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## **Evaluating Research at Levels from National to Institutional**

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# Evaluating Research at Levels from National to Institutional

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## Introduction

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- I will focus on National rather than International Rankings, because the types of evaluation that result in funding decisions are generally carried out at the national level.
- I will focus on the U.S., because the U.S. has well-developed systems for evaluating and funding research that are relevant to the theme of this conference.
  - And because I know about evaluating and funding research in the U.S.

## Overview: Three interrelated themes

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- U.S. National University classification or rankings based (at least mainly) on research:
  - Carnegie Classification
  - Center for Measuring University Performance
  - Association of American Universities
- Separating tactics from strategy in national research funding.
- Evaluating research productivity at the institutional level.

## Overview: Three interrelated themes

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- **U.S. National University rankings based (at least in part) on research:**
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- Separating tactics from strategy in national research funding.
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## Carnegie Classification: Many categories

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- Doctorate-granting universities.
- Master's colleges and universities.
- Special focus institutions, such as
  - Medical Centers.
  - Free standing law schools.
- Baccalaureate colleges.
- (Indigenous American) Tribal colleges.
- Associate's colleges (community colleges).

<http://classifications.carnegiefoundation.org/>

## Carnegie: Doctorate-granting universities

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- To be considered a university has to produce a minimum of 20 research doctorates per year.
- Three levels of classification:
  - Doctoral/Research Universities
  - Research Universities (High research activity)
  - Research Universities (Very high research activity)
- Criteria:
  - Research & Development annual expenditures. (NSF)
  - Number of Doctoral-level research staff. (NSF)
  - Doctoral degrees conferred per year. (IPEDS)
- Both aggregate and normalized data considered.

## Carnegie: Doctorate-granting universities

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- Both aggregate and normalized data considered.
  - Aggregate data measure a university's total output, such as total research expenditures.
  - Normalized data divides total output by the number of faculty members to give output per faculty member, a measure of research efficiency.
- Aggregate and normalized data are weighed equally.
  - High scores in both: RU/Very high research activity.
  - High scores in either: RU/High research activity.
  - Others that meet the qualifying criterion: Doctoral/Research



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## Center for Measuring University Performance

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- Nine criteria measured annually (all aggregate):
  - Total research expenditures. (NSF)
  - Federal research expenditures. (NSF)
  - Endowment assets. (NACUBO)
  - Annual giving to the university. (CAE-VSE)
  - National Academy members (NAS, NAE, IOM).
  - Faculty awards received (from a specific list).
  - Doctoral degrees granted. (IPEDS)
  - Postdoctoral appointees. (NSF)
  - Median SAT (or ACT) scores.

<http://mup.asu.edu/index.html>

## Center for Measuring University Performance

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- Ranking based first on the number of criteria ranked 1-25, then those ranked 26-50.
  - So, the top ranked universities are ranked 1-25 in all nine criteria, the next group in eight, *etc.*
  - In 2010, four universities, all private, ranked 1-25 in all nine criteria : Columbia, MIT, Stanford, and University of Pennsylvania.
  - One university, Harvard, ranked 1-25 in eight criteria and 26-50 in one.
  - Highest ranked public universities ranked 1-25 in seven criteria and 26-50 in one: Berkeley, UCLA, Michigan, Washington, and Wisconsin-Madison.

## Center for Measuring University Performance

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- Three of the criteria tend to favor privates:
  - Endowment assets.
  - Annual giving to the university.
  - Median SAT (or ACT) scores.
- Two of the criteria tend to favor publics:
  - Doctoral degrees granted.
  - Postdoctoral appointees.
- So, CMUP also carries out separate rankings for private universities and public universities.
  - Nine privates ranked 1-25 in all nine criteria.
  - Seven publics ranked 1-25 in all nine criteria.

## Overview: Three interrelated themes

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- U.S. National University rankings based (at least in part) on research:
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  - **Association of American Universities**
- Separating tactics from strategy in national research funding.
- Evaluating research productivity at the institutional level.

## Association of American Universities

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- AAU is a membership by invitation association of 61 North American research universities, both public and private.
- Election to AAU membership is based on meeting two sets of indicators:
  - Phase I indicators:
    - Competitively funded federal grant support.
    - Membership in the National Academies.
    - National Research Council ratings of doctoral programs.
    - Faculty awards and honors (from a list).
    - Citations of faculty publications.

## Association of American Universities

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- Election to AAU membership is based on meeting two sets of indicators:
  - Phase II indicators:
    - State, USDA, industrial research funding (non-peer-reviewed).
    - Doctoral education (number and distribution of Ph.D.'s granted)
    - Number of postdoctoral appointees.
    - Undergraduate education.
  - Both aggregate and normalized data are considered.
- Assessment is considered over many years: since 2000, only 3 universities have been invited to join.

