MIDFIELD Institute Introduction

MIDFIELD INSTITUTE 2022

Share why you are here in the chat. ☺

Multiple-Institution Database For Investigating Engineering Longitudinal Development

to the Second MIDFIELD Institute!

Thanks for coming!!

Multiple-Institution Database For Investigating Engineering Longitudinal Development

Based on support from NSF award 2142087

Everything you need…

Is available on the website!

We will build in breaks!

MIDFIELD Institute

- Welcome
- Introduction
- Before you arrive
- Agenda
- R basics
- R chart basics
- R data basics
- Visualization 1
- Visualization 2
- License

Welcome

2022 MIDFIELD Institute
Date: August 3–5
Time: 1–5 pm Eastern Time (US)
Location: Virtual
Pre-workshop: 1–5 pm, August 2

https://midfieldr.github.io/2022-midfield-institute/

Facilitators

Multiple-Institution Database For Investigating Engineering Longitudinal Development

Matthew Ohland, MIDFIELD Director/PI
Associate Head and Professor of Engineering Education, Purdue

Russell Long, MIDFIELD Managing Director

Richard Layton, MIDFIELD Data Display Specialist
Emeritus Professor of Mechanical Engineering, Rose-Hulman

Marisa Orr, MIDFIELD Associate Director
Associate Professor of Mechanical Engr/ Engr & Science Ed, Clemson

Susan Lord, MIDFIELD Institute Director
Professor and Chair of Integrated Engineering, University of San Diego

Facilitators

David Waller, Graduate Research Assistant, PhD Candidate, Engineering Education, Purdue University

Hayaam Osman, Graduate Research Assistant, PhD Student, Engineering Education, Purdue University

MIDFIELD

Multiple-Institution Database For Investigating Engineering Longitudinal Development

Workshop Objectives (qualitative)

By the end of the MIDFIELD Institute, participants should be able to

- Describe the data available in MIDFIELD
- Describe how the MIDFIELD data are organized
- Describe key principles of effective data visualization
- Identify deficiencies of common graph types

Workshop Objectives (computational)

- Use **midfieldr**, an R package specifically designed for use with MIDFIELD, to:
  - Calculate and evaluate educational metrics
  - Produce a table of data that addresses a research question
  - Explore and tell a story from MIDFIELD data

Session 1: MIDFIELD Introduction

By the end of this session, you will be able to

- Describe where MIDFIELD comes from and how that affects research
- Describe different types of studies that can be done with MIDFIELD
- Outline process to join and access MIDFIELD

Multiple
I nstitution
Database
F or
I nvestigating
E ngineering
L ongitudinal
D evelopment

Whole-population data for institutions and time period

- No sampling, longitudinal, intersectional analyses

Current dataset

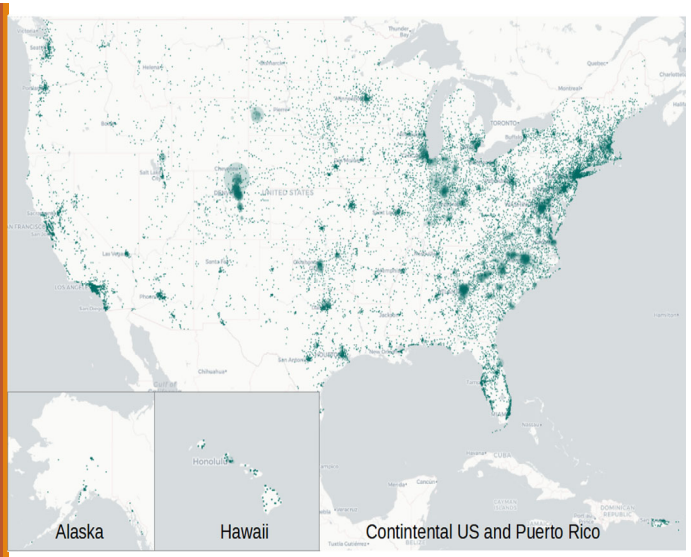
- 19 institutions
- > 1.7 million unique students in all departments
- > 240,000 unique engineering students, approximately 1/7 US engineering enrollment

Began with partners in the Southeastern University and College Coalition for Engineering Education (SUCCEED)

