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AN INSTITUTE FOR THEORETICAL ECOLOGY? PART II: THE CONCEPT OF "CENTER" - CRITIQUE AND A NEW DESIGN[1]

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Abstract. Part II of the five part series on Theoretical Ecology provides both a critique for large "Centers" that focus on a particular discipline, and suggestions to correct the flaws that are perceived. The overall theme of the discussion continues to be an argument for the design and establishment of an institutionalized program of study for Theoretical Ecology. Part I (Conley 1990) of the series provided a discussion of definitions of "Theoretical Ecology". In Parts III (Conley 1991a), IV (Conley 1991 b) and V (Conley and Brunt 1991c), I offer in increasing detail, the case for establishment of such an Institute, and some of the activities and methods that would enhance the chances of its' success.

Introduction

The rush to "Centers" is on. Some are called Biological Research Centers, some are called Biological Facilities Centers. A new U.S. National Science Foundation program calls them Science and Technology Centers. Older ecological programs supported centers but called them Biome sites (the International Biological Programme), some of which had smaller centers called validation sites. The U.S. Department of Energy supports its' National Laboratories which have centers variously called Environmental Sciences Divisions, also represented by the seven National Enrivonmental Research Parks. Emerging programs will involve ecologists in global biology and atmospherics sciences (through the International Geosphere Biosphere Programme). In the U.S. there are also the 17 Long Term Ecological Research (LTER) sites supported by the Division of Biotic Systems and Resources of the National Science Foundation. There are also a few successful private and university based institutes and field stations that qualify in practice for the title of "Center". Some of these programs are, of course, doing excellent work, others exhibit more moderate success.

The fundamental principles behind Centers involve sharing of ideas and expensive facilities. For the most part, ideas can be shared in other ways. That is, you do not need a Center to get together and discuss common interests. This is already going on at any of the myriad of meetings, workshops, and gatherings that ecologists have used since there have been ecologists. Conversely, ecologists typically go to meetings with other ecologists, and innovative approaches often arise from a blending of disciplines. Thus, a Center should - more later on how - serve to bring disciplines together.

For the most part, expensive equipment seems to serve as the prime reason for many Centers. Promoting such sharing allows access to better equipment, and perhaps better technical support than would be otherwise available. Other reasons for Centers include a focus of research expertise, a place to go to learn new techniques, opportunity to develop really expert technician support, a place to go to rub elbows with experts, a coordinating unit to maintain current information and methodology, and a place that administrators of research funds can concentrate on. The latter, of course, can be important. If a program manager sees a lot of similar requests coming in, it may make sense to focus those interests in a Center.

It is obviously not possible to spend a few hundred million dollars (or a few billions) for a high-energy physics facility at every university that has expertise in high-energy physics; or even at every university that has considerable expertise in high-energy physics. Thus, super-projects must exist. It is less clear just what expensive equipment ought to be centralized in ecology. New applications of innovative laser, infrared, and sonar technology might qualify. Centralizing expertise in Computational Ecology with respect to specialized hardware and applications software might qualify. A Center that emphasized research and training in biophysical measurements might be worthwhile for field ecology. Other fundamental support services could be described. Note that none of these seem to have the sheer size component that applies to the super-computer Centers, or to the high-energy physics Centers. Instead of dealing with hundreds of millions,

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the ecological centers appear to involve only a few millions of dollars.

But note that the concept tends to focus on researcher support - support for gaining new appreciation, for learning new methods, for working with technical specialists, for using new equipment, for organizing various gatherings of interested participants, and for just getting out of your home location for a period of real concentration on a problem. The educational component, from beginning students through senior investigators, is also an important part of successful Centers. To be sure, there is an underlying topical research component, but important research might well involve how to make the support programs better, or how to better serve as a catalyst for new ideas and opportunities. In this sense, the Center would facilitate some new science, drawn out through the visitors and participants that are not among the few permanent residents.

Should there be a Center to study kangaroo rat demography? How about one for plant root nutrient uptake? Another for producing base pairs sequences for an annual species of plant or of a bacterium? These examples seem to me to fall outside the fundamental criteria for Centers in that they deal with the application of ideas and methods that one might expect to emanate from a real Center. Thus, a Real Center might emphasize fundamental theorizing about demography, and would support work from a variety of disciplines that have potential to contribute. Kangaroo rats would be an appropriate topic for study, but not the reason for the Center. Perhaps modelling should be studied in its' own right, with emphasis on ecological models, and then with applications to terrestrial or aquatic ecosystems or populations. Same thing for genome studies. Same thing for any of the areas of interest that are one, or more, levels above the fundamental emphasis that Centers should have.

