

Some Thoughts on Transdisciplinary Discovery Convergence

APLU Presentation

Dr. Taylor Eighmy

November 15, 2015



**THE UNIVERSITY OF
TENNESSEE
KNOXVILLE**



Friends, Colleagues & Collaborators:



Dr. Julie Williams,
Senior Vice Provost for
Engagement and
Academic Outreach, UNH

Since '11: Research & Engagement
Academy

<http://www.unh.edu/engagement/research/>

Since '04: Engaged Scholars Academy

<http://www.unh.edu/engagement/scholars/>



Dr. Michael San Francisco
Interim Vice President for
Research,
Associate VP for Research for
Faculty Development, TTU

Since '11: Transdisciplinary Research
Academy

<http://www.depts.ttu.edu/vpr/transdisciplinary/index.php>



Dr. Janet Nelson
Associate Chancellor for
Research, UT Knoxville

Since '14: Faculty Development Team

<http://research.utk.edu/proposal-support/faculty-development-team/>

Some Simple Definitions...

(Courtesy of Wikipedia and NASEM)

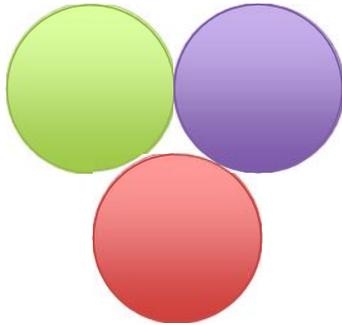
Multidisciplinary Research (MDR): The involvement of more than one discipline around problem solving...

Interdisciplinary Research (IDR): Combining two or more disciplines into *something new* that *crosses boundaries*...

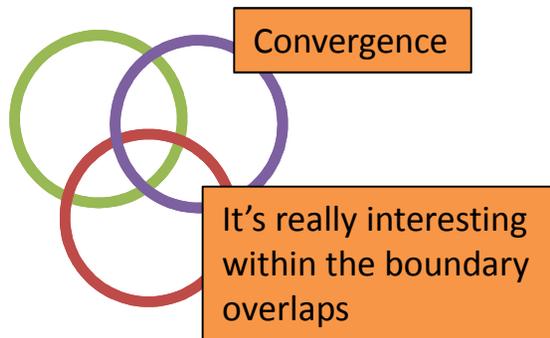
Transdisciplinary Research (TDR): A research strategy that crosses (*spans?*) *many disciplinary boundaries* to create a *holistic approach*, especially around a *new field of discovery*...

Convergence (CON): Facilitating transdisciplinary integration of life sciences, physical sciences, engineering, and beyond...

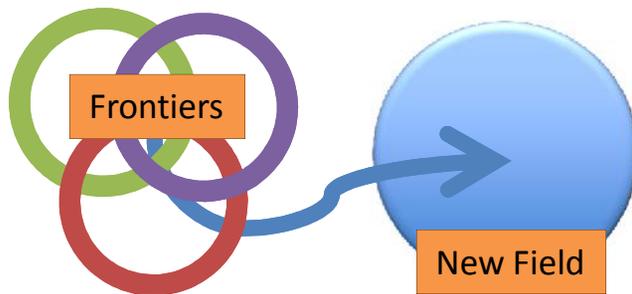
Conceptually...



MDR is simple, but important interaction focused towards a solution, with no cross-boundary discovery...



IDR collaboration is rich interaction towards a new approach to problem solving involving cross-boundary reinvention; basically resulting in new permanent disciplines...

