

# External Funding of Atmospheric Science Programs in the United States

More Than the Cost of a New Professor

BY ALAN ROBOCK

In the unending quest for new faculty positions at major universities, we meteorologists are in the enviable position of being able to argue that we can bring in more external funding, on average, than a university would have to spend on the position. When I made that claim recently to administrators at Rutgers, they seemed surprised. In discussions with colleagues at the AMS Annual Meeting in Seattle, Washington, in January 2004, many people told me that they had the same impression as I did, but nobody had any data that I could use. I therefore undertook a small research project to back up my contention and present the results here in hopes that others can use the information for similar purposes.

Table 1 shows the results of my survey. I classified the programs as to whether or not they had an undergraduate meteorology program. I asked the department chair for the latest data on annual external funding and the number of full-time-equivalent tenure-track faculty members. For departments with programs in which atmospheric science was the expertise of only a portion of the department, I asked for information on only those members. I tried to include all the major atmospheric science/meteorology departments in the country.

Several interesting observations can be made from the results here. First, the average external funding is \$450,000 per full-time-equivalent faculty member. This includes overhead return to the university; sup-

port for graduate students, postdocs, and research faculty; summer salaries; travel for research missions and to conferences; and the cost of research equipment. Clearly, the investment that a university would make in a new faculty member—even including benefits and office and laboratory space—would more than pay for itself. It is also important to remember that most atmospheric science faculty do the majority of their work with computers, so they have smaller startup costs than the average scientist. This also means that a higher fraction of the funds that we bring in goes to student and postdoctorate salaries.

At many universities, non-tenure-track faculty, variously called research professors or research scientists, operate their own research programs, and support students and other research staff. Their funding is included in the total here, but their faculty positions are not. I would argue that the tenure-track faculty establish the core intellectual climate of each department, which attracts the research faculty, and that university support and long-term commitment is only available for the tenure-track faculty, so that calculating the average funding per tenure-track faculty member is a fair way to do the evaluation.

Second, the three departments without undergraduate programs bring in almost twice as much money per faculty member as do the others. Curiously, both the University of Colorado and the University of Maryland have been successful in convincing their administrations that they do not have the resources that are necessary to operate an undergraduate program. Having been at the University of Maryland for 20 years, and now at Rutgers, which has a large undergraduate program, for 7 years, my personal experience has been that teaching and working with undergraduates is very rewarding, and I wish that I had been able to do so during my time at Maryland.

Third, the average level of support does not seem to be a function of the size of the department or at-

**AFFILIATIONS:** ROBOCK—Department of Environmental Sciences, Rutgers University, New Brunswick, New Jersey

**CORRESPONDING AUTHOR:** Alan Robock, Department of Environmental Sciences, Rutgers University, 14 College Farm Rd., New Brunswick, NJ 08901


E-mail: [robock@envsci.rutgers.edu](mailto:robock@envsci.rutgers.edu)

DOI: 10.1175/BAMS-86-3-337

©2005 American Meteorological Society

**TABLE 1. Average annual external funding for atmospheric science/meteorology programs in the United States that responded to my survey. One department did not respond to several e-mails. FTE is full-time-equivalent tenure-track faculty members. Average funding is the total funding divided by the total number of FTEs (excluding Nebraska and Missouri).**