For ecology, the inter-disciplinary component is paramount. An ecology Center would properly be a place where experts in ecology, mathematics, computer science, phychology, physics, physical and bio-chemistry, meteorology, geography, and surely others, could gather in some combination to address fundamental approaches to certain questions. Of course, combining all of these disciplines in a single Center would create a Tower of Babel, and additional focus is required. Specific questions would come and go. How much effort can we productively denote to study kangaroo rat demography, or what do you do when (if) you have the genome of species X sequenced, or when a specific model is completed and tests out satisfactorily? You do want to do these things, but they are not the reason for the Center. The fundamental goal of expanding the discipline remains and should be continued. The Center should function to draw experts from relevant disciplines together to solve problems. The Center's programs become the enticement for experts to participate.

An exception exists where new areas of technology are available, and where an opportunity to sort of "ratchet up" a whole field is possible. An example here is in computational support, where a temporary Center might be useful to focus research and training on many sites, and to provide for a quick technology transfer from relevant disciplines. Ecologists are currently buzzing about such things as networks, applications packages of various kinds, hardware of various kinds, machine intelligence, object oriented programming languages, and parallel architectures (among many such other things). In spite of the interest, there is even yet no focus on a program where ecologists can gain information and training, and, relative to what could be going on, we largely remain in a computational stone age. A Center of this sort could well pull the field forward by 10 years. Having done so, it should move on to more advanced issues or cease to exist.

To carry the example further. What if such a Center could manage to focus a concurrent program of research on ways to make the computational support for ecological needs even better? And could then test those ideas in a caldron of activities that the Center organized for real ecologists doing real ecological work? The judgement of worth would then be clear. The Center must serve to transfer new methods to sites that want to concentrate on their own interests - this is done through education, training, and coordination efforts.

The Center must serve as a place where inter-disciplinary teams attack ecological problems. Some of the work that goes on should be looking far ahead, and might initially seem unrelated to topical ecological problems. Inter-disciplinary work is done by arranging for permanent relationships among disciplines. It takes a couple of years for a real computer scientist and a real ecologist to learn to talk to each other on a high enough level to do advanced work. One-week long inter-disciplinary exchanges do not suffice. The Center must serve as a test bed of ideas presented by the inter-disciplinary teams. The testing is done by organizing the inclusion of yet more visitors (length of time is arbitrary) and attacking the method or idea (or theory).

This approach sould be applied to fundamental areas of study in ecology. Thus, the study of the proper characteristics of ecological models might by pursued for its' own sake, and models that related to topical problems should be the examples that provide model evaluation. This approach explicitly emphasizes the comparison of models rather than the development of any particular kind of model. An innovative statistical approach for exploring or testing ecological data could be tested on familiar data sets. When the problems are worked out, the techniques could then be extended to

new data sets where new questions are approached.

If there is promise in the techniques and concepts, the Center could initiate a temporary program to transfer the ideas and methods to all ecologists. If background work (by visitors and residents at the Center) could be approached in a directed inter-disciplinary manner, workshops where the new ideas are applied could be conducted. Thus, one would bring in the data and even more inter-disciplinary experts and go to work on analytical and statistical analyses of the problem. The key point is to make the associations of experts of long enough duration to permit appreciation for other disciplines to develop. Only when an ecologist really begins to understand mathematics or theory in computer science, will they be able to bridge between these disciplines. The same goes for chemistry, meteorology, or molecular methods as might be related to ecological problems. If the Center fosters such relationships on purpose the whole process would be made considerably more productive.

Of course, there are locations where this sort of work model is being practiced now - but not generally in ecology. For the most part, there is no place where not only are the topical questions being addressed, but the more fundamental problem of how to aproach the questions is being researched. The two are not mutually exclusive. What we mostly have now are sites that specialize in answering specific questions of ecological interest. In the current grant review climate this had better involve a stated hypothesis and explicit (replicated) experiments, and some data collections. A research group that desires to study how to better approach statistical problems in ecology, or computational approaches to ecology, or a new prototype (which must be built) of a widgit to measure something deemed of ecological relevance, has a much more difficult time getting funds. You are not doing cutting edge mathematics, computer science, probability, or physics, you are attempting to apply useful aspects of each to ecological questions. You will then want to test your results against real ecological questions. Such work tends to fall between the cracks in existing organizational schemes for research support. In short, the Centers concept is the best way that real inter-disciplinary programs that concentrate on basics can be established and maintained.