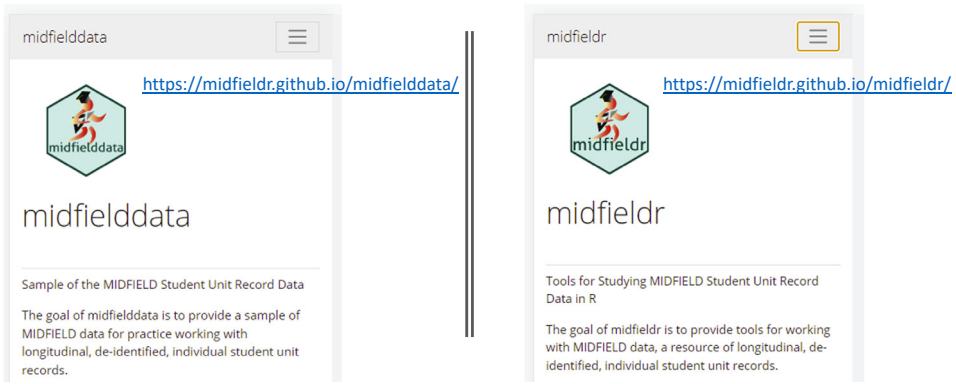
How the design of MIDFIELD affects research

- Southeastern bias – population growth / diversification
- "Large institution" bias – the experience of students at smaller institutions isn't well-represented
- Public institution bias – the experience of students at private institutions isn't well-represented
- Two HBCUs – can't discuss the "typical experience"
- No HSIs or institutions with high Asian or high Native student enrollment, institutions with larger populations being added

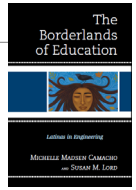
Students in MIDFIELD based on home zip code



Resources to help in using MIDFIELD



What have MIDFIELD researchers accomplished?



- Many publications in journals and conference proceedings, conference presentations, multiple book chapters, & a book.
- 5 journal best paper awards (JEE, IEEE ToE), 2 conference best paper awards, and other recognitions (e.g. WEPAN, ECEDHA).

- Panel discussions, invited workshops and talks, keynote addresses, publicity in various media outlets.

MIDFIELD Impact: Research

- Citations - thousands
- Promoting the use of more sophisticated graphical displays
- Promoting an intersectional approach
- Promoting ecosystem thinking
- Promoting the use of new metrics

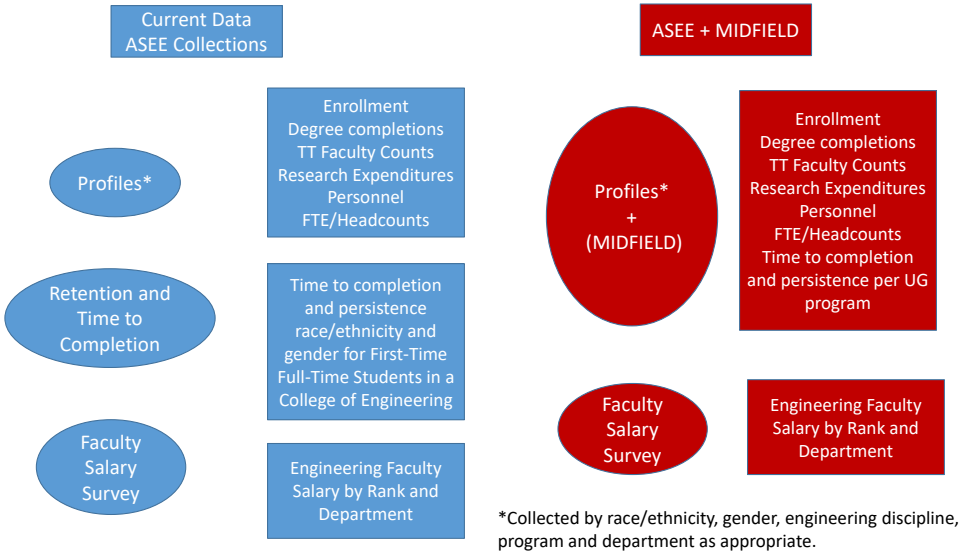
MIDFIELD Impact: Policy and Practice

- Citations of our work in papers describing
  - How our metrics and/or graphical displays are being used by others
  - Cases of policy and practice reform based on MIDFIELD findings
- Example: *change in policy* – changed criteria for continuing study
- Example: *new program creation* – the University of Colorado's Gold Shirt program