University	FTE	External funding (\$)	Per FTE (\$)	Source (from dept. chairs or their staff)
Pennsylvania State	25	6,250,000	250,000	Bill Brune, 16 Mar 2004
Oklahoma	18	15,050,000	836,111	Fred Carr, 4 Mar and 9 Aug 2004
Florida State	15	6,000,000	400,000	Bob Ellingson, 9 Mar 2004
Georgia Institute of Technology	14	7,320,740	522,910	Judy Curry, 4 Mar and 14 Jul 2004
Texas A&M	14	4,500,000	321,429	Richard Orville, 2 Mar 2004
Massachusetts Institute of Technology	13	11,000,000	846,154	Maria Zuber, 5 Mar 2004
Washington	13	6,500,000	500,000	Dennis Hartmann, 2 Mar 2004
Illinois	12	2,719,000	226,583	Don Wuebbles, 1 Apr 2004
University of California, Los Angeles	12	6,642,000	553,500	Kuo Nan Liou, 22 Mar 2004
University of Wisconsin—Madison	10	1,857,381	185,738	Jan Richmond, 19 Mar 2004
University of California, Davis	9.75	2,850,000	292,308	Mary McNally, 16 Mar 2004
Utah	9	2,300,000	255,556	Ed Zipser, 4 Mar 2004
Purdue	9	1,200,370	133,374	Harshvardhan, 18 Mar 2004
Wyoming	8	3,470,000	433,750	Terry Deshler, 3 Sep 2004
State University of New York at Stony Brook	7.5	1,700,000	226,667	Minghua Zhang, 3 Mar 2004
The University at Albany, State Univ. of New York	7	1,416,075	202,296	Sally Marsh, 11 Mar 2004
Arizona	6	2,700,000	450,000	Steve Mullen, 3 Mar 2004
Ohio State	6	1,324,699	220,783	Morton O'Kelly, 24 Mar 2004
Iowa State	5	1,125,000	225,000	Carl Jacobson, 3 Mar 2004
Nebraska	5			Ken Dewey, 15 Mar 2004; cannot do—they are currently merging two programs
Indiana	4	1,575,000	393,750	Sue Grimmond, 18 Mar 2004
Rutgers	4	1,580,471	395,118	Melissa Arnesen, 13 Mar 2004
Cornell	4	1,521,736	380,434	Steve Colucci, 21 Oct 2004
Missouri	3	50,000	16,667	Anthony Lupo, 3 Mar 2004; program has too many teaching demands, no time for research
Kansas	2			Did not ask—program too small
<b>Universities without undergraduate programs</b>				
Maryland	13	9,000,000	692,308	Russ Dickerson, 4 Mar 2004
Colorado State	11.67	11,000,000	942,857	Steve Rutledge, 4 Mar 2004; each faculty member only supported for 7 mos. from state
Colorado	10	6,869,824	686,982	Brian Toon, 4 Mar 2004
<b>Total</b>	<b>262.92</b>	<b>\$116,000,560</b>		
<b>Average external funding</b>			<b>\$446,994</b>	



mospheric science group within the department, except for the smallest one at the University of Missouri. Professor Lupo seemed apologetic when he sent me his numbers, fearing that they would not help my case. I told him, on the other hand, that he presents a case for a department that is not too small, and that I hoped my data could help him expand his program.

Fourth, I was pleasantly surprised by the high rate of response to my survey—28 of 29 requests (97%) were answered. I think this speaks to the pride of all the departments in their ability to garner federal, state, and other support for their work. Major sources of research support include NOAA, NASA, and the National Science Foundation, with substantial additional support coming from the Environmental Protection Administration and the Department of Energy. I know of no other field of research where such broad support is available, and I attribute it to the recognition that the work that we do and the results that we obtain are very important and useful to a broad range of society.

Finally, no attempt should be made to make specific institution-by-institution comparisons from this table. The data simply represent a first cut at a level that is sufficient to support the overall argument. Variations in faculty seniority, institutional peculiarities (such as overlap with institutes and centers), and year-to-year variability all combine to make detailed comparisons from the data inappropriate.

During the ceremony to open the new office building for our department at the University of Maryland 10 years ago, the president of the university, William English (Brit) Kirwan, announced proudly that the Department of Meteorology brought in \$5.50 in external funding for every \$1.00 in university support. Our department chair, Bob Hudson, called him aside afterward and told him, “You know, Brit, that ratio is too high.” In reply to the look of amazement on Brit’s face, he told him, “The level of external support is not too high—it is the level of university support that is too low.” I hope that the results of this survey will help you to make the same argument.

**ACKNOWLEDGMENTS.** I thank all the department chairs for answering my survey. I thank Lily Young for inspiring this study, and Tony Broccoli, Ed Zipser, Steve Rutledge, Steve Mullen, Bill Hooke, Fred Carr, and Bob Ellingson for valuable comments. This work was supported by the New Jersey Agricultural Experiment Station.