# Research Corporation
# Strategic Planning

# A Report and Recommendations to the Research Corporation Board of Directors

**As approved by vote of the Research Corporation Board of Directors**
**April 27, 2007**


**Respectfully submitted by the ad hoc Strategic Planning Committee:**

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## Executive Summary

**Directed by the Board of Directors to help to chart a guided pathway to the future for Research Corporation, the ad hoc Strategic Planning Committee, sometimes referred to as the Task Force, has considered the history of Research Corporation, current scientific frontiers in several disciplines, the programs of Research Corporation and recent program funding profiles, the national funding climate, the expenditures of Research Corporation, Program Officers and their development, and issues related to education. On the basis of these considerations, we recommend that the Board of Directors consider for adoption a revised mission statement and four strategic goals for Research Corporation.**

### Mission Statement

***Research Corporation is a foundation for the advancement of science that provides catalytic and opportunistic funding for innovative scientific research and the development of academic scientists, which will have a lasting impact on science and society.***

### Strategic Goals

1. ***Scientific Research*: *Advance Science by Enabling and Catalyzing Innovative Research***

2. ***Scientific Personnel*: *Enhance and Strengthen the Scientific Workforce***

3. ***Achievement*: *Enhance the Resources of Research Corporation to Enable it to more Effectively Make a Difference***

4. ***Recognition*: *Raise the National Profile of Research Corporation***

**This report contains details that explain and motivate these goals and the intent of the Strategic Planning Committee. The appendices are an important part of this report and contain relevant information that further documents and supports these recommendations.**

## Preface

**These recommendations arise as a result of action by the Board of Directors that created the Strategic Planning ad hoc Committee and presented it with the two-component charge: (1) to explore the opportunities, constraints and limitations that Research Corporation may expect to encounter in the future and cognizant of these, (2) offer recommendations to the Board as to what the important strategic goals for Research Corporation should be for the future and suggestions for how these goals might be achieved.**

**Here we provide a brief guide to the content of this report. To begin we propose a mission statement for consideration. Our strategic goals are outlined next, along with some brief comments that amplify them. The last major section of the report contains words that serve to make clear the intent of the Strategic Planning Committee in making the recommendations that we have made.**

**Several of the Appendices are important as they provide important background information. These include the context for this report, a summary of scientific frontiers and a summary of Research Corporation programs. Other appendices provide some substantial background and supplementary information. These include an approximate funding matrix used by the committee at several points and the minutes from the various Strategic Planning Committee meetings.**

**Following delivery to the Board of the committee recommendations, once the Board adopts strategic goals for Research Corporation, the President and his staff will respond by offering to the Board implementation strategies for adoption, with appropriate budget requirements that will be summarized in a more refined funding matrix.**

## Mission Statement

***Research Corporation is a foundation for the advancement of science that provides catalytic and opportunistic funding for innovative scientific research and the development of academic scientists, which will have a lasting impact on science and society.***

# Research Corporation
# Recommended Strategic Goals

## 1. *Scientific Research*: *Advance Science by Enabling and Catalyzing Innovative Research*

**How: Directly support transformative and innovative research, i.e. research that explores new approaches and directions that hold the potential to change our understanding of nature.**

**Approach: Promote research in Chemistry, Physics and Astronomy and their boundaries with other disciplines. Take risks to support exceptional opportunities. Remain an active foundation.**

**Recommendations: (1) Continue a CCSA program at the PUIs. (2) Continue a Cottrell Scholars program at the R1 universities. (3) Retain a rigorous process of peer review. (4) Create a new program targeted at an important national need, where we can make an enabling difference – for example in energy or the environment.**

## 2. *Scientific Personnel*: *Enhance and Strengthen the Scientific Workforce*

**How: Directly support the scholar / teacher and nurture faculty and students.**

**Approach: Support hands-on student research. Support and publicize the model of the effective scholar/teacher. Encourage students and faculty members to enter and continue in scientific careers.**

**Recommendations: (1) Continue a CCSA program at the PUIs. (2) Continue a Cottrell Scholars program at the R1 universities. (3) Create a continuing collaborative national conference for R1 scholar / teachers and support other conferences. (4) Continue a Department Development Program including campus visits. (5) Emphasize undergraduate research in the area of education. (6) Explore and act on the issues and the range of opportunities associated with scientific career choices.**

**3. *Achievement*: *Enhance the Resources of Research Corporation to Enable it more Effectively Make a Difference***

**How: Ensure that funds are utilized efficiently and expand the endowment.**

**Approach: Expand the resource base of RC to allow it to do more. Partner where possible. Ensure that the staff is able to function at an optimal level.**

**Recommendations: (1) Expand the endowment. (2) Create assessment tools to measure the effectiveness of programs. (3) Respond to exceptional opportunities. (4) Explore ways to leverage our resources. (5) Ensure that the staffing level is consistent with the expected duties. (6) Attract and retain talented people to the staff, advisory committees and Board.**

**4. *Recognition*: *Raise the National Profile of Research Corporation***

**How: Enhance the visibility of Research Corporation and its programs.**

**Approach: Create events and desirable, accessible venues that bring RC's image to its traditional audience and to a wider audience.**

**Recommendations: (1) Celebrate the 100th RC anniversary in a manner that is recognized nationally. (2) Create a continuing collaborative national conference for R1 scholar / teachers. (3) Further develop and enhance mechanisms that promote successful academic careers. (4) Enhance the scientific content on the Research Corporation web site. (5) Support appropriate prizes for accomplishment in the sciences that we support. (6) Disseminate success.**

## Amplifications of the Strategic Goals.

### 1. *Scientific Research: Advance Science by Enabling and Catalyzing Innovative Research*

(1) Continue a CCSA program at the PUIs. The CCSA program is a nationally recognized bedrock program that resides at the core of what Research Corporation seeks to accomplish. It supports faculty members and students and enables them to carry out hands-on publishable research that at once contributes to the body of scientific knowledge, promotes faculty development, and nurtures prospective future scientists. While management may wish to tinker with the details of the program, it is our recommendation to the Board that this program be retained with high priority as an individual investigator program that supports hands-on research.

(2) Continue a Cottrell Scholars program at the R1 universities. The CS award is a relatively young award in a young program, but already highly recognized in the R1 setting as a prestigious award. It recognizes innovation research and innovative teaching and thereby highlights the importance of high quality in each component of faculty life in a university setting. This program will continue to influence the recognition of high quality teaching and its importance to a balanced career for university faculty members. We recommend to the Board that this program continue with high priority as an individual investigator program that supports hands-on research and quality teaching.

Comment: We have said "a CCSA program" and "a CS program" instead of "the" program, to allow for potential changes in these programs. Indeed, with increasing opportunities for scientists from different disciplines to work together, our wording "individual investigator program" includes the possibility that two (or more) scientists, e.g. a chemist and a physicist or a biologist and a chemist, etc., might choose to work together in a research project. But, we do not encourage program changes in CCSA or CS that would diminish the probability that single investigators receive awards from Research Corporation for the support of hands-on research.

(3) Retain a rigorous process of peer review. Peer review, review of proposals by outside scientists who can independently evaluate and comment on the quality of the proposed scientific work, is a time-honored way that many Federal funding agencies use to make decisions about which scientific proposals to support. Careful use of peer review by Research Corporation helps to ensure that high quality work is supported. And, it is one of the real strengths of Research Corporation compared with many other private foundations. A rigorous process of peer review must continue.

(4) Create a new program targeted at an important national need, where we can make an enabling difference - for example, energy or the environment. Research Corporation

strives to make a difference. While we recognize that major national resources exist at the federal level to address some of these topics of major national importance, we believe that there is opportunity here for innovative exploration of new approaches. We therefore recommend that the Board direct management to explore program possibilities that would allow Research Corporation to play a role in one or more of these arenas. The committee felt a sense of urgency, with the world clearly already in a state of crisis with regard to energy and global warming and their relationship to the environment.

Comment: In the context of the CCSA, and perhaps CS or a new program, we expect that new funds will have to be found to create a mechanism to target physics and chemistry that advances the biological sciences and other disciplines such as geology, materials science, etc., while continuing core discipline support for Astronomy, Chemistry and Physics. The disciplines of Chemistry and Physics have been fundamental to the science supported by Research Corporation. The addition of Astronomy to the more traditional support for Chemistry and Physics recognized the importance of the fundamental questions addressed by that discipline, some of which are intimately connected to Physics and Chemistry. There is very strong international recognition that the biological sciences represent major opportunities for future scientific discovery. To add all of Biology as a new discipline without substantial additional funds, would overwhelm the anticipated staff and resources of Research Corporation. Although we recognize that even now a significant number of Physics and Chemistry proposals to Research Corporation are properly classified as having a biological connection (i.e. are at the interfaces), we recommend that the Board support changes in the programs of Research Corporation that would allow consideration of additional proposals that explore the interface between Astronomy, Chemistry and Physics and other disciplines, in particular Biology, but also Geology, Materials Science, etc. provided that this can be done without eroding support for research that is centered in pure Astronomy, Chemistry or Physics. We also see the opportunity to respond to a national need, but here too we believe that this should be done without erosion of research centered in Astronomy, Chemistry and Physics.

Comment: The ROA program and the RIA program are programs that target innovation, change and opportunity. Properly configured, they might again play a meaningful role in the agenda of Research Corporation without overwhelming the staff. We suggest that the topics in the national interest previously mentioned might be candidate(s) for study with a reconfiguration of the RIA and/or ROA programs.

Comment: We urge that the President remain vigilant for exceptional, unexpected opportunities. We recommend to the Board that it remain supportive of the occasional exceptional opportunity that may be unpredictable and that the Board encourage the President to be watchful for such occasional opportunities, ones where Research Corporation may play a leading or catalytic role to cause progress that would otherwise not take place. Such opportunities are ones that we have traditionally called Program Related Initiatives.

Comment: Research Corporation should remain an active foundation. This means that it must play an active role and not just manage grant programs. Campus visits and conference organization (mentioned elsewhere) help to ensure the Research Corporation does indeed play an active role.

## 2. *Scientific Personnel: Enhance and Strengthen the Scientific Workforce*

(1) Continue a CCSA program at the PUIs. We believe that the CCSA program enhances the capability of faculty members at the PUIs to conduct quality research that contributes to knowledge. Importantly, it also provides a critical opportunity for undergraduate students to experience research at the hands-on operational level. We are convinced that this contributes to the pipeline that feeds new people into the sciences and this must be continued.

