Greening Grants: Connecting Sustainability & Efficiency to Federal Research Funding for Universities

Kathy Ramirez-Aguilar
CU Green Labs Program Manager
University of Colorado Boulder
kramirez@colorado.edu
LEARNING OBJECTIVES

1. Learn about why there is a need to make connections between federal research funding and sustainability/efficiency.

2. Gain understanding about the expected benefits from making the connections.

3. Find out why now is an important time to make the connections.

4. Hear some ideas for making connections while keeping in mind the need to minimize the administrative burden on scientists.
Presentation Outline

1. How is research is funded on university campuses?
2. Why are scientists facing tough competition for federal funding?
3. Where do inefficiencies exist in the process and what are the consequences?
4. Some ideas on how efficiency can be connected with federal funding
How is research funded on US university campuses?
Majority of US University Research Is Funded by Federal Government

<table>
<thead>
<tr>
<th>Institution</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU–Boulder (FY14)</td>
<td>80%</td>
</tr>
<tr>
<td>Univ. of Michigan (FY14)</td>
<td>57%</td>
</tr>
<tr>
<td>Dartmouth (~FY14)</td>
<td>86%</td>
</tr>
<tr>
<td>Stanford (~FY14)</td>
<td>80%</td>
</tr>
<tr>
<td>Univ. of Florida (FY14)</td>
<td>66%</td>
</tr>
<tr>
<td>Northwestern Univ. (FY14)</td>
<td>73%</td>
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<tr>
<td>Univ. of Chicago (FY13)</td>
<td>74%</td>
</tr>
<tr>
<td>Iowa State (FY15)</td>
<td>53%</td>
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<tr>
<td>Penn State (FY14)</td>
<td>62%</td>
</tr>
<tr>
<td>Rutgers Univ. (FY14)</td>
<td>53%</td>
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<tr>
<td>UC-Davis (FY14)</td>
<td>53%</td>
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<td>UC-Irvine (FY15)</td>
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<td>UC-Santa Barbara (FY15)</td>
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<td>Univ. of Kansas (FY14)</td>
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<td>Univ. of Minnesota (FY15)</td>
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<tr>
<td>Univ. of Oregon (FY15)</td>
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<tr>
<td>Univ. of Washington (FY15)</td>
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<tr>
<td>Princeton (FY14)</td>
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<tr>
<td>Univ. of Rochester (FY15)</td>
<td>75%</td>
</tr>
<tr>
<td>Univ. of Wash.- St. Louis (FY15)</td>
<td>75%</td>
</tr>
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</table>
Breakdown of CU-Boulder Research Funding Awarded FY14

Federal = 80%
NREL = 1%
Other Univ. = 7%
Industry = 4%
Foundations = 3%
Organizations & Assoc. = 3%
State of CO = 1%
Foreign = 1%
Federal Funding of Research on University Campuses
Federal Funding of Research on University Campuses

- Tax Dollars
- Federal Grant
- Direct Costs
  - Research
  - Scientist salaries, cost of equip & supplies
Federal Funding of Research on University Campuses

Tax Dollars

Federal Grant

Direct Costs

Research

Scientist salaries, cost of equip & supplies

F&A (Indirect Costs)

Dept Indirect Costs

University Indirect Costs

Federal Grant $
Federal Funding of Research on University Campuses

Tax Dollars $ → Federal Grant $ → F&A (Indirect Costs)

- Scientist salaries, cost of equip & supplies
- Direct Costs
  - Research

F&A (Indirect Costs)

- Dept Indirect Costs
- University Indirect Costs

Pays for...

University costs to support research

- Energy
- Water
- Trash
- Safety
- Maintenance
- Building Use
- Custodial
- Admin
- IT & More
Why are university scientists facing tough competition for federal funding?
Non-defense US federal funding (blue line) plateaued in 2003
National Science Foundation Budget
Budget Authority in billions of constant FY 2015 dollars

Source: NSF budget requests and AAAG R&D report series. FY 2015 figures are estimates. © 2015 AAAG
NIH funding 1998-2015

National Institutes of Health Budget, 1998-2016
budget authority in billions of constant FY 2015 dollars

Source: AAAS Report: Research and Development series and agency budget documents. FY 2015 figures are latest estimates, FY 2016 is the President’s request. © 2015 AAAS
Increasing US university research sq.ft.

Net Assignable Sq. Ft. (in millions)


89% growth between 1988 & 2013
Growth of doctorates (science, engineering, health) employed in US academia

Number of doctorates (thousands)


50% growth between 1987 & 2010
Space is growing faster than doctorates working in US academia

20% increase between 1990 & 2007
Scientists facing rising competition for federal funding

- Small or lack of increases in federal research funding
- More university scientists competing for federal funding
- Inflation decreasing buying power of federal funding

Result: Rising competition for federal funding
Decreasing success rate for NIH grants
With inflation, buying power of federal funding has also decreased

20-25% loss in purchasing power of NIH budget since 2003 even though budgeted amounts have stayed around $30 billion.