SHORTEN THIS

ASEE | MIDFIELD

Multiple-Institution Database for Investigating Engineering Longitudianl Develoment



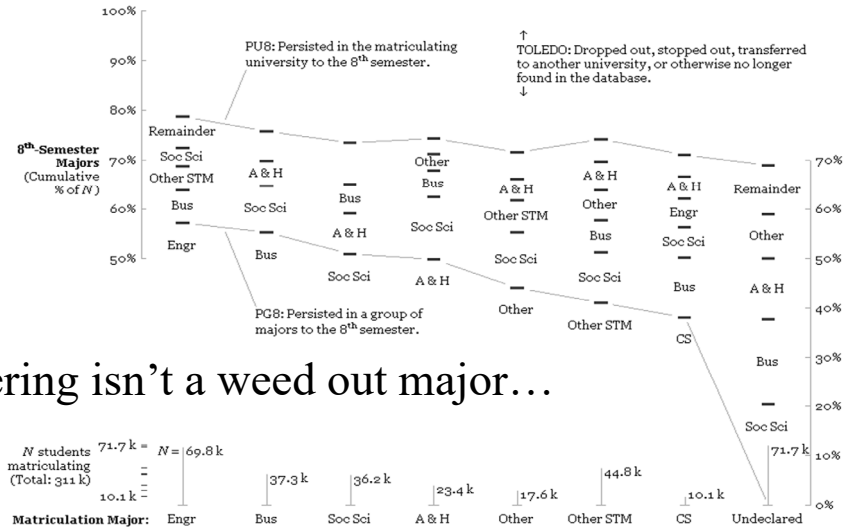
*Collected by race/ethnicity, gender, engineering discipline, program and department as appropriate.

Accessing the Data After 2022

- Accessing the data for research
  - Researchers can partner with ASEE's Department of Institutional Research & Analytics
  - Researchers can seek funding from NSF or other sources
  - Direct fee for accessing the data
  - Graduate students may apply for free access for dissertation research
- Participating Institutions will have access to the data for internal use
- Accessing: https://midfield.asee.org/request-access/

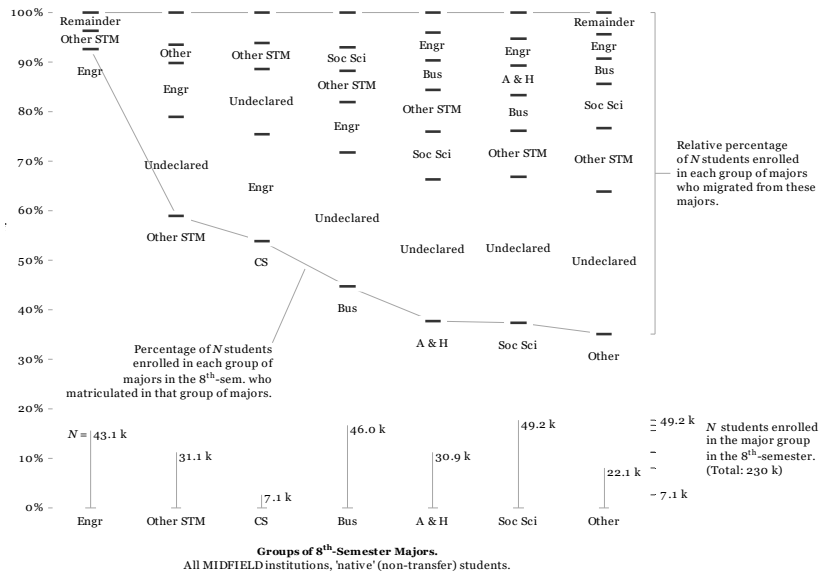
Some award-winning results from research using MIDFIELD

Multiple-Institution Database For Investigating Engineering Longitudinal Development