(2) Continue a Cottrell Scholars program at the R1 universities. In the context of scientific personnel, this program is in the process of shifting the manner in which universities regard teaching, and the value placed on it in the tenure and promotion process. It also heightens the visibility of Research Corporation in the university setting.

(3) Create a continuing collaborative national conference for R1 teacher / researchers and support other conferences. To further enhance the visibility of the value of the teacher /scholar in the university community, we encourage that the Board endorse the support of an annual national forum at which Research Corporation and other partners could shine light on the scholar / teacher and provide an opportunity to such people to network. We also encourage sponsorship of other conferences (see goal 4, item 3).

(4) Continue a Department Development Program including campus visits. The Department Development Program holds the potential to transform not just departments, but entire institutions by the model for transformation that such a program provides and by the mechanisms for internal discussion in a department and on a campus that such a program promotes. We recommend that the Board endorse this program and encourage the President and staff to develop creative selection criteria by which departments and institutions are selected for participation (e.g. competition rather than targeted invitation) and to explore ways that this program can continue to make an impact.

Comment – We are persuaded that general campus visits help Research Corporation to more effectively devote resources, identify promising avenues of research and remain up to date on emerging avenues of research. Such visits also help to define the uniqueness of Research Corporation and enhance its visibility. We recommend that the Board continue to endorse an aggressive program of campus visits by Program Officers.

(5) Emphasize undergraduate research in the area of education. This is meant to indicate that we do not believe that it is appropriate for Research Corporation, a foundation for the advancement of science, to support the traditional mission of schools of education, or to

devote substantial resources to the directions that such schools and their faculty members traditionally tend to follow. We are convinced that there is substantial Federal money to be devoted to this purpose. That said, aspects of science education that directly support some of the other enunciated priorities noted here may be carefully considered if appropriate motivation is present. We believe that Research Corporation should continue to support education in science primarily though programs that create opportunities to engage students in hands-on research and not through programs targeted generally at science education or curriculum development.

(6) Explore and act on the issues and the range of opportunities associated with scientific career choices. We are aware that there are choices to be made in career paths, that there are interruptions to career development (e.g. women give birth to their children), and that various career paths offer differing challenges and opportunities. We recommend that Research Corporation understand such issues and create ways to make a difference. For example, Research Corporation might create a major publication that highlights the issues, problems and opportunities that may exist.

Comment: In this context, we are convinced that various challenges exist that present barriers to the continuing development of scientific careers for women, among other minorities in science. Given these challenges and barriers that tend to interrupt career development, especially for women, the specific issue of reentry into a productive career is recognized as substantial. We recommend that Research Corporation explore ways in which this specific issue can be addressed in a productive manner and then act to implement a publication, a program, or some vehicle that can make a difference. One possibility might be to create a program that would help to facilitate a re-entry into research for women in science.

## 3. *Achievement: Enhance the Capability of Research Corporation to Make a Difference*

(1) Expand the endowment. Research Corporation can do more than it does and we have identified a number of directions that we regard as holding significant enough opportunities and important enough priorities that we believe that an expansion of the endowment is necessary to (a) ensure that Research Corporation will be able to achieve its strategic goals and also do more than it currently does, and (b) continue to have an impact in science and as a result make a difference for the foreseeable future. We recommend that Research Corporation explore ways in which the endowment can be expanded, and take action to implement those ways that appear to hold the most promise.

(2) Create assessment tools to measure the effectiveness of programs. We think that it is important that mechanisms be developed by which the programs and ventures of Research Corporation are regularly assessed and evaluated, with their effectiveness determined. Do our programs actually accomplish what we intend for them to accomplish? Are they consistent with our strategic goals? If not, we need to know that

and make changes. Are our expenditures efficient? This task is anticipated to be large and we believe that additional professional help, perhaps in the form of an external assessment professional, may be needed.

Comment: We think that it is particularly important to examine the criteria for CCSA support. One of the interesting observations of our study of where the CCSA funds have gone over the past years is the fact that a substantial number of awards have gone to institutions that have received only that award or perhaps only one other over more than a decade (Appendix H, figure 12). The data show that other agencies also have this profile (Appendix H, figure 13). This may have a number of causes – some positive, e.g. an upcoming institution has received its first award, and others of high quality will surely follow – some negative, e.g. the institutional setting was inappropriate and the award was money poorly spent. To the extent that constraints in the application process (e.g. appropriate extra scrutiny is given to proposals from rare-award institutions, etc.) may reduce the number of dollars poorly spent but retain an ability to provide support where it will indeed make a difference, we recommend that the President and staff engage this problem. We make this recommendation in recognition of the fact that there is a need to understand this issue fully in the context of various institutional situations, and implement a process that will help to ensure that our support money is indeed well spent. A high quality proposal is a high quality proposal.

(3) Respond to exceptional opportunities. While we don't recommend spending down the endowment for standard current opportunities because that would prevent Research Corporation from continuing to do in the future a number of the things that we deem essential to the future of science, we do believe that from time to time a rare and exceptional opportunity will materialize and that Research Corporation should not retreat from taking such an opportunity if the potential for impact is large. Thus, an occasional commitment on the scale of a traditional yearly total foundation expenditure should not be ruled out on the basis of cost alone. But, we anticipate and encourage that such commitment be rather rare and only in response to what really is an exceptional opportunity. We anticipate that the President will likely take the lead to bring such opportunities to the Board, but they may originate among Board members as well.

(4) Explore ways to leverage our resources. We encourage that opportunities be sought whereby other agencies and foundations can partner with Research Corporation for the purpose of carrying forward an opportunity that Research Corporation might not wish to, or be able to, carry on its own.

(5) Ensure that the staffing level is consistent with the expected duties. As the funds available for new programs and new initiatives become available it is essential that Research Corporation's officers remain vigilant to protect the staff from duties that exceed those that can be done in a quality manner in the time available. Where appropriate, additional staff, temporary or permanent, must be added.

(6) Attract and retain talented people. The Board must periodically review the working conditions and benefits of the staff and officers to ensure that the positions they hold

remain attractive, that opportunities for professional advancement are in place, and that as a result very talented people are hired when vacancies exist and retained once hired. It is also important that talented people with relevant qualifications be selected for the Science Advisory Committee and the Board of Directors.

### 4. ***Recognition*: *Raise the National Profile of Research Corporation***

(1) Celebrate the 100th RC anniversary in manner that is recognized nationally. As a foundation for the advancement of science with a long and honorable history, the 100th anniversary provides an exceptional opportunity to bring national visibility to Research Corporation. We recommend that the Board continue to approve the notion that the anniversary be celebrated through a major event such as a national conference, perhaps including the production of a significant publication, etc.

(2) Create a continuing collaborative national conference for R1 scholar / teachers. It is clear that the concept of a teacher scholar has gained a foothold in the university setting and the role of Research Corporation in this is recognized. Repeating, in the current context of recognition for Research Corporation, we encourage that ways be found to create a continuing a visibility and networking opportunity for scholar / teachers. One such mechanism is an annual national conference, supported in a collaborative manner.

(3) Further develop and enhance mechanisms that promote leadership. Conferences such as Models in Academic Leadership, sponsored by Research Corporation, have been effective and visible and we encourage that conferences of this type be continued, nurtured and further developed. Some mechanisms may be effectively sponsored in partnership with other agencies when desirable.

(4) Enhance the scientific content on the Research Corporation web site. We recommend that a web presence on topics and issues of science be explored as a possibility, with appropriate peer-review such that the content on the site is adequately certified as accurate and reliable. The vision is for this to be the go-to source for the information on scientific matters of current significance for the general public as well as for anyone seeking reliable information with appropriate scientific substance and references.

(5) Support appropriate prizes for accomplishment in the sciences that we support. Such awards enhance the visibility of Research Corporation and bring light onto powerful success stories in the areas that we support.

(6) Disseminate success. Where programs, conferences, or other activities with Research Corporation support or involvement are shown to be successful, vehicles should be found that disseminate this success in the expectation that such success stories will serve as models to export the success to other areas. Such stories will also enhance the visibility of Research Corporation.

## Appendices

## Appendix A. Context and Process for this set of Recommendations

**These recommendations arise as a result of action by the Board of Directors that created the Strategic Planning ad hoc Committee and presented it with the two-component charge: (1) to explore the opportunities, constraints and limitations that Research Corporation may expect to encounter in the future and cognizant of these, (2) offer recommendations to the Board as to what the important strategic goals for Research Corporation should be for the future and suggestions for how these goals might be achieved. Following delivery to the Board of the committee recommendations, once the Board adopts strategic goals for Research Corporation, the President and his staff will respond by offering to the Board implementation strategies for adoption, with appropriate budget requirements.**

**The committee began work in February, 2006, with Stuart Crampton as its chair. Shortly thereafter Stuart assumed the role of Chairman of the Board and he was replaced as committee Chair by Robert Hallock in April, 2006. The committee worked with the full involvement of the officers of Research Corporation and the Chairman of the Board. In the course of its work, the committee also involved the scientific staff of Research Corporation as often as was possible, given meeting locations, and appreciates the care, dedication and energy with which the scientific staff approached and responded to strategic planning. We also benefited greatly from the careful and thorough minutes for each meeting prepared by Linda Neefe, and by her attention to various details that made the meetings pleasant. The committee Chair(s) appreciate(s) the enormous devotion, effort and energy directed to our task by all the committee members and by the President and his officers and staff at various levels. We also benefited considerably from involvement of the full Board at our retreat in November of 2006.**

**In our work we held several meetings (summary minutes appear in an appendix):**

**February 2006: Discussion of process – we will gather information, evaluate it, communicate, digest, recommend; followed by a report, then internal decisions in the RC office, create implementations, Board approval; Reports on Presidential Panels (see below, Research, Education); "advancement of science"; workloads vs. RC staffing levels; minority faculty; institutional infrastructure; RC outreach, the web.**

**April 2006: Review of the history of RC; RC Programs, internal assessments; Major RC Initiatives; Frontiers reported by Strategic Planning Committee members: Astronomy, Biochemistry, Chemistry, Physics – i.e. where is science going and why, the opportunities, and potential implications for RC.**

**<u>July 2006</u>: National funding landscape; RC payouts, Is RC money going to the right institutions?; Need for a clear RC mission to market to partners; Program Officer roles/development; RC Programs – are they "right"; Feedback to PI's; Preliminary Presidential priorities; possible outreach; Scientific priorities (directions, management); the teacher/scholar; chat with Eric Mazur; education issues; strategic concepts. Attend Cottrell Scholars conference.**

