Activity

1. On card, write your Discipline/Major/Field
   (undergraduate major or current field)
2. Insert into your name tag holder

Find and stand near people
from similar fields

Find someone from a
totally different field

Thinking about what this means for student teams

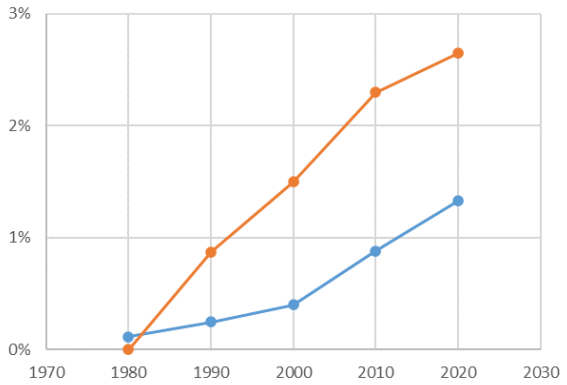
Developing & Applying a Measure of Multidisciplinarity

Julie Sonnenberg-Klein

Vertically Integrated Projects Program

Georgia Institute of Technology

Georgia Tech Vertically Integrated Projects



f
disiplinarity

cademic Journals with
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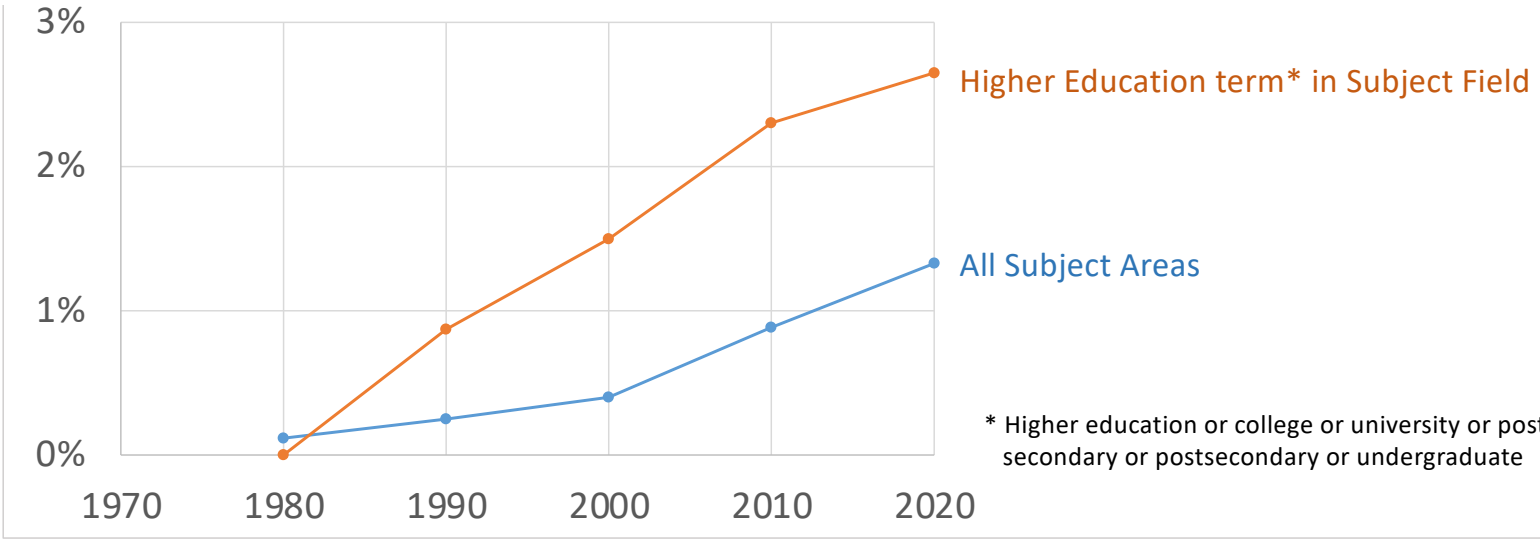


* Higher education or college or university or post secondary or postsecondary or undergraduate

