Natural, Built, and Virtual Environments

… To provide a higher quality of life for people (individuals, families, communities, & organizations), and a higher quality of place (natural, built, & virtual), where they live, work, learn, heal, play, interact, and more…

So…..

Let us also look to the lessons of

'IDDS'………

........in nature

Integrated Design and Delivery Solutions use **collaborative** work processes and **enhanced skills** with **integrated** data, information, and **knowledge** management to **minimize** structural and process **inefficiencies** and to enhance the **value** delivered during design, build, and **operation**, and across projects.

Integrated Design and Delivery Solutions use **collaborative** work processes and **enhanced skills** with **integrated** data, information, and **knowledge** management to **minimize** structural and process **inefficiencies** and to enhance the **value** delivered during design, build, and **operation**, and across projects.

.......in history

Integrated Design and Delivery Solutions use **collaborative** work processes and **enhanced skills** with **integrated** data, information, and **knowledge** management to **minimize** structural and process **inefficiencies** and to enhance the **value** delivered during design, build, and **operation**, and across projects.

Integrated Design and Delivery Solutions use **collaborative** work processes and **enhanced skills** with **integrated** data, information, and **knowledge** management to **minimize** structural and process **inefficiencies** and to enhance the **value** delivered during design, build, and **operation**, and across projects.

…after all,
the original 'BIM'….

…resulted in this…..

…..and 'IDDS' resulted in this …….

Let me close with the inimitable words of Bob Dylan….

"….. oh the times they are a changin….."

?

CRS Center for Leadership, Management & Innovation
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