**<u>November 2006</u>: Retreat with full Board; then, discussion of the November 2006 Board retreat and the input from the full Board – RC structure, RC impact, endowment, decision making and setting priorities; look beyond the existing budget; big national issues; continue a focus on our traditional areas; minorities and women; Departmental Development Awards; undergraduate research; outreach; program-related initiatives; convergence toward strategic goals; RC programs; rotating Program Officers**

**<u>February 2007</u>: Refinement of the Strategic Goals; disciplines appropriate for grants; management to develop implementation plan, but the Board must approve the Strategic Goals; Program Officers and their development; RC's visibility; leadership; awards; what "education means" to RC; undergraduate research as an educational venue; Cottrell Scholars; discussion of the matrix (of priorities and associated costs); the need for new money.**

**In addition, there were two Presidential Panels that brought to the Research Corporation offices groups of scientists and educators to discuss with the President and scientific staff issues relevant to research and education initiatives:**

**<u>October 2005</u>: Presidential Panel – <u>Research Initiatives</u>; change cultures with RC programs; define funding by science type; target high-risk science, inter-disciplinary, or team efforts; proactive approach.**

**<u>December 2005</u>: Presidential Panel – <u>Education Initiatives</u>; changing cultures; promote women re-entering departments; extension to HBCU; partnerships and programs for HS teachers; cross-discipline communication; recognition awards; assessment tools; interdisciplinary proposals; publications; leadership activities.**

## Appendix B. Summary of Scientific Frontiers and Opportunities Identified

The members of the Strategic Planning committee took homework assignments to identify scientific frontiers in four disciplines that we believed were relevant to Research Corporation and in the more general and connected area we identified as interdisciplinary. By consulting recent decadal studies conducted by the National Academy of Sciences and other reliable sources, including our own personal knowledge of the scientific disciplines, we identified emerging scientific frontiers ripe for future research and discovery and include here those listed below. The committee was reminded of the remarkable range of exciting opportunities from which the following have been extracted. Unfortunately, the brevity of the extractions hides much of the excitement that the scientific community feels about these areas of opportunity. But, that excitement is very real. In addition to these traditional disciplines, opportunities were also identified in interdisciplinary areas, some which are also listed here. The committee was also reminded that unforeseen opportunities may arise at any time. Indeed, some of the most exciting and important developments are never foreseen, they simply happen. Science progresses in an orderly way – sometimes – and it progresses by surprise quite often, when the unexpected discovery takes place.

**Astronomy: Origin of the Universe, formation of stars, galaxies, extra-solar planetary systems, origin of life in the Universe, science with the LBT and the LSST. *Examples*: Extra-solar planets; dark matter; the early universe; dark clouds and their organic molecules; astro-biology and astro-chemistry; Is there life out there?**

**Biochemistry: (with organic chemistry and biomedicine) Catalytic reactions, carbohydrate synthesis, parallel synthesis, DNA sequencing and genomics, gene expression, proteomics, protein engineering, knock out genes, bioinformatics, drug discovery and development. *Examples*: synthesis of complex molecules; reduction of byproducts; auto-synthesis of carbohydrates; bio-synthesis of novel molecules; cloning of bio-synthetic genes; pharmaceuticals; rapid genome sequencing; gene activity; protein engineering and therapy; gene manipulated animals.**

**Chemistry: Synthesis strategies, self-assembly of complex systems, green chemistry, surface chemistry / catalysis, chemistry of the biosphere, agro-chemistry. *Examples*: Chemistry of living systems; medicine development; create materials with unique electrical and optical properties; the chemistry of the nano-scale; interactions chemicals and biological materials; battery technology; photo-catalytic systems.**

**Physics: Quantum technologies, creating new materials, understanding complex systems, unifying the forces of nature, exploring the universe, applying Physics to Biology. *Examples*: Manipulation of individual atoms and molecules; self-assembly of materials; studies of non-linear phenomena; protein folding; cellular electrical activity; instrumentation development; physics of molecular motors; fluid dynamics at the cellular level.**

**<u>Interdisciplinary Opportunities</u>: Bio-medical, Biology / Chemistry / Physics Interface, Complex Systems, Computational Techniques, Designed Materials, Energy, Informatics, Infrastructure, Nanoscience, Network Theory, Neuroscience, Surface Science. *Examples* from the first two of these: Understanding bio-molecular machines; understanding gene recognition and signal transduction; understanding the mechanics and spatial structure of the cell; understanding the origin of self-replicating systems (build functional biological cells, systems and networks); harnessing the synthetic capacity of life.**

**Appendix C. <u>Summary of RC Programs, with Strengths and Needs Identified</u>**

With the help of the Program Officers, we undertook an internal critical look at the programs of Research Corporation to assess their strengths and various relevant issues. In some cases questions emerged that require a more careful look than we were able to provide. A summary of our conclusions appears here.

**<u>Cottrell Scholars</u> (CS): *Positives*: Focus is on a balanced research / teacher scholar (in a Research University setting); it is a nationally recognized prize; CD awardees appear to influence departmental cultures re teaching / research balance; the award stimulates curricular changes; it influences teaching practices; it stimulates outreach; the award is building a national community of research / teacher scholars. *Comments*: The success rate relative to proposal pressure is not high (~ 10%); the program needs success metrics, and an objective assessment for the CS program; CS conferences may need to be modified, but should be continued; the CS program is more selective than NSF-CAREER program (which serves a similar mission).**

**<u>Cottrell College Science Awards</u> (CCSA): *Positives*: Provides critical support for research by young faculty at PUI's; creates opportunities for undergraduates to do research; is a faculty development / student hands-on education program; institutional visits by RC staff members provide critical feedback and visibility for RC; a critical, nearly unique, core program that enables research; CCSA is a highly visible program among the PUI's. *Comments*: There have been a substantial percentage of awards to institutions with rare submissions; can the program change to enhance awards at interfaces among disciplines; should renewals be more difficult to acquire; should the CCSA program be so strictly an early-in-career program; should institutional matches be more substantial in true dollar value; the success rate is reasonable (32%); RC should develop assessment tools for CCSA.**

**<u>Research Opportunity Awards</u> (ROA): *Positives*: Serves to reinvigorate mid-career research programs; nearly unique in the area of mid-career development; provides an avenue into research universities. *Comments*: Should develop criteria for better selection of "winners"; need assessment criteria to determine the real impact; other support agendas could be included, e.g. sabbatical; discipline switches; could we make it visible like the CS program has become; ROA has been a relatively small program to date; anticipate substantial proposal pressure if the program is active; ROA may serve women who reenter careers following childbirth or motherhood.**

**<u>Research Innovation Awards</u> (RIA): *Positives*: Enabled risky, innovative, fundamental research, which are core RC targets; the RIA is another presence in the university research community; RIA supported very young faculty members. *Comments*: The proposal pressure was too great for the staff to handle; awards were small, in the context of faculty start-up money; good assessment metrics area**

**needed; may need a new approach within the review process; i.e., "Is it innovative"; should the RIA program be open to PUI's; should it be open to more senior faculty (as opposed to more junior faculty members); e.g. post-tenure, where the willingness to take risks may be greater?**

**<u>Departmental Development Awards</u> (DD): *Positives*: a highly focused, leveraged opportunity to advance a department; the institutional benefit can transcend the department; the internal department / institutional process of self evaluation and future-thinking is a key value of the DD; the DD promotes peer-reviewed activities (i.e. research). *Comments*: The selection process may need modification "how to best identify candidate institutions"; guidelines may need improvement; have we lost our uniqueness in this area?; could be changed to promote interdisciplinary approaches though multi-department interactions; e.g., multi-department proposals that clearly cross traditional boundaries.**

**<u>Special Opportunities in Science Awards</u> (SOS): *Positives*: A flexible program; quick response; a program for something that does not fit elsewhere; a program "aimed" at very novel projects. *Comments*: The program lacks structure; the guidelines are fuzzy; there is a need to better articulate the selection criteria: there is assessment needed on awards; where research is risky, expect big success as well as big failure; the program can enhance RC visibility.**

**Appendix D. Approximate Funding Matrix (as used by the committee)**

The table below, which indicates approximate current costs for Research Corporation's operations, is categorized in terms of "items" which could be listed as "priorities" for the future. We made a reasonable very rough extrapolation of the projected costs of each of these in the event that we decide to carry these forward. The numbers represent an educated guess and this matrix will eventually be replaced by at least one new one once the President and his colleagues are finished with thoughts about implementation strategies. The President has wisely suggested, consistent with the initial game plan, that to do this right will take significant time as it requires thoughtful planning (months) in the RC offices and thus a refined matrix should only be completed after the Board accepts the strategic planning goals and he has a chance to make internal decisions. A priority number (from 1 to 4), gives some sense of the priority with which the committee views the item. An X in the goal columns is an initial indication of which of the goals the item supports. The interface with other disciplines is here presumed to be addressable among the programs, but the addition of a new program may be needed.

| Item | Recent Annual Cost ($ M) | Projected Annual Cost ($ M) | Annual FTE Staff | Goal 1 | Goal 2 | Goal 3 | Goal 4 | Priority |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| CCSA | 3.4 | 3.4 + | | X | X | | | 1 |
| CS | 1.3 | 1.3 + | | X | X | | | 1 |
| National Need | 0 | 1.0 | | X | X | | | 3 |
| RIA-ROA | 0.3 | 1.0 | | X | X | | | 3 |
| Pubs | 0.2 | 0.4 | | | | | X | 2 |
| Conferences | 0.3 | 0.5 | | X | X | | | 2 |
| DD | 0 | 0.3 | | X | X | | | 2 |
| Web | 0 | 0.1 | | | | | X | 3 |
| Leadership | 0 | 0.2 | | | X | | X | 4 |
| PRI | 1.5 | 1.0 | | X | X? | | X | variable |
| Raise Funds | | 0.2 | | X | X | X | X | 1 |
| Campus Visits | 0.1 | 0.2 | | X | | | | 1 |
| Career Path | | 0.5 | | X | X | | | 3 |
| Staff and Benefits | 2.0 | 3.0 | | | | X | | 1 |
| Other | 0.7 | 1.0 | | | | | | ? |
| | | | | | | | | |
| Total | ~ 10 | ~ 14 + | | | | | | |

## Appendix E. Board Retreat – November 2, 2006

**The President initiated a Retreat for the Board of Directors at which the Directors could engage in extended discussion about current activities, the future and hear from the President. The Strategic Planning Committee requested time at the retreat to bring a detailed progress and status report to all of the members of the Board, request input, and listen to thoughts and concerns of Directors who were not part of the ongoing committee process.**

