



INSIDE RFF

Putting People in the Picture

Resources talks occasionally to RFF's researchers about their personal goals, outlooks, and expectations as they go about their work day to day. This profile features Molly K. Macauley, a senior fellow in the Energy and Natural Resources Division.

Senior Fellow Molly K. Macauley has helped to build the field of space economics. That's outer space—not real estate. The field is still so tiny that folks are apt to jump to the wrong conclusion, Macauley laughs. Thinking of outer space as a natural resource and applying economic principles to its allocation are still somewhat obscure notions. It took about five years before Macauley could attract any outside funding for her research at RFF. And it took the same period of time, she adds, to overcome the rap that, as an economist, she was rather alien herself, ready to reduce the thrill of space exploration to a lot of number crunching.

What kept her going, Macauley says, was the encouragement she received from her colleagues. Macauley was a new Ph.D. fresh out of Johns Hopkins University when she came to work for RFF in the mid-1980s. Senior staff had occasionally thought about outer space as a natural resource, but no one had pursued the idea until Macauley came along. As she took up the subject, she used to have long talks with Senior Fellow Allen Kneese, known for pioneering the field of environmental economics.

"Maybe he was just speak-

ing metaphorically," she recalls, "but I remember him saying that when he first advocated taking a market-like approach to understanding the environment he used to be blackballed in Congress and elsewhere because it seemed heretical to put a dollar value on the environment.

I've sometimes felt like I've gotten the same reaction to space economics, that people have found it heretical to talk dollars and cents about a quest that has these spiritual, emotional, and philosophical dimensions."

"Allen's counsel," she remembers "was always to go forward with the best economic analysis you could do. And that's what I've tried to do. Even when it hasn't been very popularly received."

Over time, attitudes have

changed. People have become more aware of the contribution that economics can make to space exploration and development. The National Space Society cited Macauley as a "rising star." Commercial activities in space have grown, too. No longer the exclusive

province of government, space is now filled with private-sector competitors in telecommunications as well as in newly privatized ventures such as remote sensing, where satellites take pictures of

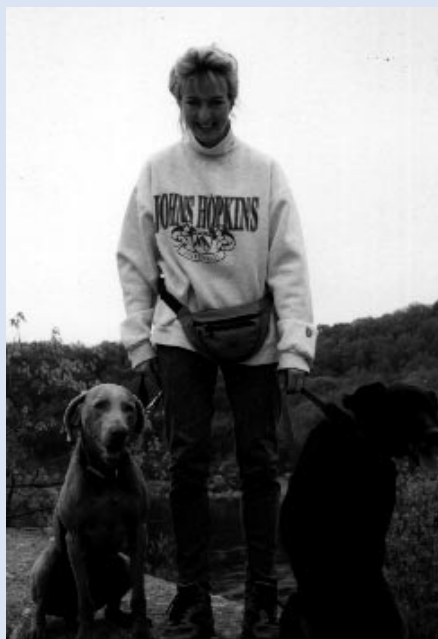
objects on Earth and send them back down for sale.

And nowadays Macauley gets a serious hearing on Capitol Hill. She is invited to testify fairly regularly on the pros and cons of legislation to foster space industry growth. Based on her recommenda-

tions, Congress has decided to give a voucher program for space transportation a try. The demonstration program operates on concepts that Macauley developed. The vouchers work much like the ones used for education, only in this case scientists pick and choose among a number of commercial alternatives to the government space shuttle to launch experiments that need to be done in outer space.

"Really all I've been doing," she says, "is applying RFF's traditional toolkit to space as a natural resource." It's a great time to be weighing in, she adds, since the regulation of space-related activities is still new. "We're able to apply some of the lessons learned from the regulation of environmental quality, for example, and try not to make the same mistakes."

Macauley's contribution to the development of outer space is a testament to the virtues of serendipity. Never a Trekkie or a science fiction buff, she says an internship at the Communications Satellite Corporation actually led to her interest in space. Once on the scene, however, it didn't take her long to find that COMSAT lawyers and engineers were grappling with issues that could be clarified by economic analysis.



Molly Macauley, Morgan, and Jeeves

One problem was how to allocate satellite locations in the geostationary orbit that girdles the Earth about 22,300 miles above the equator. Certain locations along the orbit were increasingly congested because they were prime real estate for communications satellites. Instead of using customary administrative procedures to match satellites with locations in ways that did not account for supply and demand, Macauley suggested the idea of applying some of the principles of urban economics, a field that RFF coincidentally had pioneered in the 1970s.

"To cope with the scarcity of land downtown you economize by building up, building skyscrapers," she explains. Likewise, there are only so many choice locations in the geostationary orbit. From certain locations you can see Europe and the United States and interconnect the two for telecommunications purposes. Other locations are out over the ocean and thus a sort of boondocks.

"Many nations were clamoring for access to 'downtown,' if you will. So I thought if downtown were properly priced per acre you'd have capital-intensive satellites, economizing on the orbit just like skyscrapers economize on land. And in the so-called boondocks you could have a very simple satellite, operating with just the basic technology."

The idea became the basis of Macauley's dissertation. Once she arrived at RFF, she

was able to refine some of her analysis by drawing further on her new colleagues' work. The cross-fertilization cuts both ways, since some of her colleagues at RFF have joined Macauley to put the principles of environmental economics to work in outer space.

Right now, for example, she and Fellow David Austin are helping NASA's Jet Propulsion Laboratory develop a set of measures to assess the efficiency and cost-effectiveness of some of their technology-transfer efforts. With Senior Fellow Tim Brennan, she is studying the economic value and use of information about Earth's environment and climate; this information is gleaned from space-based satellites taking photos and other measurements of Earth processes.

So what is on Macauley's wish list? If she could determine the future of space exploration and commercial activity, what would she like to see? NASA's mission should be streamlined, she says, to focus more exclusively on R&D, the study of the planets, and space science. "What is the origin of the universe? That sort of question."

Right now, the space agency's authorization mission may be too broad, she thinks. "Unfairly so, because it has too many constituencies to which to answer." Although there is money to be made in space, she would like to leave the opportunities for commercial activity to the private sector.



THE GALLERY STUDIOS

The greening of America's profits

Can companies profit from operating clean and green? And do their environmental records have any bearing on how they are valued in the stock market? These were among the questions that some sixty corporate managers, investment advisors, environmentalists, and researchers considered when the RFF Council held its eighth annual meeting in Florida this past spring.

Pictured here are Council member Bob Woodall and guest Jim Hendricks of Duke Energy who chatted during a break in the sessions presented under the umbrella topic, "Corporate Environmental Performance and the Bottom Line."


Instead, NASA should visit comets, asteroids, and planets, which raises another controversy about whether robots or people should go. "Some say you need to keep people involved in the space program to maintain support. There's a saying to that effect: 'no bucks without Buck Rogers.'" Both sides have their merit, she says. What's important is that the exploration take place.

The very boom in space activity has its worrisome implications for the future, however. Will the thrill we felt when a man first walked on the moon soon be gone, Macauley wonders. The realization that we now use a satellite

to make a phone call has already faded into the background. Will young people support a space program when virtual reality games can make them feel like they've already been there and done that?

There's no way to tell, but a NASA mission that focuses on good, high-quality science might help lead us back to the origins of our quest, Macauley believes.

One more wish: She would love to fly on the space shuttle.

 For more information about Macauley's current research projects and her recent research outputs and publications, go to http://www.rff.org/about_rff/web_bios/macaleuy.htm.