A Critique of "Research Center"

Sites that are funded to study a specific topic or local research area lack the fundamental aspect of Centers described above as necessary. They are too narrow, they mostly lack the explicit inter-disciplinary aura, and they have no unselfish service component. Support received by these sites is used primarily to further the work of the on-site participants rather than the discipline at large.

An Institute for Theoretical Ecology (2) sounds like a good idea. It is broad, it could be inter-disciplinary, and it could incorporate the necessary service and support components including training and "technology" transfer. The technology in this case being ecological abstractions including models that emphasized both mathematical and statistical approaches. Importantly, the new Institute would play a major role in the construction of a critical two-way bridge to the empirical facet of the ecology diamond. An Institute for Theoretical Ecology could provide a focus, and a place to come to do foundational work in ecology. It would not need to emphasize data collections, but would provide some balance to the other 98% of the ecological funding picture that does. If it were associated with related programs of field research, the programs of the Institute could combine as a demonstration that could play a leading role in the discipline.

Here are some of the problems that must be considered.

Where Would You Put It? The mere establishment of such a Center with significant funding constitutes a general statement that "... this is where the action is", which carries with it approval of the sort of work that will be going on. If this is really where the action is at, what about all those other folks that are somewhere else? The paradox is that the very act of establishing a Center at an existing location makes a statement about style and vogue. This will first of all create another rush to the ecological theory-of-the-day and second, it excludes all of those good folks who want to pursue other, and equally relevant, notions.

If you chose to put the Center at a currently strong site, you must consider what makes a site appear strong? Usually just one or two dominant figures. Such people frequently move on to other pastures. If the strong ecology program exists at a moderate sized university then they will not get a Center anyhow. Current requirements for contributing matching funding are such that only large, well supported universities can hope to succeed. This adds a clear aura of being able to buy into a Center that has little to do with good science. It also excludes from consideration those sites that have the most potential to make the service and support aspects of the Center most likely to succeed.

How Do You Organize the Center? Almost by definition, Centers are expected to be "self-supporting" in some sense, ans somewhere down the road. This puts the burden on the Center to attract funding from all

2 In what follows, I use the term "institute" to convey the notion that what is ment is something other than a central administrative organization such as is typically found in "centers". This distinction is important to ultimate success of the organizational scheme to be described.

corners so that the Center can continue to exist. Typically, the Center will be directed by a well known scientific figure, funded because of excellent work as demonstrated by the curriculum vitae of the resident scientists, and then expected to get along somehow after the initial funding period. This puts the lead scientists in the position of being essentially full time funding and lobbying agents, and the world class science that is expected is going to get done by someone else, ... maybe. Have a visit with any administrator-scientist of any existing Center and see for yourself that their primary concern must be getting you to write a grant proposal with them so that a portion of the funds could go to Center support. The dual responsibilities - funding and world-class science - are only partially compatible, and one or the other inevitably must give way. This notion of funding also assumes that ability to conduct world-class science is positively correlated with obtaining funding and administrative abilities. Further, since so much effort must be devoted to obtaining additional grant funds just to keep the organization going, there is a significant overhead cost in running the Center that does not explicitly produce answers to scientific questions. This problem does not exist with individual or small-team research.

What Does the Center Do? If you have such a Center, there is a reasonable expectation that some science will be produced - and high quality science at that. If the world-class folks are spending their time keeping the whole thing going, who is doing the science? Well, in the general scheme of things, visitors, and resident post-docs, graduate students, and technicians. The funding at the top is going to a publically funded public relations program. This is so both locally and nationally, as the Center administrative people are constantly called upon to present overviews, tours, and demonstrations of worth - none of which produces answers to any scientific questions.

If the Center is set up to review and dispurse funds for topical research then you have created yet more overhead and administrative load. Why should the funding agency give a Center millions, and have the Center then receive proposals, review them, and fund them for thousands? That is delegating responsibility that should be retained by the agency. The agencies are already geared up for review and funding activities, they generally do it pretty well, and there is no double overhead loading involved. The agencies also have well developed accountability and conflict of interest policies. If the Center programs are going to run into millions of dollars for support of topical research then it would be more cost effective for the agency to hire a program manager to dispense the funds. This puts more money to work for science and less into indirect costs budgets.