**A key ingredient in the roughly three-hour session at which the Strategic Planning Committee discussed progress and issues with the Board was a presentation of the emerging strategic goals, amplified by the committee's reasons for each goal. The Retreat began with a discussion of why there was such a committee, with the committee noting questions of relevance: Where are the scientific frontiers? Where are the opportunities? Are there opportunistic investments in science? What are the President's thoughts? Where / how can we make a difference? What is the status and effectiveness of our programs? Are program changes needed? Priorities: where are our limited funds best placed? Is the staffing consistent with the emerging goals? Are there adequate staff opportunities for growth? How will we document / measure progress? Do our priority goals exceed our resources? Do we need development activity?**

**In the view of the Strategic Planning Committee the Board was fully engaged in the discussion (which went to three hours instead of the originally planned two hours) and it offered a number of comments and suggestions. The committee attempted to include all of these suggestions in its subsequent deliberations. We note particularly the call from the Board that the President provide a summary funding matrix to the Board when requests for expenditures for new or changed programs are presented by the President to the Board for approval.**

## Appendix F. Minutes from Strategic Planning Committee Meetings

**1. February 2, February 4, 2006**

**2. July 6, July 8, 2006**

**3. November 4, 2006**

**4. February 1, 2007**

# Meeting Summary

**of the**

**STRATEGIC PLANNING TASK FORCE**
of the
Research Corporation Board of Directors

Ocotillo Room
The Lodge at Ventana Canyon
Tucson, AZ

9 a.m.
February 2, 2006

**Task Force Members:**

Stuart B. Crampton, Chair
Peter Dorhout
Jim Gentile
Bob Hallock
Brent Iverson

Patrick Osmer
John Schaefer

**Staff:**

Raymond Kellman
Daniel Gasch
Silvia Ronco
Lee Radziemski
Dena McDuffie

Linda Neefe

Dr. Crampton convened the meeting at 9:30 a.m. and welcomed the committee. He asked Dr. Gentile to begin the discussion on strategic planning. Dr. Gentile explained that interactions with RC colleagues and grantees, as well as educators and scientists across the country, led him to consider the strategic planning process. He said he sees the effort as a three year process with the first year spent gathering extensive information, the second spent on the internal decision making and the third implementation.

Dr. Gentile said that he began the effort by asking a panel of Researchers and a panel of Educators to meet and discuss what is happening across the nation in science, science education and research; where Research Corporation could have an impact, what RC does well, what it could do better, what it could do differently and how. Ken Keller headed the panel on Research and Shirley Malcom headed the Education panel.

Dr. Gentile said that this committee, the Science Advisory Committee, and the Cottrell Scholar Conference participants also will provide input in the planning effort. The RC Board will retreat for a full day in Tucson, Nov. 2, prior to the November RC Board and Committees meeting, to discuss a tentative plan.

Dr. Crampton suggested that the strategic planning process should establish a balance between the Research Corporation vision and its programs, use effective assessment to determine the value of programs, and consider science and education issues worldwide.

Dr. Dorhout said that in his experience, in the absence of strategic planning, everything is impossible. He suggested defining RC's mission statement and vision to guide the process. He said assessment was essential, but only if done correctly.

Dr. Schaefer said that strategic planning is a great exercise. He said he did not meet with the Research Panel. He did participate with the Education Panel and came away with the strong impression that the group was the wrong mix of people to address the issues of RC's future direction in education on a national level.

Dr. Osmer said he has participated in strategic planning and assessment at his own institution. He would like the discussion to include consideration of science frontiers, where RC should be going, opportunities, science education and the big questions in Science.

Dr. Hallock said Research Corporation is a foundation for the advancement of science and that should serve as a backdrop for all discussions. He said that the strategic planning focus must allow for opportunistic funding as well as look at the possibility of reducing existing programs, identifying new resources and enhancing the endowment.

Dr. Iverson discussed Research Corporation's educational component. He said it is unclear how it will fit over the next century and suggested a high-level discussion on the direction of education. He suggested a self-evaluation of Research Corporation to include how the foundation fits in nationally and how to use its resources to have the best impact. He suggested a critical evaluation of funding sources in the country to determine if Research Corporation could find a niche.

The group discussed Research Opportunity Awards, Research Corporation's original mission of funding serendipitous projects, the strategic planning process and adding scientist to the Board of Directors.

Next, Dr. Ronco provided a PowerPoint presentation summarizing the outcomes of the Presidential Advisory Panel on Research Initiatives.

The group discussed eligibility requirements for RC Awards Programs, the evolving fields of science, funding proposals at the interface boundaries, tweaking the Cottrell Scholar Program allocation of funding and/or awarding those who are post-tenure with funding, developing assessment tools, assigning assessment projects to the soon-to-be hired Rotator Program Officer, clarifying RC's vision, mission and goals, issues concerning women in science, Research Opportunity Awards, Research Innovation Awards and Department Development Awards.

Dr. Ronco said that the Committee should focus on finding a balance in its strategic plan and consider the amount of work RC Program Officers have to do including campus visits, proposal review and reports.

The discussion continued around the impact of teaching science to non-scientists, science teachers being aware of what students want to major in, RC's education initiatives and defining what they should evolve to, how to gather data, identify which ideas to consider, triaging all ideas to a few key ideas, identifying ways to implement the ideas, drafting the RC mission as a top priority, defining RC's vision, and developing tools to assess outcomes at the program level.

Dr. Crampton asked Dr. Dorhout, Dr. Iverson, Dr. Osmer , Dr. Hallock and Dr. Gentile to be prepared to identify trends in their disciplines and science overall at the April meeting.

The discussion next turned to where science, research and science education funding is going so that RC's programs can compliment what Federal funding is targeting and what its peer institutions are funding.

Dr. Gentile offered to report on the national funding landscape at the April meeting.

Dr. Iverson said he wanted to amplify that the Committee is having "real-time" discussions. He said he wanted a concerted projection of what other foundations are funding and that the task of collecting that data be identified as an action item.

Dr. Crampton said that RC overlaps with other agencies and agreed that the committee should be aware of what those agencies are doing.

Dr. Gentile reiterated that he would gather the information for the April Meeting.

The group broke for lunch.

When the meeting reconvened, Dr. Radziemski summarized via a PowerPoint presentation the results of the Presidential Advisory Panel on Education Initiatives.

Regarding the Panel's suggestion of weak program assessment, Dr. Radziemski said that RC's Program Officers prepare terminal summary reports on all grants and that the RC system captures information on the number of grants applied for and awarded and the number of peer-reviewed papers generated by awardees.

Dr. Kellman responded to the Panel's suggestion concerning RC's lack of emphasis on mentoring faculty from Historically Black Colleges and Universities and other minority serving institutions. He said RC does an unheralded job with minority serving institutions including San Francisco State University, Sacramento State, San Jose State, Cal State, Fresno State, Cal State Long Beach, Northern Arizona University, Ft. Lewis College, UTEP, New Mexico State, Utah, San Antonio, Texas State San Marcos, University of Houston, Florida International University, UMBC, Rutgers, Camden, Wayne State,

University of South Dakota and West Georgia State. He also said that he would argue that the Partners in Science Program served minority kids and the RC has more than 35 years of faculty experience in minority serving institutions.

Dr. Hallock asked how the Panel got the idea that RC did not serve minorities. Dr. Radziemski suggested it might be because RC does not tout its service to minority population.

Dr. Ronco suggested engaging in conversations with faculty at minority serving institutions to determine if and how RC might serve them.

The discussion concerned minority serving institutions lacking the infrastructure required to qualify for awards, sociological issues or problems that prevent RC from doing more to serve these populations, cultural issues that prevent minorities from seeking RC grants, the inability of many to write proposals, the ability to quickly and easily secure federal funding causing minority faculty and researchers to pass on RC awards, adding Program Officers visits to HBSU's in the coming year, partnering with people who could facilitate more involvement with RC by HBSUs, the possibility of reaching out to one institution and creating a model to attract others, and more.

Dr. Dorhout discussed his experience with the Society for the Advancement of Chicanos and Native Americans in Science. He said the meetings have grown from a few hundred attendees to a few thousand and that he has met young faculty who repeatedly ask, "How do we move our science?" He said this group is crying out for faculty development and suggested that this is a challenge that RC could look at.
Dr. Crampton next asked for a discussion of the Partners in Science Program. Dr. Schaefer provided a background on how the program was established to assist High School Teachers. He said it was a necessary but labor-intensive program that RC ran for 10 years then turned over to the Murdock Trust.

Dr. Kellman also discussed the program. He said he and Dr. Andreen visited colleges and universities to recruit faculty, then went to high schools to recruit teacher participants. The program was well received, but was an administrative nightmare. He said Murdock has a good system.

The discussion included the national need for this type of program, a possible supplement to Cottrell Scholar Awards to bring high school teachers into labs, partnering with Murdock on expanding the program, other partnering programs that include lab and/or field work components, the safety issues of such programs, getting teachers and students involved, and more.

Dr. Crampton next asked about other topics for discussion.

Dr. Iverson mentioned RC's Web presence. He suggested a series of Web sites devoted to topics of public interest. The discussion included RC Web site links to other sites, posting peer-reviewed papers on topics of interest, offering a Web-based journal of publications,

targeting and attracting students, educators and the general public, offering an ask a question/get an answer site, and more.

Dr. Crampton next briefly summarized tasks to be completed for the next meeting including defining the RC mission and visions, identifying what other foundations are doing and how RC can compliment those efforts, and identifying the frontiers of science and RC's programs assessment needs.

The meeting was adjourned at 5 p.m.

The Committee reconvened at 2 p.m., Saturday, February 4, in the Research Corporation Board room following the Board of Directors meeting. The purpose of the second meeting was to clearly define the tasks of the Committee for the next meeting. Below is a list of action items and assignments that was emailed to the group on Monday, February 6, 2006.

**Research Corporation**
**Strategic Planning Task Force**
**Action Items, assignees and due dates**
**February 2 and 4, 2006**
**RC Board of Directors and Committee meetings**

Tentative Goals for November 2006

- Define Science scope of Research Corporation
- Define Education scope of Research Corporation
- Assess Programs
- Formulate "New" Programs

Six Objectives: tasked member due date

1. Identify RC's core values and create Mission Statement all/Gentile April

2. Identify Scientific Frontiers Dorhout, Gentile, Hallock, Iverson, Osmer April

3. Identify current and future funding landscape Gentile April

4. Assessment historic/anecdotal of programs All
April

(HIGHLIGHTS OF 90 YEARS: The "I got my first grant from RC!" Phenomenon,
"History of RC" in Handout – Linda will make J. Schaefer's PowerPoint available to all)

5. The Dream Screen Kellman
Nov.

(What questions should appear on the Web application page to capture information useful in assessing the programs?)