## Summary of National Rankings/Classifications

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- Criteria to be used must be selected with great care:
  - That they correlate with the desired ranking.
  - That they not be biased toward a subset of the institutions being ranked, or that the biases can be resolved.
- Consideration should be given to using normalized, as well as aggregate data:
  - More accurately compare institutions of different size.
  - Provide a measure of efficiency.



## Overview: Three interrelated themes

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- U.S. National University rankings based (at least in part) on research:
  - Carnegie Classification
  - Center for Measuring University Performance
  - Association of American Universities
- **Separating tactics from strategy in national research funding.**
- Evaluating research productivity at the institutional level.

## Separating tactics from strategy

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- Strategy: Which research areas in which a nation invests is usually decided at the national level, in the U.S. by legislative and executive branches.
  - Setting funding levels for agencies with different missions.
    - National Institutes of Health.
    - National Science Foundation.
    - Department of Energy.
    - National Aeronautics and Space Administration.
    - National Endowment for the Humanities.
    - National Endowment for the Arts.
    - Department of Agriculture.
    - *etc.*

## Separating tactics from strategy

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- Strategy: Which research areas in which a nation invests is usually decided at the national level, in the U.S. by legislative and executive branches.
  - Within each agency, funds are divided among programs in what is meant to be a strategic process. In practice, the division often reflects that used in prior years, with small strategic adjustments.
  - With very few exceptions, such as USDA block grants, federal funding in the U.S. does not flow to universities in a formulaic way.

## Separating tactics from strategy

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- Tactics: Most federal funds in the U.S. are distributed by a process of peer-review.
  - Agencies typically issue Requests for Proposals (RFP's) outlining areas eligible for research funding.
  - Individual investigators or groups of investigators submit proposals describing the research they would carry out.
  - Proposals are reviewed by panels of peers, selected for their expertise in the area, sponsored research history, *etc.*
  - There is often a second level of review either by a second, more senior peer body (NIH) or by agency officers (NSF) to insure that the strategic goals are being met.
  - Peer reviewed funding is the competitive funding mentioned in the CMUP and AAU rankings.

## Overview: Three interrelated themes

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- U.S. National University rankings based (at least in part) on research:
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- Separating tactics from strategy in national research funding.
- **Evaluating research productivity at the institutional level.**

## Evaluating institution-level research productivity

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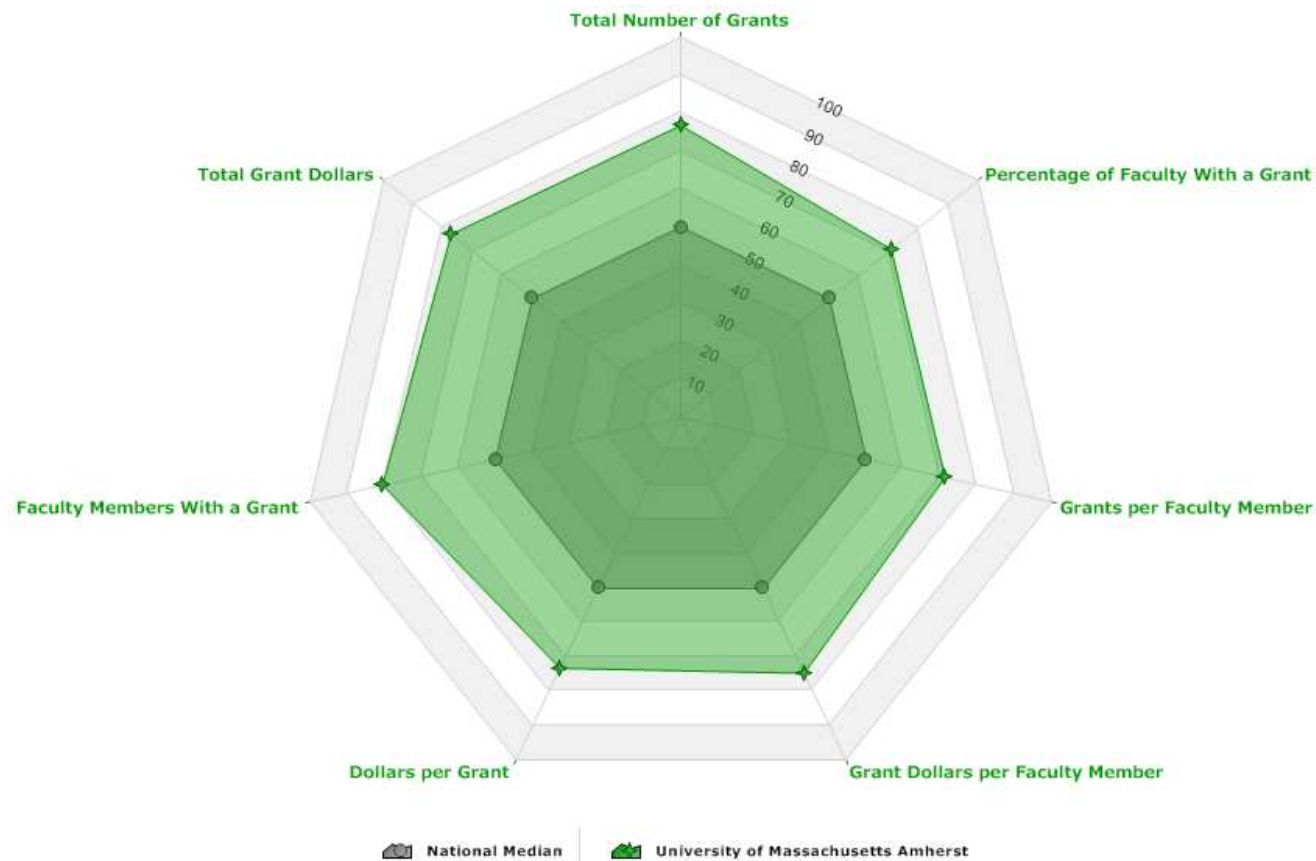
- One cannot directly compare research productivity of, for example, a Chemistry department with that of a Political Science department.
- Therefore, one has to assess the productivity of each department with like departments at peer institutions, using discipline-appropriate criteria.
  - Chemistry with other Chemistry departments, according to criteria relevant to Chemistry.
  - Political Science with other Political Science departments, according to criteria relevant to Political Science.
  - *etc.*