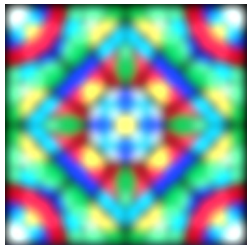
Klein Places the 3 Terms on a Spectrum

Multidisciplinary

Juxtaposing

Coordinating

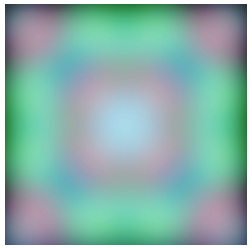
Interdisciplinary



Blending

Linking

Transdisciplinary

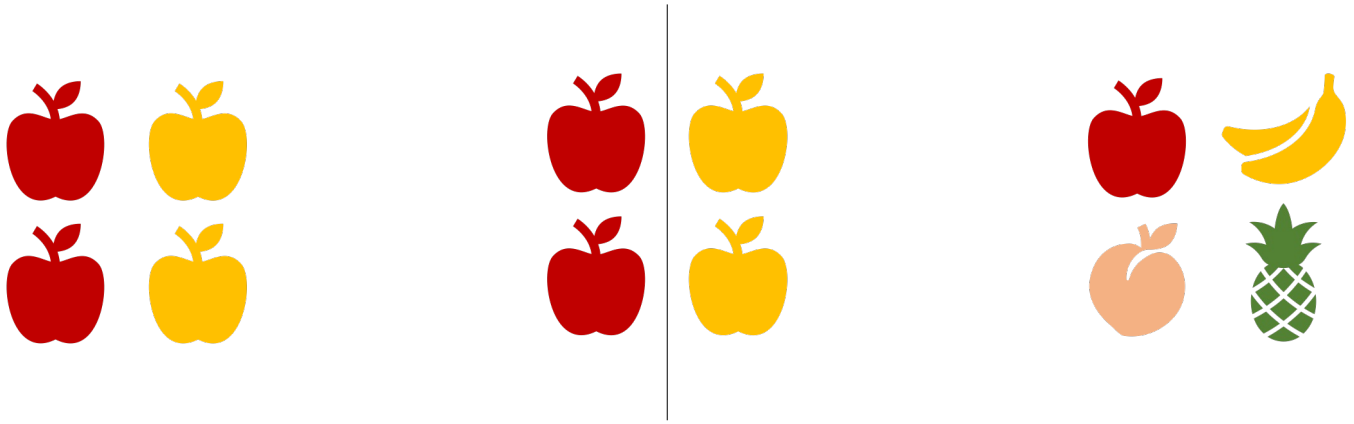


Transcending Boundaries

Position on spectrum depends on how they interact

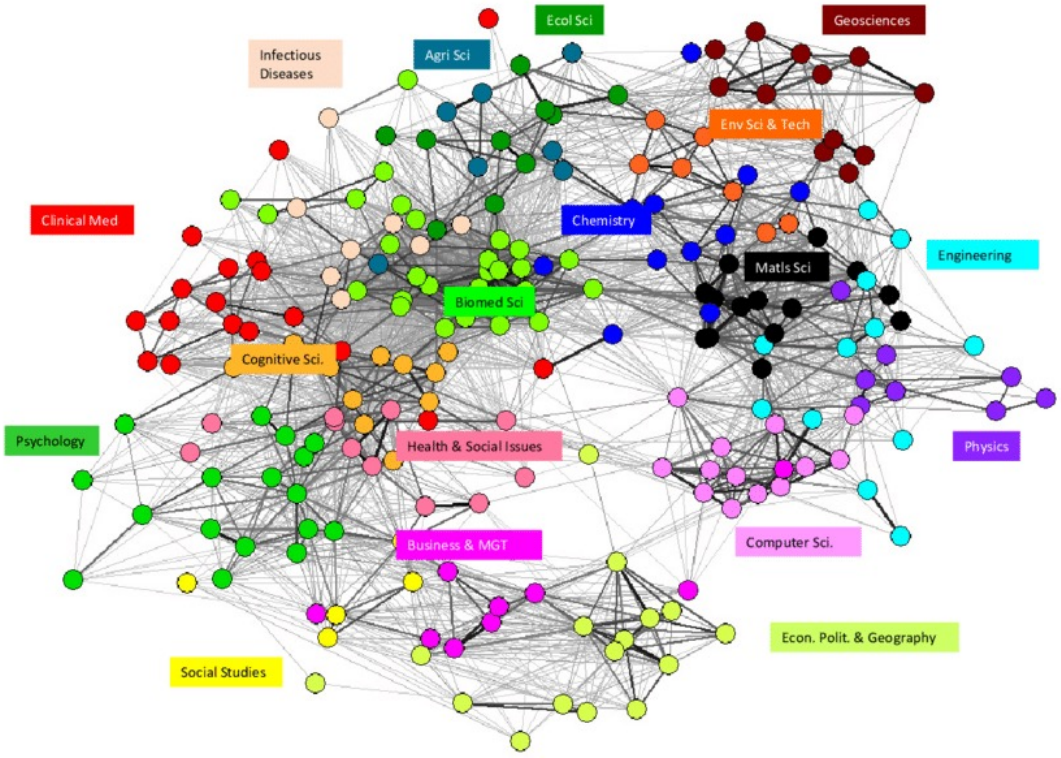
J. T. Klein, "Typologies of Interdisciplinarity: The Boundary Work of Definition," in *The Oxford Handbook of Interdisciplinarity*, R. Frodeman, Ed., Oxford University Press, 2017, p. 0. doi: 10.1093/oxfordhb/9780198733522.013.3.