6. Educational and other Important issues of scientist All
April

7. Telescopes/Major initiatives Schaefer and
Osmer April

# Meeting Summary
**of the**
**STRATEGIC PLANNING**
**Ad Hoc Committee**
of the
Research Corporation Board of Directors

Tucson, Arizona

9 a.m.
July 6, 2006

| **Committee Members:** | **Guests:** | **Staff:** |
|---|---|---|
| Robert Hallock, Chair | Stuart Crampton | Jim Gentile |
| | | Raymond Kellman |
| Peter Dorhout | | Daniel Gasch |
| Brent Iverson (by video conference) | | |
| Patrick Osmer | | |
| John Schaefer | | Linda Neefe |
| | | Dena McDuffie |
| | | Silvia Ronco |
| | | Lee Radziemski |
| | | Jack Pladziewicz |
| | | Richard Wiener |
| | | Randy Wedin |

Dr. Hallock convened the meeting at 9 a.m. and welcomed the committee. Recently hired RC Program Officer Richard Wiener was introduced to the committee. Dr. Hallock outlined the tasks/issues to be addressed at the two meetings planned around the Cottrell Scholar Conference.

**Being duly moved and seconded, the summary of the April 29, 2006, committee meeting was unanimously approved with the following two changes:**

**On page three, paragraph four, the second sentence will read: Dr. Osmer responded that it was hard to know, but that he would estimate at least eight years.**

**On page four, paragraph four, the sentence should read: The big problem, Dr. Dorhout said, is the popular media are strongly negative in its representation of the issues.**

Dr. Hallock next asked Dr. Gentile to present the information on the national funding (of science) landscape. Dr. Gentile delivered a PowerPoint presentation of the material contained in Tab 3 of the committee materials and an additional handout.

The ensuing discussion included the shifting focus of NIH, NIH granting primarily to medical institutions, Department of Education grants, the number and size/amounts of grants awarded today, large grants/awards going to centers of excellence, age as a factor in acquiring grants or ongoing funding, the finding landscape in other countries, science funding distribution in other countries, aging faculty leading to a pulse of position openings in a decade and creating a set of problems for fields of science that could create an opportunity for RC.

Dr. Gentile next reported his thoughts on Scientific Frontiers using a PowerPoint and additional handout found in Tab 2 of the committee packet.

The discussion included a number of identified science drivers, the new technologies, costs of infrastructure that lead to the development of centers, RC developing a strategy to help scientists cut across the boundaries, the big projects, super data bases, collaboration from afar with occasional visits.

There was discussion of the "Clarion Call" to train and produce scientists for the future. The book, *The World is Flat* was mentioned along with the Science and Technology PhD pipeline leak. The discussion included the growing number of men, primarily black men, exiting the science degree pipeline, the consistent number of women earning Chemistry and Biology PhDs but not getting tenure, the looming workforce issue, the publication *Bio2010,* the crucial need for faculty development, how RC can help PUIs, promoting literacy through building on RC's strengths and focusing on science literacy.

Dr. Hallock next asked Mr. Gasch to discuss the history of RC program payouts and income. Mr. Gasch directed the committee to the charts and data in Tab 4 of the committee packet.

Mr. Gasch said that RC funds at 7 percent. RC can do this because its investments have realized great returns. He suggested the committee consider program assessments to determine if they accomplish what is intended. He said that to fund other/additional programs, something must change. He suggested considering growing the endowment, partnering with other foundations or substituting programs.

The discussion included RC's history of funding opportunities to make things happen, i.e. the Large Binocular Telescope, the consistent spending rate over many years, predictable expenditures, and how to engage the Board in the discussion of the spending rate and growing the endowment.

The committee discussed at length what each member would like to happen at the November Board retreat. Dr. Hallock suggested that the committee bring the Board up to date on where the committee is in the process, present some preliminary conclusions, ask

for the Board's perception of Strategic Planning and what they would like to see in a Strategic Planning Report and create an opportunity for Board buy-in.

Dr. Hallock suggested that the final plan could be presented to the Board at the April 2007 Annual Meeting.

Dr. Gentile said the committee should have a crystallized, concrete mission to market to potential partners. That mission must be impeccably clear for presentation to the Board.

There was minimal discussion of the centennial celebration and fundraising in conjunction with that milestone event, although it was recognized that the 100th anniversary was an opportunity to celebrate Research Corporation and enhance its visibility.

Dr. Hallock directed the committee's attention to Editor/Archivist Dena Mc Duffie's report: Comparison of time span between RC funding and awarding Nobel Prizes, 1939-2006, found in Tab 5 of the committee packet.

Ms. McDuffie's report said that RC-funded science changed in the 1980s when RC ended its involvement with patent management. Thus, RC moved from the support of more practical research to more fundamental research, which lengthened the time between RC support and the award of Nobel Prizes. She also wrote that with the funding of more grants, the interaction between RC and its grantees diminished. The chart she prepared reveals that over the last 66 years, the time between receiving RC funding and being awarded a Nobel Prize has grown from 0 to 30, 40, even 50 years.

Next Dr. Kellman distributed two charts on distribution of RC grants to institution. He said the charts show that 54 percent of RC awards were granted to institutions from which we have received only one or two proposals over the last 15 years. It was noted that we are not unique in this regard with a composite of a number of agencies showing a similar trend.

The discussion included identifying wasted award money, whether to consider only a single grant awarded to a number of institutions over 15 years a failure of RC, determining a desired outcome from the granting of an award, determining whether the institution or the individual PI is more important, determining whether RC funds science, faculty development or institutional development, determining RC's primary motive or objective. The committee wondered whether teaching loads might be a general predictor of such results. The committee also wondered what data from 2001-2006, might look like in comparison to that presented for RC grants for the 15 years 1986-2000 (see below).

Dr. Iverson said that if RC decides that institutions with few applicants don't need its services and focuses on the multi-applicant institutions, then RC becomes the foundation that only funds the big things or centers.

There was more discussion around ratifying the goals of RC and assessing the success of the programs.

Dr. Radziemski promptly produced and distributed a chart of awards made from 2001 to 2006

Dr. Hallock next directed the committee to the Program Officer reports contained in Tab 7 of the materials. He asked the Program Officers to discuss their roles, the programs and their vision for the future of RC. He said it was important to consider the transition in PO staff, career development for Pos, opportunities for Pos to see the research in action, the Pos responsibility to "train the tiger", and the Pos' opportunity to insinuate into APS and ACS.

Dr. Gentile reminded the committee that it needed to frame the conversations on where science is going, not that RC would necessarily fund the science. He said RC's vision for the future starts to shape the pulpit. He said the committee needed to take a broader view to create an opportunity to have an influence.

Dr. Dorhout asked the Pos if, during campus visits, faculty and administrators asked why RC doesn't fund this or that, and if it was a commonly heard question.

Dr. Ronco said no. Dr. Radziemski said he talks with administrators about the ROA program and asks them what they see as the value of the program. He gets nibbles, he said, i.e. a new scheme for delivering freshman labs, improving R1 undergrad education at the department level rather than faculty level, things like that.

Dr. Ronco said that RC has an opportunity to make an impact by helping Pis and developing departments.

The discussion included:

- considering joint proposals from Pis,
- finding a way to allow joint applications from two or more Pis,
- key words in the online application system to prescreen applications,
- caution against RC becoming paternalistic in the application acceptance process,
- changing the culture of what's accepted,
- measuring collaborative outcomes,
- expectations for Program Officer development and involvement in professional organizations,
- the suspended RC programs and any perceived loss as a result,
- what, if anything RC has to offer R1 post-tenure faculty and physics departments,
- RC grants becoming more valued in Canada,
- tweaking programs or creating something new,
- a program geared toward beginning faculty and a program geared toward innovative work by immediate post-tenure faculty.

Dr. Iverson noted that when the RIA was suspended, the CSA application numbers went up. Dr. Pladziewicz said that the number of CSA applications went up because he and Dr. Ronco conducted campus visits and promoted the program.

Dr. Crampton asked if requiring PI's to include the local department data in the proposals would be beneficial. Dr. Kellman said that was unnecessary as he and the Pos know the schools, and if they don't, they ask for data.

The discussion included whether to tell applicants why their proposals were rejected, whether information on applicant teaching loads, etc. should be collected, whether the CCSA program should be changed to meet needs in the community, whether to and how to fund research at the boundaries, and how RC could use information and perform outreach.

Dr. Gentile mentioned the Annual Report article and the spring newsletter. He asked the committee members to read both.

Dr. Hallock next asked Dr. Gentile to present his preliminary thoughts on Strategic Planning priorities and directions, noting that a more thorough presentation was likely at the time of the retreat.

Dr. Gentile led the committee through a PowerPoint presentation that was distributed as a handout.
He discussed RC's purpose, approach, targets, goals, a mission statement, means to accomplish goals, and a number of "questions of a strategic nature."

The discussion included RC hosted workshops, projects for the rotator program officers of the future, publications, book and lecture tour possibilities, a Nobel Laureate tour, RC certifying public information to educate the public, a Web site with links related to popular culture science questions, and partnering with professional societies.

Dr. Hallock next asked the committee to address Scientific Directions, what RC might do and why.

The discussion included

- RC being "light on its feet" and watching for the abnormal science or things no one anticipates,
- developing a review process that is "not locked in",
- developing a greater presence at R1 institutions,
- promoting interdisciplinary science,
- growing the endowment,
- developing a mechanism for continued assessment and review of programs,
- looking for measurable outcomes,
- fostering science and faculty development at PUIs,
- using key words in the online application system to bounce proposals,
- finding ways to fund the "wedges" no other agency is funding,

- spending down the endowment when necessary to respond to an exceptional opportunity,
- watching for new, good ideas and funding them,
- making the list of AAU as a foundation that offers significant support to academic institutions that are ranked,
- the centennial celebration,
- using the Department Development Award funds to create a new program at the R1s,
- how to leverage not only RC's dollars, but also its people,
- redesigning the RIA program to target energy research.

Dr. Iverson said that as an RC Board member, he wants to be able to say that the people who solved the energy crisis got their funding from RC. He also reminded the committee that it should not be conservative in the strategic planning process.

Dr. Hallock adjourned the meeting at 4:30 p.m.

The Strategic Planning committee reconvened on Saturday, July 8 in the Palo Verde room at the Westin La Paloma Resort.