Source: Historical obligations data and BRDPI deflators from the NIH budget office. © 2015 AAAS
NIH asking for more funding

Before: 1/3 of grants funded

Now: 1/6 of grants funded
NIH received $2 billion boost...only restores less than a third of purchasing power lost

20-25% loss in purchasing power of NIH budget since 2003 even though budgeted amounts have stayed around $30 billion.

Source: Historical obligations data and BRDPI deflators from the NIH budget office. © 2015 AAAS
Will the competition continue?

Yes!

→ Federal government does not show signs of increasing funding for research at the rate that was done prior to 2003.

→ Presently, universities are continuing to grow research on their campuses putting more demand on federal funds.
So, how can we do more with existing federal funding?

NIH asking the same question:

Request for Information (RFI): Optimizing Funding Policies and Other Strategies to Improve the Impact and Sustainability of Biomedical Research

Notice Number: NOT-OD-15-084

Key Dates
Release Date: April 2, 2015
Response Date: May 17, 2015

Efficiency stretches research funding
Greening Grants is about connecting efficiency and sustainability with federal research funding

Efficient use of resources:

• Maximizing effective use of federal research funding

• Minimizing the environmental footprint of research
Where do inefficiencies exist in the present system and what are the consequences?
Missing Sustainability/Efficiency Connections in University Research Funding:

1. Federal grant application process & spending of those dollars (direct costs)

- Tax Dollars
- Federal Grant
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  - Scientist salaries, cost of equip & supplies
- F&A (Indirect Costs)
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During the grant application process and spending of those dollars, there are missed opportunities for federal granting agencies to ask or encourage scientists to:

1. Select lab equipment and processes that are energy/water/material efficient

2. Make use of equipment assets already on campus

3. Utilize lab space and fume hoods efficiently

4. Share equipment purchased on grants with other campus scientists
Individual space with individual resources leads to more space than necessary and duplication

Individual spaces with individual resources leads to “ownership” mentality for space and equipment, which leads to duplication
Duplication of Equipment
Lack of awareness of what equipment resources exist on campus
Uniform Guidance CFR 200.313 c2
“must also make equipment available for use on other projects or programs currently or previously supported by the Federal Government, provided that such use will not interfere with the work on the projects or program for which it was originally acquired.”:
http://www.ecfr.gov/cgi-bin/text-idx?SID=597cf895a4e1859ccf447c54c795d4b3&node=se2.1.200_1313&rgn=div8

Uniform Guidance CFR 200.318 d
“must avoid acquisition of unnecessary or duplicative items”:
http://www.ecfr.gov/cgi-bin/text-idx?node=2:1.1.2.2.1.4.31&rgn=div7
Lack of sharing results in equipment duplication

Some may say: But cutting back on the more general use equipment is not really going to saving a lot of federal research funding.
Now we are talking about a lot of $$$: Laboratory space is one of the most expensive university spaces to build and maintain. It is also one of the most energy intensive spaces on campus.
Missing Sustainability/Efficiency Connections in University Research Funding:

1. Federal granting process & spending of those dollars (direct costs)
2. Indirect costs (F&A) process

University costs to support research:
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Tax Dollars $ → Federal Grant $ → Direct Costs:
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- Scientist salaries, cost of equip & supplies

F&A (Indirect Costs):
- Dept Indirect Costs
- University Indirect Costs

Pays for $
Federal funding to universities for overhead costs is significant

*Nature 19 Nov. 2014 “Indirect costs: Keeping the lights on”:

- 2013: $5.7 billion of NIH’s $22.5 billion went for indirect costs

- Facilities and Administrative Rate (or F&A rates) for universities are between 20% and 85%

- Typically F&A rates (a.k.a. Indirect Cost Recovery rate or ICR rate) are in the 40%s, 50%s, 60%s

- But, because there are expenses that do not qualify for F&A, average effective rate for universities is really 31%
More information on F&A (a.k.a ICR)

Negotiation between university and federal government occurs every 3-4 years. Universities create extensive report justifying the F&A rate request focused on a single base year.

How is it calculated?

F&A Rate = \[\frac{\text{F&A expenses supporting research}}{\text{modified total direct costs}}\] \times 100

How does rate work?