Quantify Multidisciplinarity of Team Composition



Whole Fields Built around Topic in Other Contexts

- Scientometrics
  - Bibliographies to construct Global Maps of Science
- Measures of Interdisciplinary Research
  - Inform administrators, policy makers
  - Quantify interdisciplinarity
    - Colleges
    - Departments
    - Centers
    - Individuals



Simple Equation

- Rao–Stirling diversity index (*D*)

$$D = \sum_{i,j(i>j)} d_{ij} p_i p_j$$

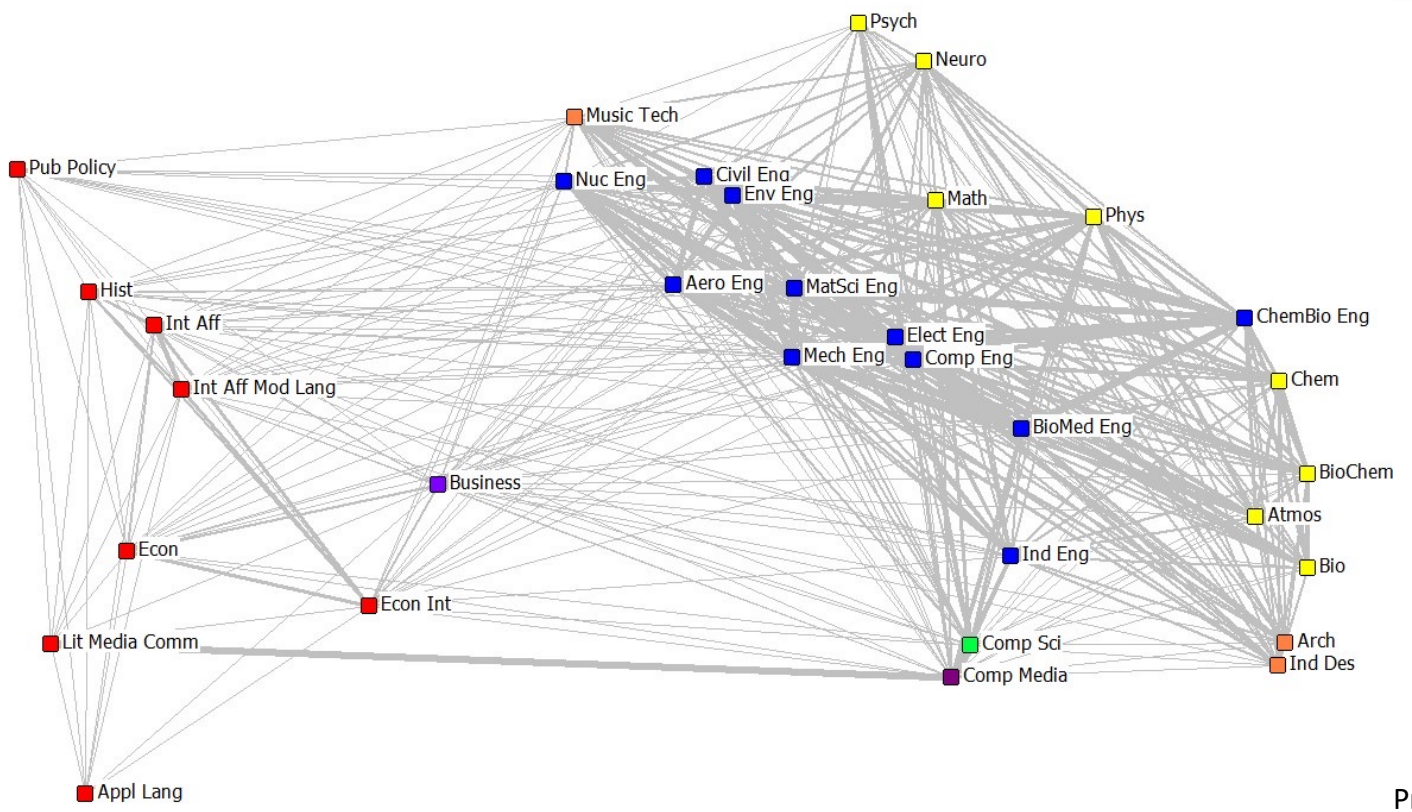
p_i = Proportion of team members from the group (easy)