Dr. Hallock called the meeting to order at 1:10 p.m. and reviewed the next steps and items to be addressed at the meeting. He started the discussion on education issues with the question: What do we mean when we say the word education? What should be RC's role?

The discussion included Cottrell Scholars being educators, the CS proposals requiring a teaching component, the Cottrell Scholar Conference workshops addressing education, the Scholar's innovative teaching ideas and methods, using education to drive research, offering a Web site clearing house of programs, best practices, etc. to share innovative ideas in teaching, and developing a professional growth mechanism for RC Program Officers and Awardees.

Dr. Gentile said that RC is working with Teacher/Scholars at both PUIs and R1s, but there is no conversation between the PUIs and the Ris. He asked how RC can start a conversation on Undergraduate Research.

The discussion included finding ways to measure if what Teacher/Scholars are doing has an impact. Suggestions included

- exit interviews of majors,
- alumni surveys,
- stimulating APS or ACS to make this happen,
- RC championing a continued discussion across disciplines to identify key things to use in a long-term assessment,
- how to measure the impact of education on career success,
- making the CS Conference more visible,
- expanding the CS Conference,

- building off this strong program,
- collaborating with other funding foundations/organizations to develop a national conference,
- RC serving as a matchmaker to establish collaborative partnerships between Cottrell Scholars from R1s and PUIs,
- and hiring a Development Officer to work on getting "buy-in" at the state and local level.

Harvard University Professor Dr. Eric Mazur joined the meeting at 2 p.m.

Dr. Hallock introduced the group and its goals. He said the committee was interested in Dr. Mazur's thoughts on the Teacher/Scholar and/or educating students and faculty development. He asked for Dr. Mazur's view on what role RC could play.

Dr. Mazur said that two things immediately come to mind:
- the Cottrell Scholar program
- RC publications.

He said that RC has an impact through the CS Program that is highly visible at R1s. He suggested expanding the program to make it even more visible. He said that any effort to continue or amplify these efforts will have a broad impact.

Dr. Schaefer provided a history of the CSA program.

Dr. Mazur suggested promoting the CS program through a visiting lecturer program that would increase the leverage of the awards, improve the visibility of the program and awardees, and raise the profile while beating the drum for the Scholars and the program.

Dr. Gentile asked for Dr. Mazur's thoughts on establishing a conversation between the R1sand the PUIs.

Dr. Mazur suggested meetings or workshops that target the new faculty in both R1s and PUIs. He described an annual, new faculty, NSF-sponsored conference in Washington, with workshops on a number of topics (how to write grants, time management, effectiveness training), and a visit to NSF.

The discussion included stimulating a conversation in the professional societies across the disciplines, RC organizing a conference where Cottrell Scholars are required to attend and bring a senior faculty member or administrator, publicizing CS success stories, the importance of undergraduate research, the Department Development Grants' campus-wide impact, how to evaluate proposals, and how to support graduate students and cultivate scholarship.

Dr. Mazur said that the Cottrell Scholar Award program is making an impact and thanked the committee for asking him to participate. He offered to promote the CSA program in

his travels, and to assist RC with planning a national conference and placing a CSA program article in a science publication.

The committee warmly thanked Dr. Mazur for his thoughts and offer to remain helpful and Dr. Mazur exited the meeting.

Dr. Hallock next turned the discussion to the continuing Strategic Planning process and direction and asked the committee to address a presentation to the Board of Directors.

Dr. Crampton said that he envisioned two groups of programs or directions for RC.

The first group includes:

- the Cottrell College Science Grants program which allows the Bio-faculty to participate,
- the Cottrell Scholar program which is good for science, teaching, and RC because it puts RC at the table at the R1s,
- the RIA program that needs some direction as to how and when and whom to target (perhaps faculty at R1s),
- and publicity/publications.

The other possibilities would include:

- an R1 Department Development program,
- the ROA program,
- the SOS program
- and a program targeting teaching graduate students and/or post docs.

Dr. Gentile suggested the committee present clear and strategic directions to the Board for example,
RC's mission is to develop scholar/educators at R1s and PUIs , to fund transformative research through the RIA program and to aggressively raise the national profile of RC.

Dr. Hallock raised the issue of enhancing the ability of RC to do all these things, possibly through enhanced funding. He asked if the committee wanted as a strategic goal for five years to grow the endowment.

The discussion included reallocation of funds, granting more awards, whether increasing the number of awards would degrade the quality of awards, whether publicity would increase the visibility of RC and its awards, developing assessment mechanism, establishing goals, objectives and reporting out annually, raising funds in conjunction with the centennial celebration, continuing the current RC programs with changes that are application directed, and RC's evolution as a result of responding to clientele which in turns leads to a new clientele.

Dr. Hallock next asked the committee to visit the question: What do non-academic types see as included in strategic planning?

Dr. Gentile reviewed the evolution of the strategic planning effort to date and said he believes the Board expects a reporting out on strategic planning from the committee.

Dr. Dorhout said he sees the Board's participation as an agreement on the mission and vision, as well as a strategic plan for Board membership and for regular evaluation of Bylaws and governance issues.
Dr. Hallock asked what the committee's perception on how broad the strategic planning should be.

The discussion included:

- looking at the landscape of future science and science education and comparing RC's programs to that landscape,
- engaging the entire Board in the process,
- whether the committee has done enough to develop a preliminary view of a strategic plan,
- presenting the current status of our work and broad strategic statements to the Board and allowing the Corporate and Financial members of the Board to suggest to the Task Force from their perspective any areas or aspects of strategic planning we may have overlooked.

Dr. Hallock said that a meeting summary and his notes would be distributed to the committee for feedback and that an advance view of his planned topics and an outline of his presentation planned for the Board retreat would be distributed for discussion possibly during a teleconference before the November meeting. He thanked all for participating and for the depth of engagement offered.

The meeting adjourned at 4:15 p.m.

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Linda Neefe, recording secretary

# Meeting Summary
**of the**
**STRATEGIC PLANNING**
**Ad Hoc Committee**
of the
Research Corporation Board of Directors

Tucson, Arizona

9 a.m.
November 4, 2006

| **Committee Members:** | **Guests:** | **Staff:** |
|---|---|---|
| Robert Hallock, Chair | Stuart Crampton | Jim Gentile |
| | | Raymond Kellman |
| Peter Dorhout | | Daniel Gasch |
| Brent Iverson | | |
| Patrick Osmer | | |
| John Schaefer | | Linda Neefe |
| G. King Walters | | Silvia Ronco |
| | | Jack Pladziewicz |
| | | Richard Wiener |

Dr. Hallock convened the meeting at 9:15 a.m. and discussed his plan of action for the meeting.

**Being duly moved and seconded, the summary of the July 7, 2006, Strategic Planning Ad Hoc Committee meeting was unanimously approved.**

Dr. Hallock next reviewed what occurred at the November 2, 2006, Board Retreat. He said that the entire Board has taken ownership of the Strategic Planning effort and has high expectations and enthusiasm.

The ensuing discussion included the Committee having a willingness not to be handcuffed by budget restraints in arriving at recommendations, developing measures to evaluate existing programs in a new way, considering spending $1 to $2 million a year on a new program or direction, planning for the centennial celebration, the possibility of a fund-raising campaign, spending a portion of the endowment to fund something compelling and staying focused on the recommendations and allowing RC management to develop the means to implement the Board-approved strategic goals.

Dr. Hallock next reviewed the list of challenges identified at the Board Retreat and asked the Committee to discuss any topics members felt had not yet been adequately addressed.

These challenges included: RC's structure (strengths, weaknesses, perception in the community, uniqueness what is enduring), RC's impact (enhance it, measuring success, how to address opportunities), Funding (how can we do more), and Decisions (the value of a cost benefit matrix).

The discussion included solving the problems of energy, having a conversation on directed research, establishing the ability of RC to change direction, creating targeted programs, taking innovative versus incremental steps, being willing to go where attempting to solve a problem leads, expanding RC's data base to create a new pool of reviewers and add value to the existing pool, the big issues of food and water, and establishing a matrix.

Dr. Hallock next directed the conversation to gender issues. He asked if RC addresses gender issues in a specific way. Does the Committee/Board/Staff want to do something specific? Do RC programs address gender?

The discussion included maintaining a focus on chemistry and physics where women face challenges, a publication to raise awareness of gender issues, the NSF report on women in science, the proposal screening/reviewing methods being gender blind, how to raise the RC award success rate for women, learning why women do not seek jobs at R1 institutions, and more.

Dr. Hallock asked if the same issues applied to minorities.

The discussion included special programs for minorities, a conference to bring together people who have done something successful to assist in this area, funding sabbatical leaves and collaborations, understanding that HBCUs lack the resources of space and equipment, that HBCU faculty is hired to teach not to do research and that the faculty at HBCU institutions apply for bigger awards from larger funding organizations.

Dr. Wiener suggested possibly finding the right minority-serving institution to work with on a Departmental Development Award and establishing a national model.

With this, Dr. Hallock asked the committee to discuss the Departmental Development awards. The discussion included establishing award programs measures of success, developing a matrix of active programs with before and after results, taking better advantage of the Department Development Award program, finding different approaches to improve the impact of a DD Award, disseminating information on what RC has done with DD Awards, the department development that occurs during the preparation work to get to where a department could apply for a DD Award, RC becoming more involved nationally in Department Development, shifting RC's focus on moving B+ departments to A departments to moving lower-end departments up, and more. President Gentile noted that there was a temporary administrative pause in the program at the moment; RC was taking a breather and there were lots of approaches to DD.

Dr. Iverson asked that the summary reflect the potential strategic idea of increasing the minority population in undergraduate programs.

The discussion continued around other ways RC could have an impact, the possibility of spending down the endowment, looking at other science funders and/or funding models, developing a conference where faculty/departments/schools could come together to talk with each other, and finding ways to cause institutional reform with a high payoff.

Dr. Hallock next asked the committee to address Education issues: supporting teacher/scholars and their professional growth, empowering students via hands-on research, supporting faculty/student research at PUIs, and not going where RC will have little impact.

The discussion included considering what is on the horizon for undergraduate research, if giving 1 or 2 undergrads money for research is only background noise, the experience at R1s, how researchers can fit not 1 student, but 60 into research projects, avoiding the increasing trend of science departments working with schools of education, finding the novel proposal that can be translated at the PUI level, RC finding a niche to impact R1s to balance programs, and more.