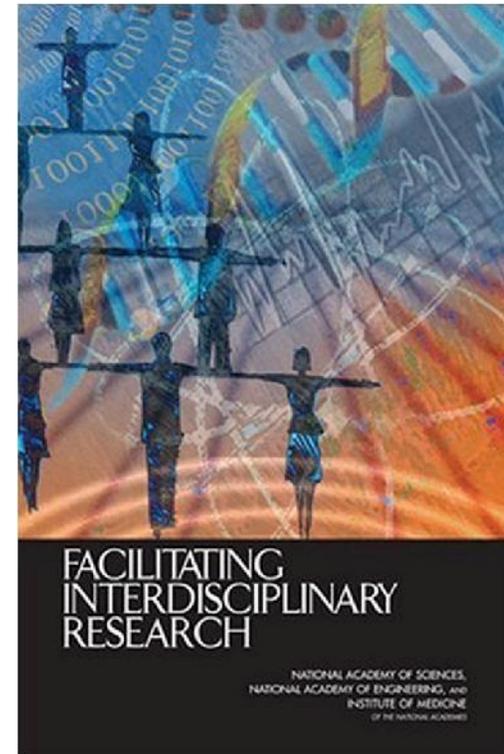


TDR and **CON** collaborations result in profound reinvention, usually at the frontiers of discovery; resulting in new holistic fields that span many disparate disciplines...

2004 National Academies' Report on Interdisciplinary Research (IDR)

Some recommendations:

- Undergraduates should seek out IDR
- Graduate students should broaden their disciplinary expertise
- Researchers and faculty members should embrace IDR
- Educators should facilitate IDR
- Academic institutions should adapt policies and procedures to enhance IDR



http://www.nap.edu/catalog.php?record_id=11153#description

2011 American Association for the Advancement of Science IDR & Education Practice Guide

Some findings:

- The imperative for IDR
- Creating an IDR culture
- Ensuring diversity in IDR and education
- Processes for creating an IDR team
- IDR education
- Supporting and sustaining IDR
- Measuring the outcomes of IDR

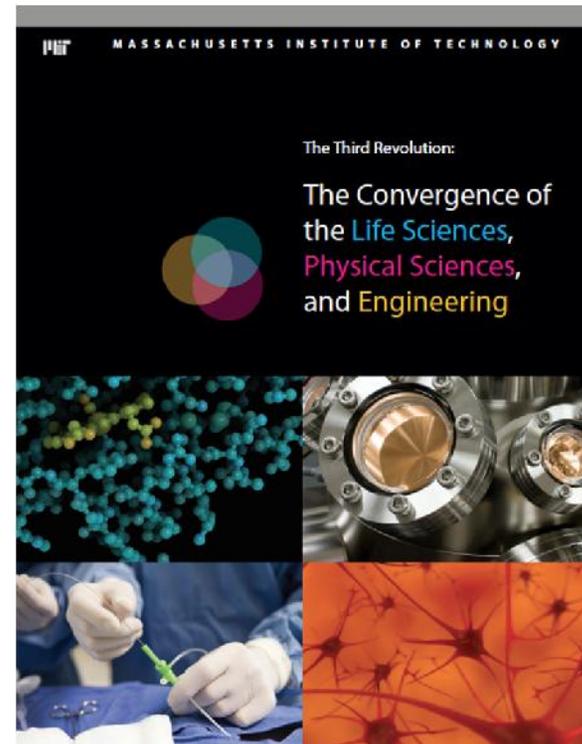


<http://www.aaas.org/cspsp/interdisciplinary/guide/>

2011 MIT White Paper on IDR

Recommendations:

- Ensure federal support for agencies
- Establish convergent ecosystems
- Reform peer review
- Balance large scale and small scale investments
- Improve IDR within the federal agencies
- Educate, expand and support the next generation of convergent researchers



<http://dc.mit.edu/sites/dc.mit.edu/files/MIT%20White%20Paper%20on%20Convergence.pdf>

The Internal Dialogue: What Faculty Say in Listening Sessions---

“We would like a *Community of Scholars* around...”

“Would you help us organize a new group to do _____ across _____ boundaries?”

“I am from _____ and I good at _____, how can I join this MDR/IDR/TDR effort?”

“Tell us more about the NSF INSPIRE Program...”

“The _____ Foundation is interested in this MDR/IDR/TDR disciplinary approach. I want to know more...”

The Internal Dialogue: What Graduate Students Say in Listening Sessions---

“The world is increasingly collaborative...”

“We want our learning to prepare us for the world”

“Our best classes involve cohort learning...”