d = Cognitive distance between two groups (hard)

Developed a Measure for Distance (d)

- 2 Components
  1. Overlap in elective and required courses
     - US System: Students take courses from many departments
  2. Cross-listed courses
     - Thermodynamics in ME = Thermodynamics in Physics
     - Shared home department → shared pool for in-major electives
- Generated social network diagrams (global map)
- Calculated diversity indexes
- Mapped individual teams onto the global map

Disciplinary Distances (Global Map)



Georgia Tech

Program VIP

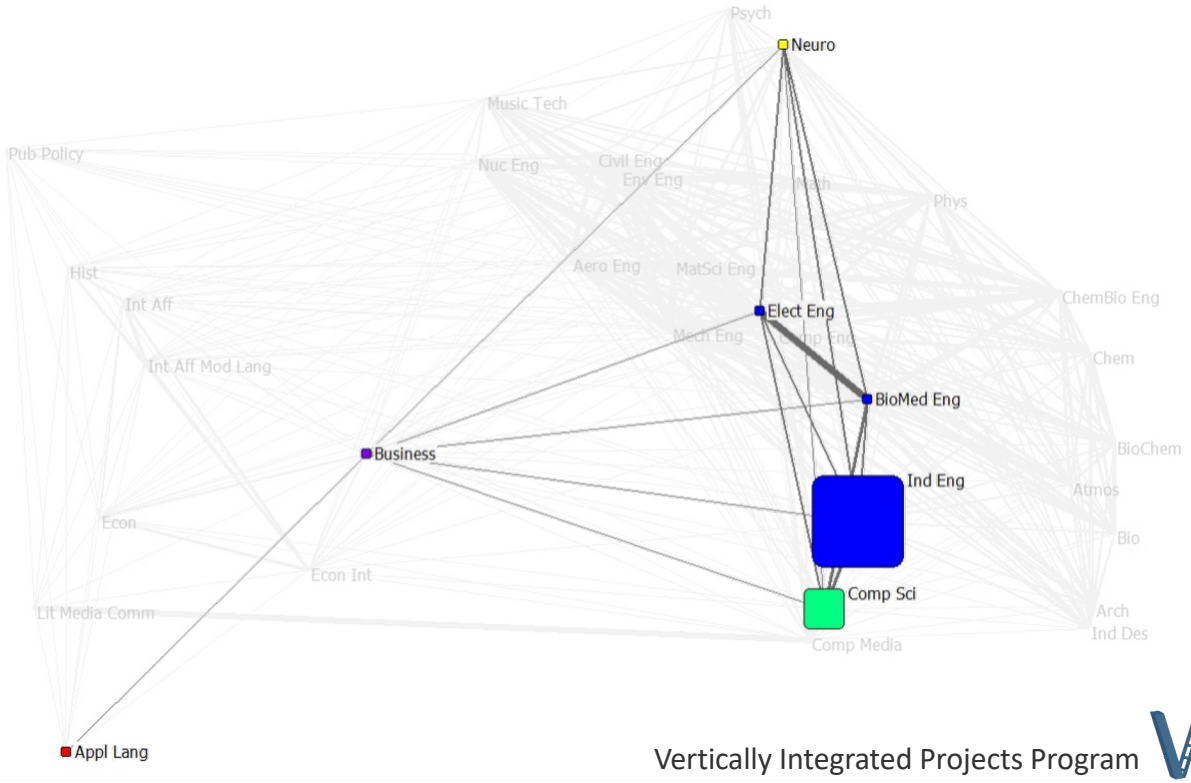
Mid-level Index

Health Informatics on FHIR VIP Team

18 students

7 majors

0.30 Diversity Index



Georgia Institute of Technology

Vertically Integrated Projects Program

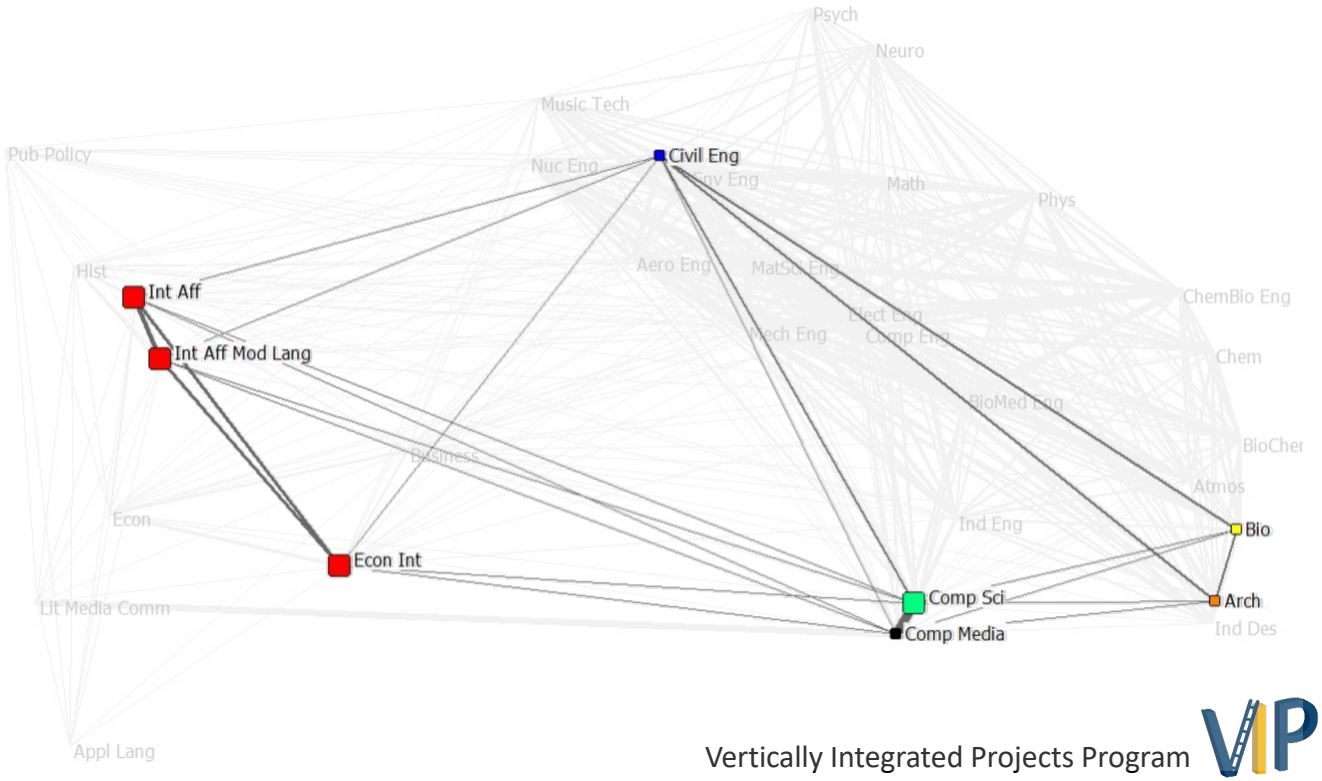
Higher Index

Global Social Entrepreneurship VIP Team

12 students

8 majors

0.40 Diversity Index



Georgia Institute of Technology

Vertically Integrated Projects Program

Lower Index

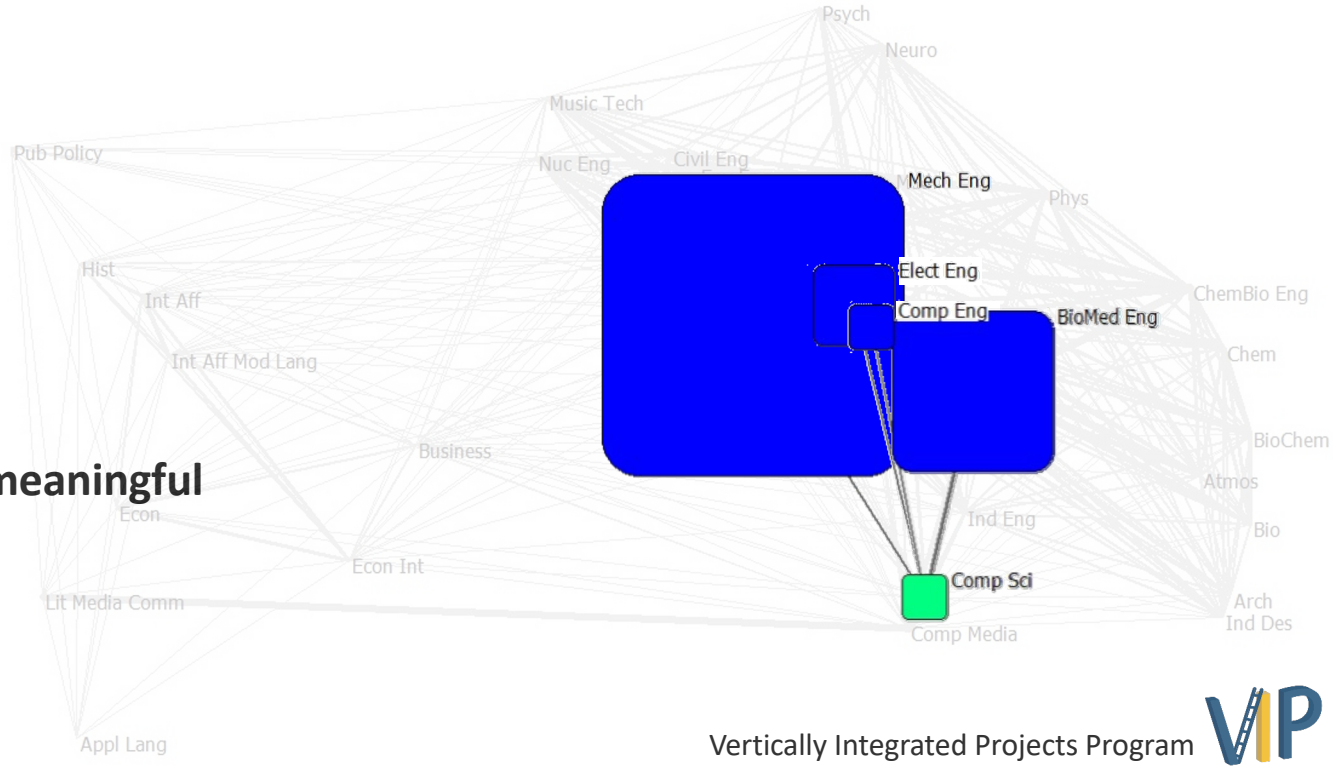
Robotic Human Augmentation VIP Team

55 students

5 majors

0.18 Diversity Index

Lower index ≠ Less meaningful



What now?

- Weaknesses
  - GA Tech-specific
  - Influenced by organizational structures
  - Represents US practices
- Could. . .
  - Develop multi-institution measure (let me know if interested)
  - Use distances & student interaction to place teams on the scale
  - Look at “disciplinary entropy” on teams (information theory)

Transition to Next Topic

Find a natural collaboration
(adjacent field, personal interest, etc.)

Transition to Next Topic

Find someone who you don’t know how you’d collaborate with