Dr. Hallock next asked the group to discuss outreach opportunities available to RC. The discussion included publications, web-based information sources, partners in science programs, the Mt. Lemmon Space Camp, finding a way to connect the public to science, expanding the reviewer base, participating in public lectures, i.e. UA Evolution and Global Warming lecture series, small discretionary grants to impact local High School teachers, establishing a peer-reviewed, "seal-of-approval" website clearing house for scientific information to help the public, and more.

Dr. Hallock next directed the conversation to program related initiatives. The discussion included RC focusing on opportunistic things, keeping an eye out for clever ideas, letting the world know that RC is open to ideas, maintaining that catalytic, opportunistic flexibility to fund a unique initiative, delineating RC's mission, vision and values and funding Program Related Initiatives in concert with them, the flexibility to fund a PRI that falls outside of RC's scope but moves science forward, professional development at RC, drawing the best and brightest from all areas to RC, and more.

The group broke for lunch from 12 to 1 p.m.

Dr. Hallock asked the group to discuss any strategic goals that should be included that were not yet addressed. The discussion included supporting institutional transformation, improving/increasing RC's visibility, identifying the audience of RC's increased visibility, RC being recognized as an organization that has something to say at the national level, an RC presence at the policy-issues table, the need for and possible impact of a fund-raising effort, and the need for RC to have clear, articulate values and goals that reflect them.

The Committee next reviewed its list of Preliminary Convergence Strategic Goals contained in Dr. Hallock's PowerPoint presentation and accompanying handout that was distributed at the Nov. 2, 2006 Board Retreat and again at the Nov. 4 Strategic Panning Committee meeting.

The discussion included promoting/championing the "Teacher/Scholar", distribution of RC's Annual Report, determining measures to improve assessment of all programs, including solving the Energy problem in some manner, creating opportunities for initiatives in the Energy area, establishing a legacy with the Strategic Plan document, the development of a concepts matrix, national vs. global issues and where RC's focus should be, visibility through conferences and staff opportunities, the centennial celebration and how and with whom to develop it, and more.

The Committee next discussed the awards programs, raising the level of recognition of recipients nationally, continuing the CCSA program following an evaluation and modification-where-necessary effort, the Research Innovation Awards Program, changing the profile of RIA awardees, managing the program, establishing an R1 program for innovation, whether the Research Opportunity Award grant is accomplishing what RC intended, formalizing a mechanism/policy/strategy with which programs are modified, avoiding a "kiss-of-death" through ROA proposal rejections, a discretionary grant in place of the RIA program, targeting RIA grants to women returning to work or to mid-careers who need a kick-start or as a post-tenure seed grant for high risk research or to fund faculty development initiatives.

Dr. Hallock turned the discussion to the work ahead and a schedule for completion. The discussion included establishing general strategic goals, informing the Board and advising that a matrix is in development vs. fast-tracking the process with a matrix for presentation to the Board in February, doing both to have information to present to a fund-raising professional, development of a non-detailed preliminary draft for the Board, prioritization of long and short term goals, and prioritization relative to costs.

Dr. Hallock said he would develop a set of strategic goals that mate the implicit with the explicit and include some examples. He will distribute this in a few weeks, asking the Committee to edit and add to the list. The final list would then be sent to Dr. Gentile so that management could develop a preliminary matrix with a "no-holds-barred" approach for discussion by the Committee in advance of the February meeting.

The discussion included assessing programs relative to strategic goals, the matrix including information on whether or not programs address their intended goals, creating a program evaluation project to be carried out by a fellowship student or a Rotator Program Officer or as a graduate thesis project, an RC internal program assessment effort using the strategic goals, the necessity of including creating the future scientific workforce in the Strategic Plan and going beyond the committees opinions in developing the plan.

The Committee agreed to work toward being ready by the February meeting.

The meeting adjourned at 3:15 p.m.

_____
Linda Neefe, Recording Secretary

# Meeting Summary – Draft
**of the**
**STRATEGIC PLANNING**
**Ad Hoc Committee**
of the
Research Corporation Board of Directors
Loews Ventana Canyon Resort
Tucson, Arizona

Noon
February 1, 2007

| **Committee Members:** | **Guests:** | **Staff:** |
|---|---|---|
| Robert Hallock, Chair | Stuart Crampton | Jim Gentile |
| | | Raymond Kellman |
| Peter Dorhout | | Daniel Gasch |
| Brent Iverson | | Linda Neefe |
| Pat Osmer | | Dan Huff |
| John Schaefer | | Silvia Ronco |
| G. King Walters | | Jack Pladziewicz |
| | | Richard Wiener |

Dr. Hallock convened the meeting at 12 p.m. and began with a review of the Strategic Planning initiative's timing, presentation to the Board, and management timeframe to develop and implement the plan.

Dr. Hallock said he planned to report briefly to the Board on the committee's progress at the February 3, 2007 meeting. He said that at this meeting, the committee should have a focused, sharp discussion on the materials developed thus far.

Dr. Hallock next asked for consideration of the November 4, 2006 Strategic Planning Ad Hoc Committee meeting minutes.

**Being duly moved and seconded, the summary of the November 4, 2006, Strategic Planning Ad Hoc Committee meeting was unanimously approved.**

Dr. Hallock next directed the Committee's attention to the Strategic Goals outlined in the meeting materials and asked for an in-depth discussion of all elements of the goals.

The discussion included approval of the written presentation format; an in-depth review of the wording of each of the four proposed Strategic Goals, with modifications made; which specific disciplines should be allowed/included in the future programs of RC; i.e., is RC limited to Chemistry, Physics and Astronomy?; maintaining the status quo or broadening the research projects funded, tweaking the review structure for proposals;

maintaining or changing the arbitrary filters that help to determine eligibility for submission to a program, i.e. the "letterhead" issue; assessment and the tools or measures that will be used to accomplish such; management developing an implementation plan; professional development of Program Officers, including defining Program officer duties; RC's national profile, branding of RC in the public mind; web-based information sharing; conferences, leadership activities; RC sponsored Awards through APS and ACS; education and what the word education means to us (see below); curriculum development, connections in the journalistic education world, and RC's educational initiatives.

The discussion continued on whether or not RC is involved in Education, a growing trend for funding organizations to pull away from research active research programs, undergraduate research being one of the best educational tools, RC advocating for the type of education that will advance science, whether colleges are moving away from research, research at the interface, who is funding this type of research, is research at the boundaries so at the cutting edge that no one will fund it?, does RC want to do this?

The continuing discussion included Cottrell Scholars, establishing a cohort of this group, a networking component to the Award, dissemination of information to the cohort and beyond, what things RC can do/fund that have ties to the history and spirit of RC, funding researchers who are teachers, and getting students into the labs to do research rather than have them read about research.

The Committee agreed that RC management and staff have the freedom to create an implementation plan to carry forward the Strategic Plan. The Committee also agreed that the plan would be presented to the Board at the April 2007 Annual Board Meeting and that RC management would present its implementation plan to the Board at the November 2007 meeting in Tucson.

Following a break, Jim Gentile delivered a PowerPoint presentation that is attached.

Following Dr. Gentile's presentation the discussion turned to the proposed Matrix – the two dimensional display, of desirable items and programs, their estimated costs, etc..

The discussion included whether management should produce a dual matrix to include what can be done within the current budget and what can be done with additional funds, how much detail should be included, identifying national needs and priorities in science funding, whether RC should take a leadership role through its program funding, whether RC should grow its endowment, raising money to push initiatives forward, doing something new and bold, not allowing the Strategic Plan to look like last years' annual report.

The group ended the meeting with a discussion of what will be presented to the Board at the February Board meeting.

The meeting adjourned at 4:25 p.m.

## Appendix G. Sources and References

A large number of sources and references were consulted by the members of the strategic planning committee during various stages of their work. This was particularly important when the committee addressed (1) the national funding climate, (2) the historical manner in which Research Corporation has supported scientific endeavor and (3) the scientific frontiers that are present in the various disciplines. A reasonable subset of these references is listed here, but this list is certainly not exhaustive.

### The National Funding Climate

For an updated version of many of the graphs and charts (drawn from the AAAS – American Association for the Advancement of Science) that informed the committee on various aspects of national funding issues, some of which are included in this report, see the PDF graphs that are found in: http://www.aaas.org/spp/rd/rd07tbls.htm. The National Science Foundation also tracks expenditures in various ways and considerable information on this can be found among the various tables and graphs that can be found at: http://www.nsf.gov/statistics/.

### Research Corporation Expenditures

Annual Reports of Research Corporation; Tables of data from Research Corporation Board meetings; budget information supplied by the Chief Financial Officer.

### The Scientific Frontiers

National Academy of Sciences, *U.S. Beckman Frontiers of Science Symposium*, November 2004.

National Academy of Sciences, *U.S. – U.K. Symposium on Frontiers of Science*, June 2004.

*A 21st Century Frontier of Discovery: The Physics of the Universe*, A Strategic Plan, National Science and Technology Council Committee on Science, February 2004.

An amusing article: *What's Wrong with These Questions*, N. David Mermin, Physics Today, February 2001.

*Physics in a New Era*, Thomas Applequist and Donald Shapiro, Physics Today, November 2001. A summary of the Overview (below) for the general membership of the American Physical Society. http://www.physicstoday.org/vol-54/iss-11/p34.html

*Physics in a New Era: An Overview*, National Academy of Sciences, 2000. See http://darwin.nap.edu/books/0309073421/html/R1.html for an online copy of the Overview volume. The preface to this book lists the earlier relevant volumes and important studies: "The overview is the final volume of the survey and was welcomed and supported by the Department of Energy, the National Science Foundation, and the National Aeronautics and Space Administration. Volumes published previously in the series are *Atomic, Molecular, and Optical Science: An Investment in the Future* (1994) (the AMO science survey), *Plasma Science: From Fundamental Research to Technological Applications* (1995), *Elementary-Particle Physics: Revealing the Secrets of Energy and Matter* (1998), *Nuclear Physics: The Core of Matter, The Fuel of Stars* (1999), *Condensed-Matter and Materials Physics: Basic Research for Tomorrow's Technology* (1999), and *Gravitational Physics: Exploring the Structure of Space and Time* (1999). In addition to these six volumes, which are known as the area volumes, the survey includes four more: *Cosmology: A Research Briefing* (1995), *Cosmic Rays: Physics and Astrophysics* (1995), *Neutrino Astrophysics: A Research Briefing* (1995), and *The Physics of Materials: How Science Improves Our Lives* (1997). A related study that was recommended by the AMO science study is entitled *Harnessing Light: Optical Science and Engineering for the 21st Century* (1998)."