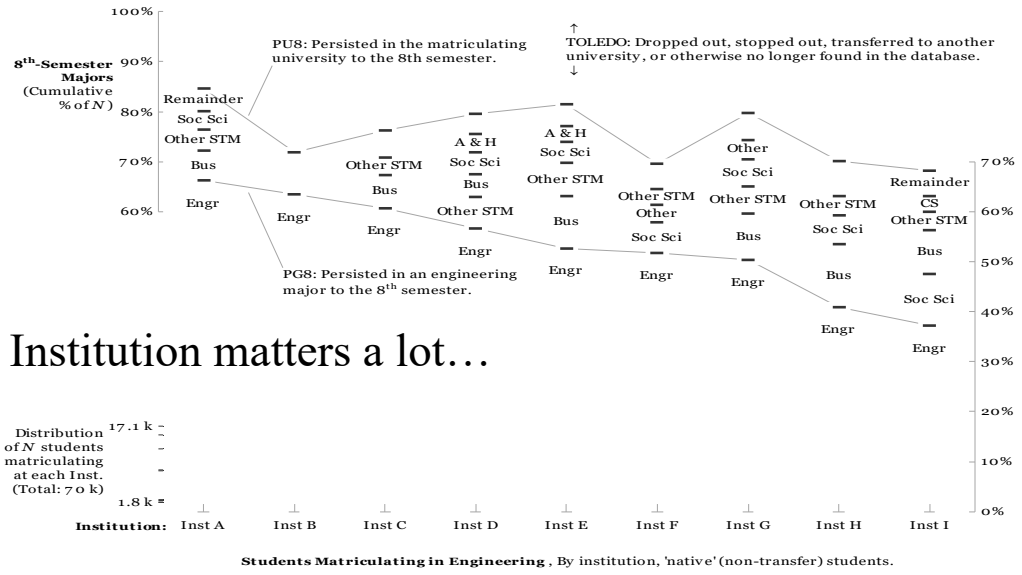


Engineering isn't a weed out major…

Students Matriculating in All Majors: all MIDFIELD institutions, 'native' (non-transfer) students.



it just doesn't replace the students it loses.



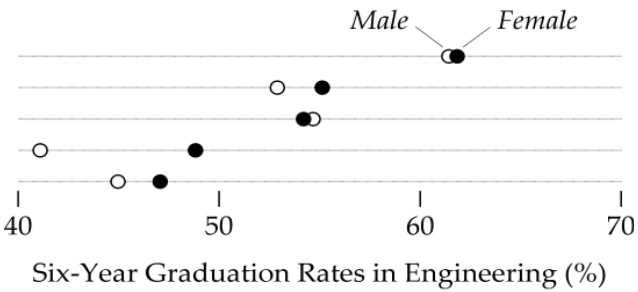
Institution matters a lot…

Students Matriculating in Engineering, By institution, 'native' (non-transfer) students.

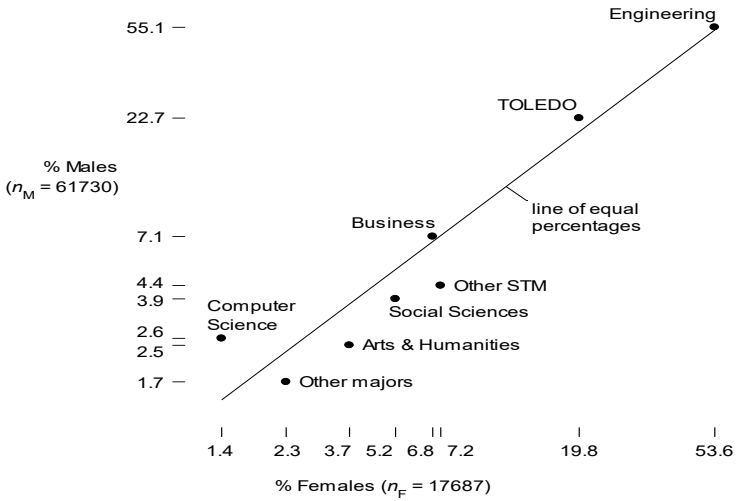
Women graduate at the same rates as men…