How Do You Keep the Center Going? Self-sufficiency of such Centers is largely a myth. Unless they have a very good applied service arm, there is no way to get new funds except to write new grants. What applied services can most Centers offer for sale? While some may do rather well at this, the need to keep attracting an increasing proportion of the funds is distracting to the program, where the best scientists in the group must put their best work into seeking funding. Some of this funding effort is, of course, the typical way of funding science and is desirable for many reasons. In the case of Centers funding, however, this process is greatly exaggerated because of the operations and service burden that must be supported.

One thing is really in your favor if you do get a Center funded the first time. Having invested a few millions and lots of fanfare in a Center, the Program Managers, and the agency and university administrators, are not going to be too willing to see it die on the vine. Their reputations are on the line as well as yours. This fundamental fact of upward mobility sets the stage for a curious and difficult problem. In order to keep the Center going you have to be self-sufficient. Self-sufficiency for a research Center means that you continue to get grant proposals funded. The same program managers that funded your Center in the first place will likely be in a position to influence subsequent proposals that are submitted, and they will want to see them be funded. Dollar amounts that non-Center folks are having to write real and detailed proposals for are going for short "addenda" and "coordinating" activities in the Centers. Funding for "coordinating activities" means that Center members get funds easier than you can for doing much the same thing. This is funding that non-members cannot get, even if they mistakenly find out it is somewhere in the research pool. Funds that are fenced for particular programs deny the very tenet of grant-getting science that only the best proposals get funded. The assumption that the relatively few scientists associated with the Center are the only ones who are doing good work is plainly false.

In short, the whole Center concept in this respect is counter-productive. Good science is still good science, regardless of whether it is conducted by a card-carrying member of a Center or not. All too often Centers are created to be special places, only to subsequently find out that the really innovative research is going on somewhere else, and that the Center has become part of the problem rather than part of the solution. This begs the question. If the kind of work that is going on in the Center is also going on outside the Center, then the Center has no unique reason for existing.

It is certainly true that politically popular programs can generate agency funds that would not have existed in the first place. Thus, if Center funding was over and above funding for individual and other science, there would be less reason to be concerned. The total amount

of funding is, however, finite - and no serious observer can believe that fifty or a hundred millions devoted to Centers does not reduce the chances that individual proposals will ever see any funding. This does not mean that there should be no Centers, it means that the Centers have an extraordinary obligation to justify the funding received.

How Do You Get a Center Funded in the First Place? Well, you write a proposal. The ultimate irony of the first of the National Science Foundations' Science and Technology Centers competition come to mind. Something like a thousand proposals were indicated as intended by the scientific fields of the U.S. About 300 were formally submitted and about 50 received site visits after a full series of panel meetings. Eleven were funded at levels below those of many non-Center multi-investigator projects. The wasted effort invested in researching and writing all of these proposals is quite out of proportion to the number actually funded. It seems fair to wonder if this effort might be more productive if it were being devoted to something other than failed proposals.

Chances are quite good that one of these funded Centers will be in a discipline other than yours. The total cost of the effort, including panels, site visits, and local support for all of the principle investigator efforts, would have funded some nice projects and maybe produced some answers to current questions of importance. If you add in the costs of time and effort for some of the best scientists in the country to devote to 1,000 short pre-proposals and 300 actual proposals, the costs to productive science are staggering.

Guidelines for Centers proposals typically follow the standard dictum to put the science first. But everyone is doing science. For sure, some better than others, but not all good science is restricted to people who are interested in some Center or other. If you put the good-science first, there is no way to separate out what ought to be a Center from simply some good research projects. The additional criteria for Center funding ought to be the inter-disciplinary, service, organizational, educational, and facilitation components mentioned previously. It is these emergent properties that presumably justify the extra overhead of funding science through a Center in the first place.

Thus, if you write your proposal according to the usual guidelines, you are writing it backwards. This is why people who really do have an idea of what a Center ought to be all about have such a hard time getting it put together. This is also why the ad hoc reviewers, panels, and site visit teams have so much trouble with their evaluations. If a Center is to support many research projects, how do you get a survivable discussion of each into a 45 page technical section of a proposal? If you concentrate on just a couple of more elaborate descriptions, you are being too narrow. In any case, if you put all of the science projects in somehow, and only leave a couple of pages for the Center concept that you propose, then how are the reviewers to know that you really have a good idea for a Center as opposed to just another collection of research projects? And why should the agency fund the Center to fund research projects when they should be doing that themselves? If you really emphasize the Center concept, there is little room for credible discussions of the research projects to be supported. If you try to detail a 5 to 10 year effort on topical research projects, you are plainly denying that you will learn something dramatic in Year 2 of your Center funding cycle that you cannot now predict. No 10-years-ago scientist predicted, in detail, experiments and methods generating current excitement in molecular biology or in computational biology. How can we reasonably expect them to do so in a grant proposal. That is not science, it is fortune telling.

