

# Spatial Analysis of Externally Funded Research Activity at the University of Missouri

Diane Oerly – oerlyd@missouri.edu

GIS1 Class, Fall 2008, Dept. of Geography, University of Missouri, Columbia, MO

## Introduction

Understanding a place like the University of Missouri can be expanded by a visual representation of the activities that occur here. An example is the import and significance of externally-funded research. As an unusual combination of a land-grant research university, MU balances three major activities: teaching, research & outreach/extension. MU's FY08 Budget is \$1.75 Billion. Externally-funded research in FY08 exceeded \$200 million.

School/College	FY05-07 Average Expenditures		Fall 07 % of Faculty	Fall 07 % of Students
	\$ % of total	% of total		
Ag, Food & Nat. Resources	36,553,031	21.6%	11.4%	9.2%
Arts & Science	20,821,149	12.3%	29.9%	33.1%
Business	130,840	0.1%	3.3%	15.7%
Education	14,152,906	8.4%	5.0%	7.6%
Engineering	11,191,293	6.6%	6.0%	8.0%
Extension	9,312,153	5.5%	0.1%	0.1%
Grad School	3,446,782	2.0%	1.0%	1.5%
Human Env. Sciences	4,747,297	2.8%	2.8%	5.5%
Health Professions	1,787,152	1.1%	2.2%	3.7%
Journalism	1,265,224	0.7%	3.7%	8.0%
Law	191,743	0.1%	1.7%	1.9%
Library	151,302	0.1%	0.1%	0.1%
Medicine	36,749,330	21.7%	25.1%	1.6%
Office of Research	10,130,499	6.0%	0.3%	0.3%
Nursing	3,731,224	2.2%	1.3%	3.0%
Veterinary Medicine	14,834,407	8.8%	6.2%	1.2%
Subtotal sch/colleges	169,196,330	100%	100%	100%

MU is organized into schools and colleges which have varying amounts of these activities. For example, Arts & Science teaches more than 1/3 of the total credit hours and has 1/8 of the grants while Medicine generates over 20% of the grants, and educates less than 2% of the students.

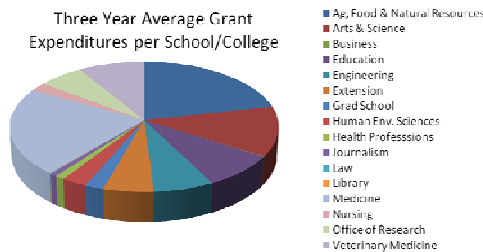


Fig. 1. Distribution of grant expenditures by school and college

## Methods

- Step 1 – Gather external-funded grant expenditures from the Office of Research web site. Organize in Excel, weed out errant data, calculate average of FY05-FY07.
- Step 2 – Acquire data on full-time equivalent (FTE) numbers of faculty.
- Step 3 – Request and receive shapefiles of campus buildings and roads from.
- Step 4 – Identify a location for each department
- Step 5 – Combine the data – since ArcGIS join and relate did not work, I had to gather X and Y for relevant buildings from the shapefile and add that data to Excel file.
- Step 6 – Import the expenditures data in ArcMap
- Step 7 – Use ArcGIS and other tools to analyse and present the data.

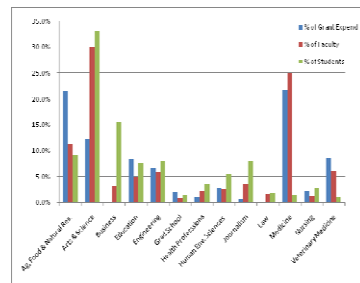


Fig. 2. Comparison of types of activity performed by schools and colleges (Each bar represents that school or colleges percent of total)

## Results

- Analysis of Grant Activity by School/College
- Analysis of Numbers of FTE Faculty and Numbers of student credit hours taught (FTE Students) along with grant activity by School/College
- Map of grant activity by School/College
- Map of grant activity by Department

## Acknowledgments

1. This work was created for GIS1 Final Project, Fall 2008 taught by Dr. Yingkui Li & Jere Steele.
2. Thanks to the U. of Missouri employee benefits which funded 3/4 of my tuition costs.

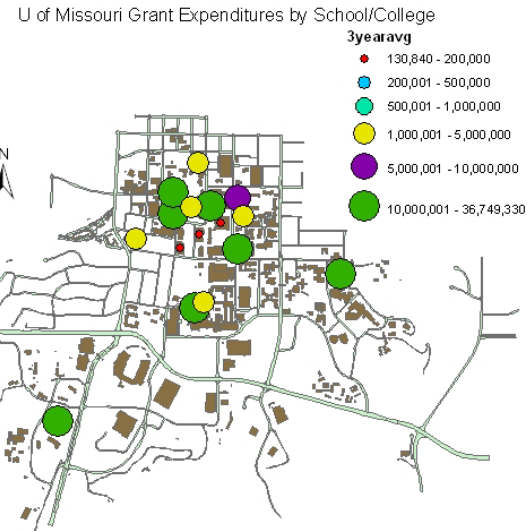


Fig. 3 Graduated symbol representations of the fifteen schools and colleges at MU that generate significant amounts of grant activity

U of Missouri Grant Expenditures by Department

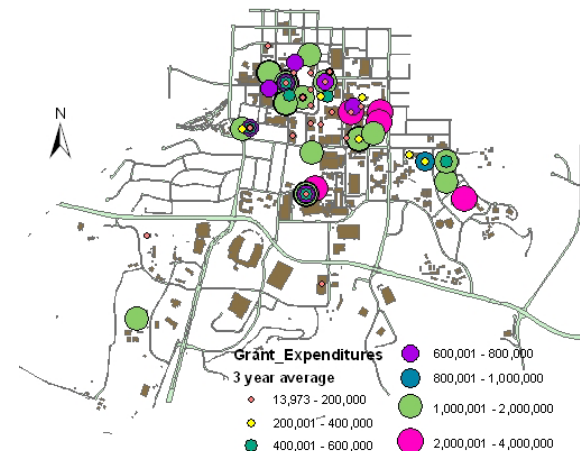


Fig. 4. Graduated symbol representations of the over 100 departments at MU that have significant amounts of grant activity

## Conclusions

(Or, what's so spatial about this data?)

1. Reliable data is difficult to find – even with good organizational contacts.
2. Assigning place to data (georeferencing) can be challenging especially when the software does not perform as hoped.
3. Even for data that does not have a strong spatial connection, a map can be very useful in understanding data.

## Data Sources

Intro info: <http://www.missouri.edu/about/mufacts.php>

Expenditures data: Office of Research Web site: <http://research.missouri.edu/2007/query.htm#>

MU's Office of Institutional Research - data on Ranked Faculty FTE and student FTE

Campus addresses for departments, are from "Find A Department" at: <http://www.missouri.edu/directories>

MU Campus Facilities provided ArcGIS Shapefiles of campus buildings and streets and roads.