All Engineering Matriculants

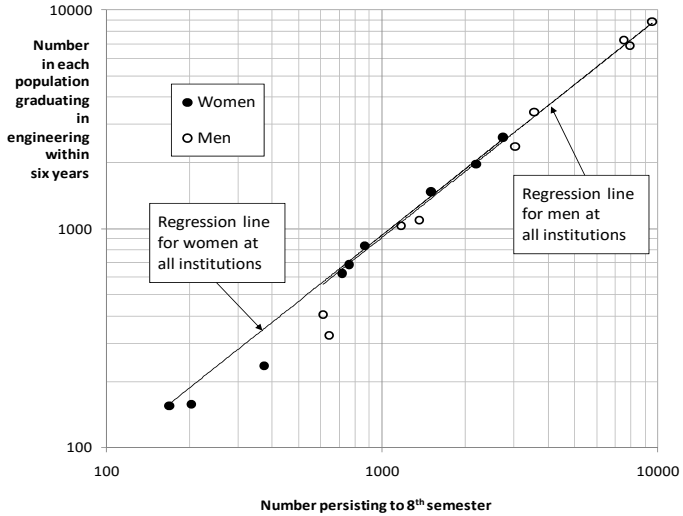
	n_F	n_M
Asian	1001	3927
Hispanic	390	1607
White	9997	45291
Black	3957	6624
Native-Am	68	258



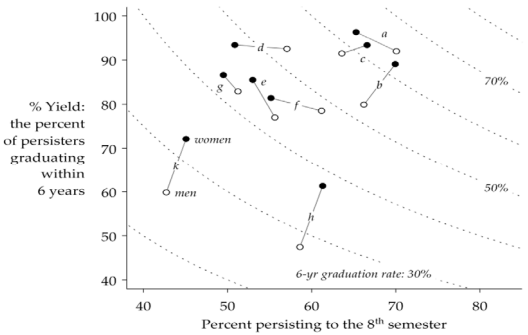
…and have surprisingly similar outcomes.

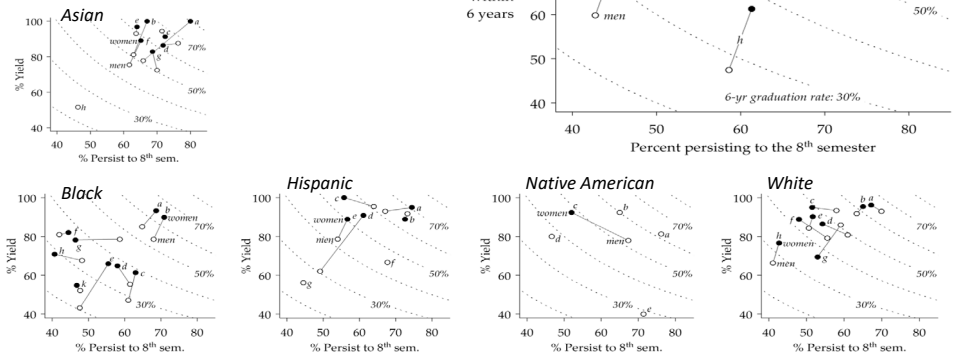


Eight-semester persistence is a good predictor of six-year graduation… but not for everyone.

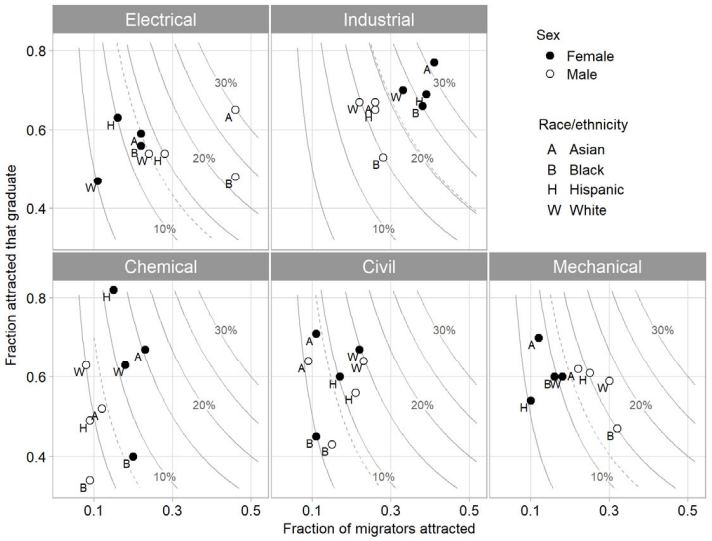


The aggregate doesn't represent any racial/ethnic group.





Some disciplines show gender differences …others show racial/ethnic differences.



Some disciplines are better than others at graduating students… but some of the students who leave will graduate in other engineering majors.