A Constructive View of Centers

So what should a Center be like? In spite of the pervasively negative tone of the above discussion, I am convinced that we seriously need something like an "Institute for Theoretical Ecology". In the following part of this paper, and in the several papers that follow in this series, I consider if there is any way to establish an Institute that might work on the long haul. My intent then, is to first develop a general concept of Centers that relates to what I think needs to be done. These are the critical issues to be understood.

- Get the concept straight. In my view, the support, coordination, and emphasis on fundamental aspects of the discipline are paramount. Encouraging inter-disciplinary work is essential. A proper Center is infrastructure and basics, not topical fads. Concentrate on basics - there will be plenty of topical things to use for testing and screening the real ideas. If that works, the folks who operate the Center and the visiting contingent will see that some good science is a result. The Center should function much like a good library, with excellent support and facilities for visiting researchers. If the science that emerges is not qualitatively different from what might be done at any good research site then funding should be discontinued. Use a rigorous merit review process to assure that the work is going well, and that this criterion is met.
- Have the merit reviews of the Center conducted by program managers that do not have a stake in the continuance of the Center. Use the reviews to make things better, and to eliminate the Center when the time of morbidity arrives. Centers receive extraordinary funds, and it is reasonable to expect that there would be an extraordinary review process to assure that there is value received. The

work at a good Center should be qualitatively different from that of small individual projects. It is reasonable to expect that Centers would provide an extraordinary level of innovation and new ideas - ideas that arise from interactions of individuals that would not have occurred without the Center. Judge the work on that basis. This point is a difficult one. This criterion suggests that a Center should produce not necessarily more work, but rather better work. It is not clear just how many Centers manage to perform this role, nor that innovation is somehow more present in a Centers-like environment. I consider the jury to still be out on this point.

- Expect that the Center will be devoted largely to support, working environments, equipment, organization and coordination, and fundamentals. Again, the library analogy applies. Judge the productivity of the Center on the basis of what all participants (visitors and residents alike) in the Center do. If the Center Director is keeping up with things there will be little time to write 8 papers a year. Judge the Center on the quality of science that the participants produce, not on the grant-swinging that the permanent staff may accomplish. Judge the quality of science on whether the products of the Center matter - whether they have influence. This is a long term notion, and includes geneologies and associations as well as mainline influential publications.
- Consider the fact that the Center might well be best directed by a person who is not a world-class scientist, but rather by someone who can emphasize the quality of the support program and infrastructure rather than their own coup stick. Bring in the world class scientists as participants to do some world-class science - and then require that they do or eliminate the funding. To be sure, the Director must not be a failed-attempt at world class work, rather, this position requires an attitude and aptitude for service and helping and coordination.
- Recognize that there will have to be support personnel. For a Center funded at a million dollars per year, budget a public relations representative to give tours, present overviews, and represent the Center on all of the various university and national committees that will suddenly be so important. This may seem wasteful, but it recognizes that these important tasks are probably better done by people who are devoted to the needs. The Center will require both highly-technical and less-technical help. Budget for these positions and judge the productivity on that of the participants not on the resident support people. That puts the burden on the Center to cooperate with the community at large. Indeed, a case could be made that a Center ought to have only a very few fully qualified Ph.D. level scientists as permanent residents, working with a moderate support staff of technical people, all of whom exist for the use of the visiting scientists, who will be doing the real work of the science represented by the Center. Lean is better.
- Eliminate the self-sufficiency clause in the Center concept - either the work of the Center deserves funding and stability, or do something else with the money. There will not be much science done by people who are spending most of their time lobbying for additional funds. If there is to be technology transfer out of the Center, fund a sub-group to concentrate on that aspect of the program. Do not ask that research scientists mix technology transfer and entrepreneurial enterprises with cutting edge science; the conflict here is simply too great. Seek the creation of endowment support. Without a permanent endowment, few Centers will survive on the long run. Encourage the Center to redirect some indirect costs and maybe other funds back into the endowment for the Center. This establishes the habit of a savings account, and instills responsibility in the administration of the Center. This often requires changing some rules and regulations, but it makes the cost-sharing requirement realistic, and it puts the commitment into long term stability where it is really needed. Fund the permanent research staff of the Center at about three-forths annual time. This keeps them hungry and attracts essential funds, but provides needed long term stability that the Center must have if it is to retain good people.
- Establish the nucleus of the Center at a neutral site. The point here is the need to avoid the statement that this-kind of science is better than that-kind when they are simply different kinds. The fundamental emphasis of the Center must work to the benefit of all kinds of science within the discipline. Establishing the Center on a bare-ground patch has appeal. This alternative, however, is expensive, and can only be developed under extraordinary circumstances. The best alternative here seems to be to establish the Center at one of the many medium sized universities where essential services such as libraries and networks exist, but also where a genuine pride of achievement and success would be developed about the Center.
- If the Center is established on a university campus, force it to operate within the academic structures of the host university. The time may arrive for joint appointments and full-time Center appointments of salaried personnel that are paid more than their academic counterparts across the street, but that