• Rate = 53%
• Grant for $1,000,000
• University will receive $530,000 for overhead costs (this in addition to the $1,000,000 the scientist has been awarded)
Space is an important factor in the F&A rate calculation

Two general components of overhead costs:
1. Administrative costs (capped at 26%)
2. Facilities costs (not capped)
   - Building and equipment depreciation
   - Operations & maintenance of facilities
   - Other (library, interest on facility debt)

Facilities costs calculation greatly depends on space assigned to federal funded research:
- the greater the space
- the higher the F&A rate
- The higher the F&A rates for universities, the less federal funding available for direct costs of research
The F&A process requires universities to report costs, but misses opportunity to ask for efficiency

1. Lacks asks for efficiency in the use of energy, water, etc.

2. Lacks requests for efficient, effective use of research space

Thus, inadvertently the process perhaps allows for inefficient use of space and helps justify continuing growth of research space. After all, the more space connected with federal funding the higher the F&A rate.
Likely the trend that large research universities are used to:

Awards through FY 2014

Source: VCR Office website, CU-Boulder

As US universities think about continuing to expand research space…

• Federal research funding is not growing like it did prior to 2003, and is being stretched and stretched

• Federal F&A dollars will only come in if scientists are able to bring in federal grants
Missing Sustainability/Efficiency Connections in University Research Funding:

1. Federal granting process & spending of those dollars (direct costs)
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3. Universities generally do not connect occupants with overhead costs

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Tax Dollars $
Facilities Management Funding for Efficient Lab Equipment Purchases

Up to 5 yrs of energy or water savings:

- Equipment replacements
- New equipment

Reach out to CU Green Labs for Facilities Management dollar incentives for your lab.
Missing Sustainability/Efficiency Connections in University Research Funding:

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University costs to support research pays for:
- Direct Costs
- F&A (Indirect Costs)
Inefficiencies mean a greater environmental footprint for research.
Inefficiencies mean scientists spending more and more time writing grants.

Less time doing research

+ Focusing on projects that are likely to get funding
Greening Grants would improve both of these issues
Greening Grants: Are there connections to federal funding that can encourage:

1. Sharing equipment
2. Making use of existing equipment resources already on campus
3. Use of campus lab space and fume hoods efficiently & effectively that fit present researcher needs rather than historical needs
4. Selection of lab equipment and processes that energy/water/material efficient where possible
Some Considerations in Greening Grants

• Should it avoid the selection process for grants?

• How to implement without unwelcomed increase in administrative burden
Need to avoid or minimize administrative burden

155 universities, 10 federal agencies

“purpose is to reduce the administrative burdens associated with research grants and contracts.”
Some ideas for starting to make the connection
Actions to start

Federal Granting Agencies:

1. Raise awareness about CFRs

2. Encourage
   - Efficiency in general
   - Making use of equipment resources already on campus
   - Sharing equipment resources that are purchased
   - Listing purchased equipment on a campus shared instrumentation tool
UC-Santa Barbara Shared Instrumentation Tool

- Green Labs in collaboration with VCR

www.sharedinstrumentation.ucsb.edu
Actions to start

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2. Encourage
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   - Making use of equipment resources already on campus
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3. Incorporate voluntary section in grant applications where scientists could include actions for efficiency
Actions to start

Federal F&A Process:

1. Incorporate voluntary section in F&A application where universities could include what they are doing to minimize overhead costs on the topics of:

   • utilizing research space efficiently & effectively

   • promoting energy efficiency & water efficiency in research spaces
Actions to start

VCR office:
1. Provide tools such as a shared instrument website

Scientists:
1. Start writing into grant proposals actions for efficiency with direct and overhead costs.
   • Your proposal stand out verses other proposals
Scientists can influence the culture...

Scientists write the grant proposals

Scientists judge grant proposals
Scientists can influence the culture...

Scientists write grant proposals

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- Scientists write the grant proposals
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Actions to start

Planning, Design, Budget, etc.:

1. Taking into consideration the present financial climate for federal research funding when thinking about growing research space

2. Promote managed shared equipment in shared spaces with scientists
   • Provide positive examples and its benefits over individual space with individual equipment
Turns out that managed shared equipment in shared spaces benefits science and scientists:

- Saves funding
- Saves time
- Attracts talent & promotes collaboration
- Benefits space & equipment utilization
- Compliance with CFRs
- In line with campus sustainability goals
Greening Grants is a win-win. It is in everyone’s best interest.

1. Scientist → more money for research & easier access to equipment resources
2. Tax-payer & government → better use of federal dollars
3. University → resource efficiency and financial benefits
4. Environment → reduced research footprint
Greening Grants Meeting at DOE Summit in Washington DC
May 10, 2016, 2PM-5:30PM

Join us!

Efficient use of resources

- Maximizing effective use of federal research funding
- Minimizing the environmental footprint of research
Join the I²SL University Alliance Working Group focused on the topic of Greening Grants

QUESTIONS?

Contact Information:
Kathy Ramirez-Aguilar
kramirez@colorado.edu
www.colorado.edu/ecenter/greenlabs