“In my mentor’s lab group, undergraduates, graduate students and senior researchers all collaborate while crossing disciplinary boundaries ”

“In my summer internship, I worked with engineers, policy analysts and social scientists as a team... ”

Research and Engagement Academy at UNH



[Apply](#) [Contact](#) [Maps & Directions](#) [Storm](#) [MyUNH](#) [Give](#) [A-Z](#) [Social UNH](#)



[About UNH](#) [Academics](#) [Admissions](#) [Students](#) [Alumni](#) [Parents](#) [Faculty/Staff](#) [Research](#) [Arts](#) [Engagement](#) [Donors](#) [Business Resources](#)

Engagement & Academic Outreach

[Faculty Development](#) > [Research and Engagement Academy](#)

Engagement Home

- [Engagement](#) >
- [Faculty Development](#) v
- [Research and Engagement Academy](#) v
 - [Mission and Goals](#)
 - [Academy Schedule](#)
 - [Current Scholars](#) >
 - [Past Scholars](#) >
 - [Scholarly Coaches](#) >
 - [Research & Engagement Academy Application \(2016\)](#)
 - [Survey for Faculty Learning Communities](#)

Research and Engagement Academy

Welcome to the Research and Engagement Academy. The Academy is designed to advance and support the scholarly careers and success of faculty members by strengthening the quality and quantity of grant proposals submitted to federal agencies and foundations and by increasing the diversity of faculty who are awarded funding. Academy scholars commit to submit a competitive grant proposal, to attend seven half-day workshops and to work closely with an assigned "scholarly coach." Scholarly coaches are senior UNH faculty with established track records of external funding. This faculty professional development Academy is one of several programs offered by the Office of the Senior Vice Provost for Engagement and Academic Outreach to help support scholarship and engagement.

The 2016 Academy application period is open. Completed Dean's Nomination forms and Faculty Online Applications due:

Monday, November 9th, 2015. [Apply](#)



Research and Engagement Academy Class of 2015
Faculty Scholars, Scholarly Coaches, and Leadership Team

Transdisciplinary Research Academy at TTU

- Faculty-focused...
- True interest at the intersections...
- Keen desire to collaborate...
- Serious desire to contribute...
- Year long academy
- Catalyze free ranging discussions
- Tangible outcomes (e.g., IGERTS, institutes, grad programs)
- Extensive hands-on learning:
 - Team building
 - Federal agencies
 - Foundations
 - State agencies
 - Corporate R&D
 - Grant writing experts
- Dean nominated individuals or self-assembled teams
- Mentoring by senior faculty
- Self-assembled topics or grand science challenge projects
- \$10 to 20k support per group

The screenshot displays the website for the Transdisciplinary Research Academy at Texas Tech University. The header includes the university logo and the text 'TEXAS TECH UNIVERSITY Office of the Vice President for Research'. A search bar is located in the top right corner.

The main content area is titled '2012 Academy Team Members and Project Areas'. It is organized into three columns, each representing a different project area:

- Engineering and Biology:** Lists team members Siva Vanapalli, Jerzy Blawdziewicz, and Kendra Rumbaugh. The description focuses on developing innovative research projects at the intersection of medical sciences, biology, engineering, and physics, specifically targeting chronic wound infections and antimicrobial drug resistance.
- Law and Society:** Lists team members Hans Hansen, Patrick Metzke, and Jill Patterson. The description discusses providing an informed voice for marginalized groups through social impact research and public outreach.
- Food, Health, Cancer:** Lists team members Conrad Lyford, Barbara Pence, Barent McCool, Erica Ilbeck, and Autumn Shafer. The description focuses on the effective delivery and marketing of food and health products from both public and private perspectives.

Each project area includes a photograph of the team members and a caption with a 'Click image to enlarge' link.

Transdisciplinary Continuum at UT Knoxville

Computational Social Sciences

Smart Composites

Asthma and Rural Health

Computational Neuroscience

Materials Genome

Complex Systems Biology



Increasing Investment

Increasing Scale, Increasingly External



The Threes...

Three Key Issues or Impediments

- Academic credit without diminishing the role of disciplinary discovery
- Scale and external connectivity
- How best to cultivate locally, regionally, nationally

Three Specific Action Actions

- Support Kavli/NASEM effort
- Encourage federal investment
- Encourage G-U-I-F nexus

Three Guiding Questions

- How best to work this on your campus?
- How to share exemplary approaches?
- Regionalism to grand challenges?

Questions?

Please feel free to contact me:

teighmy@utk.edu

(865)974-8701 (office)

(806)252-6444 (cell)