time is not when start-up occurs. If you lose the good will of your on-campus academic colleagues you will lose the Center on the long haul. If the Center is properly interdisciplinary, draw on the expertise of the university at large, before you hire new full-time people. Put the Center administratively at the level of academic departments. This will force Center personnel to cooperate rather than compete. Resist the urge to put the Center at the level of vice-president or some such. This perhaps looks good politically, but it will only work in universities that are awash with funds, and where the Center and Departments are not competing for part of the university resources.

- If the Center is established at a fully neutral site (i.e. de novo on an endowed tract of land or other similar situation) the design and operation of the Center is at once more flexible and more critically intricate. The flexibility exists in the complete freedom to develop inter-disciplinary programs without the campus problems of territorial disciplinary departments. Universities seldom solve this problem well, while private and agency laboratories often do so. The difficult problem here is to assure that the Center has adequate academic linkages to stable and reputable programs. The Center must be a source of training and education for students at all levels from undergraduate through post-doctoral and sabbatical programs. While the Center ought not to attempt to offer formal degrees, it must be a location where quality work on degree programs is conducted. The few resident scientists at the Center will typically desire an academic appointment, and should be of sufficient quality to obtain one at a cooperating university.
- Develop an accommodating physical plant for the Center. Inter-disciplinary teams require accommodations that allow them to work together on a daily basis. Arrange the work spaces to draw disciplines together. Arrange for common spaces for conferences, informal meetings, office areas, refreshments, and most aspects of the daily work routine. Establish a reading room and inter-disciplinary library. All of this keeps inter-disciplinary groups together, and being together, they will learn to respect other views of the way the natural world operates. If the various groups of the Center are across the campus or street, or even on the next floor up, you create the potential for geographic isolation that leads to divergence. If the Center is located at a remote site, accommodations must be more elaborate, and the supporting programs must offer a full and rich environment for scholarly work.
- Arrange for serious effort to be devoted to educational programs. Joint or inter-disciplinary degrees are not necessary. Any good graduate program contains sufficient flexibility to allow an ecology graduate student interested in mathematics to get both in their program. Same for computer science, chemistry, and so on. Good universities recognize the credits of other good universities, and students can gain needed credits for their work under existing academic structures. If the Center survives, there will come a time when participating students will be hybrids of the disciplines represented. This will be an indication that you are doing something right.
- Another aspect of the educational programs that requires attention is continuing programs for mature investigators. Nothing divides a group more than the perception that some of the members have access that others lack. This is particularly so for the computational systems and data archives. Establish routine training programs that provide instruction for all visitors and residents alike - in this manner, people will come to help themselves, and you will avoid the problems associated with unintended restrictions based on capabilities.
- Protect the Center from Center-envy. The quickest way to bad community relations is to present the face of an elite group that is receiving fenced funds who are not having to compete for what they get. The solution here is not to fence the money. Aside from the actual implementing funds, which must be fully shared through the activities of the Center, make the Center's participants compete on an equal footing with all members of the scientific community. At all costs, program managers must avoid the stain of favoritism for established Centers with respect to extra-mural funds.
- Keep the role of the Center general and fundamental and altruistic. Make the support services available to all. Let the participants add topical specificity. This makes the Center a magnet for a broad group of participants - to do less generates ill will that will ultimately come back to haunt the Center and its' programs. If the Center concentrates on support and conferences and workshops and coordination, it has a chance to succeed. If it attempts to carve out a specific topic of research for its' program, it will probably fail either because no one will care as the next topical bandwagon comes by, or because some bright soul somewhere else will have done it better.

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