## Evaluating institution-level research productivity

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- After carrying out such analyses for all departments, one can then rank order departments within one's institution according to their competitiveness vis-à-vis their peers.
- There are commercial databases and analytical tools that can be employed in such analyses, two of which we will hear about tomorrow morning:
  - Joep Verheggen, Elsevier
  - Jeff Clovis, Thompson Reuters

## Analyzing a program: grants

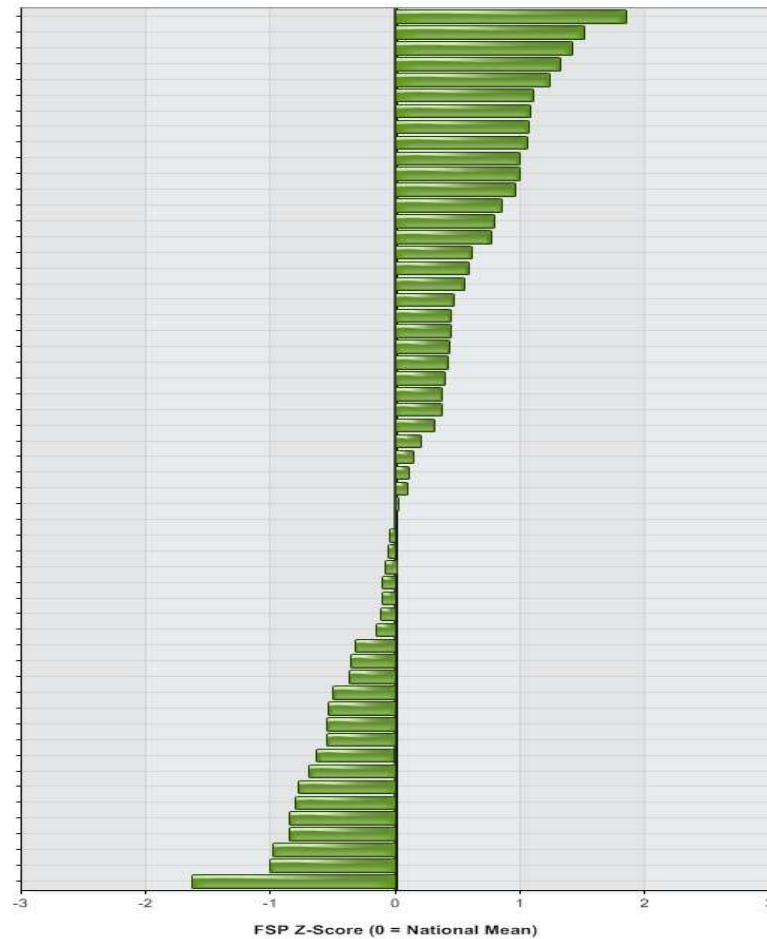




## Analyzing a program: all criteria



# Many programs compared with national peers



## Summary

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- Briefly reviewed three different systems used to classify or rank universities in the U.S.
  - Importance of choosing the “right” criteria for the task.
  - Importance of normalizing data for comparisons of different size institutions.
- Discussed separating strategic decisions concerning research funding from tactical approach to efficiently using those funds.
- Very briefly discussed how departments can be compared with peer departments at other institutions and how those data may be used to assess their relative research strength.

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