*Science Magazine, 125 Questions*, July 1, 2005 (Vol. 309, Issue 5731, p. 1). 125th Anniversary Special Issue. This issue explored 125 outstanding opportunities for scientific investigation.

*Astronomy and Astrophysics in the New Millennium, 2001*, National Academies Press. The NAS/NRC decadal survey for NASA and NSF projects.

*Connecting Quarks with the Cosmos: 11 Science Questions for the New Century, 2003*, National Academies Press

## Appendix H. Statistical Information

Statistical information can be dry and rather uninteresting, particularly to those who may not have direct interest in some of the details. None the less, the Strategic Planning Committee directed its attention to a number of charts and tables of statistical information in an effort to understand funding at the national level as well as the recent funding history within Research Corporation. Some of the more relevant information is presented here for completeness, with an effort made in each case to provide a bit of context.

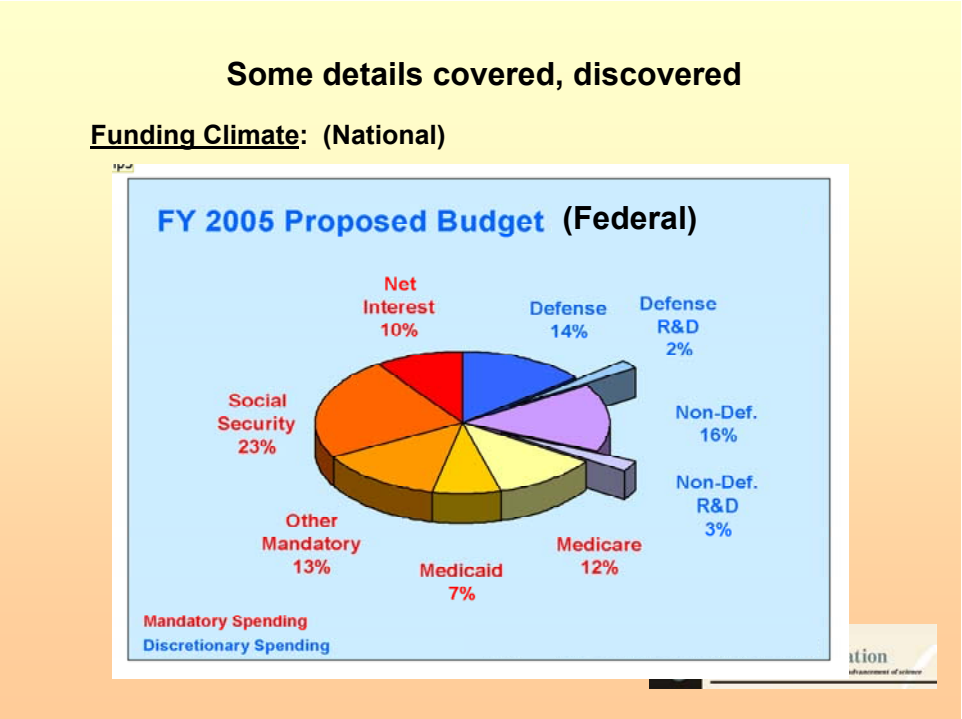


Figure 1. From the most recent Federal data available to the committee we explored how much of the Federal budget was devoted to various categories. Non-defense research and development is a small part of the Federal pie.

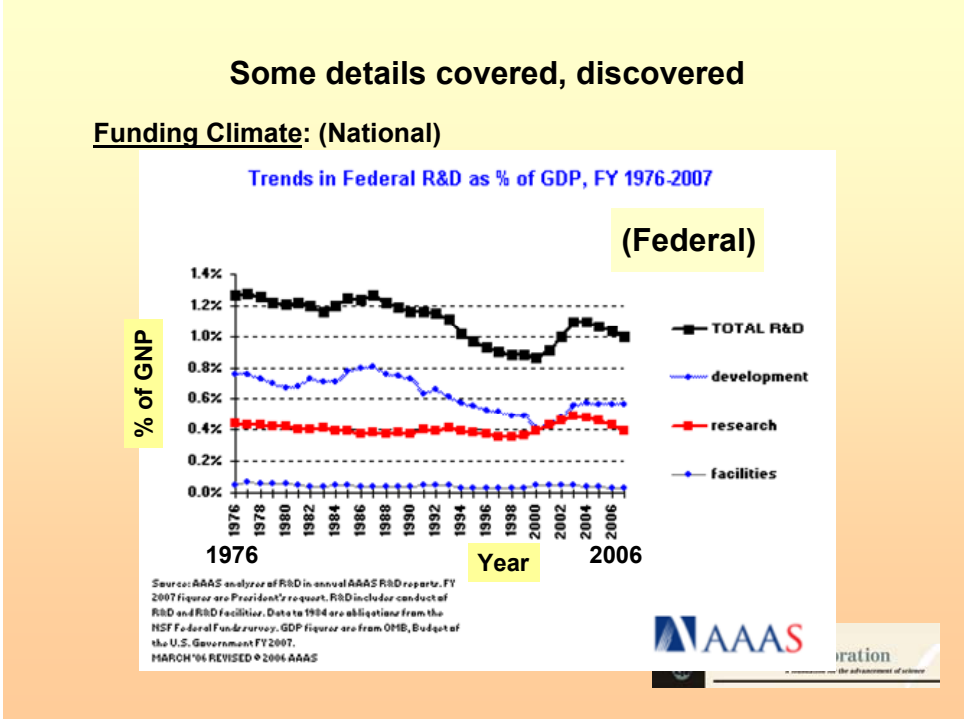


Figure 2. The portion of the Federal budget expressed as a percent of Gross National Product is shown as a function of time for a period of twenty years. Research is separated from development. Facilities include national facilities that can be used by researchers as the need arises.

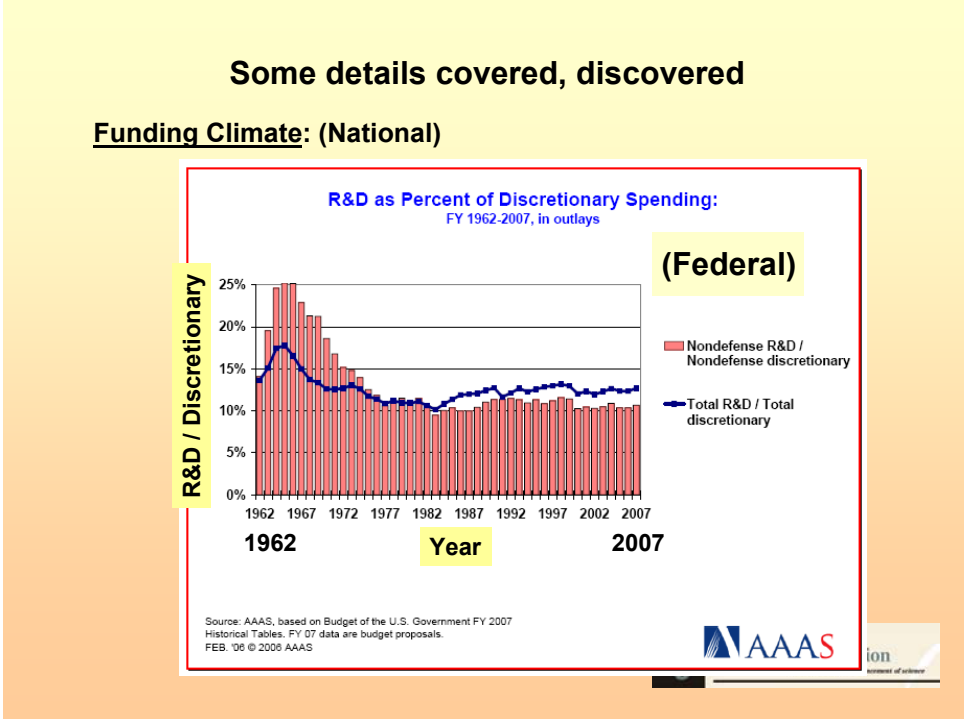


Figure 3. The Federal budget has only modest discretionary funding, with much of the budget tied up in various "required" programs, such as entitlements. Here is shown the history of the percentage of the discretionary budget that is devoted to research and development over a period of 45 years.

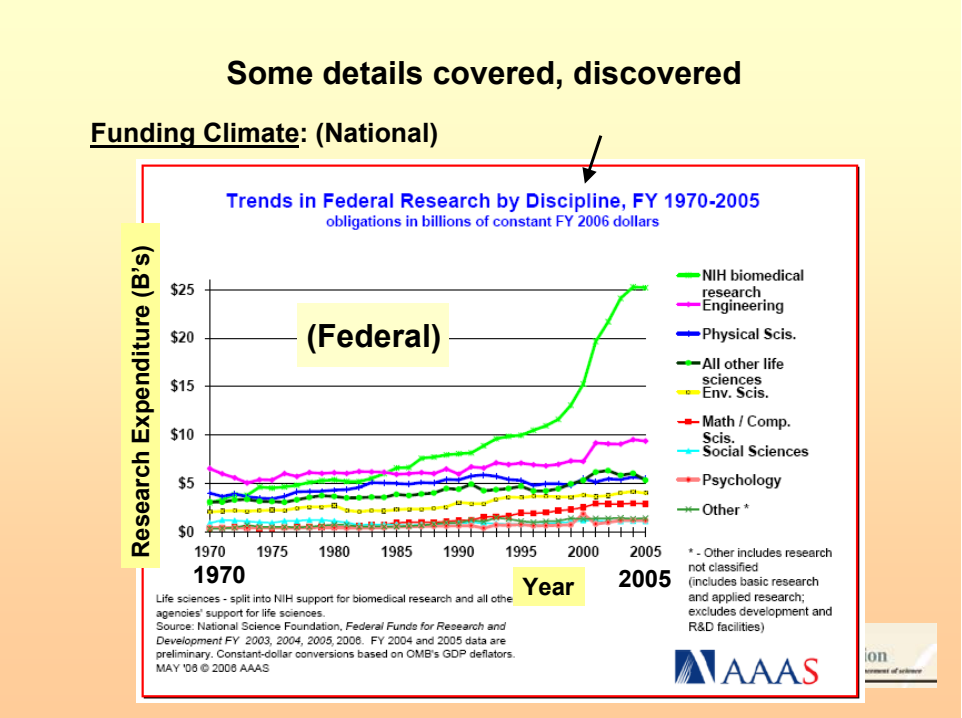


Figure 4. A twenty five year history of expenditures among a number of scientific disciplines – in constant FY 2006 dollars. The dramatic rise in support for the National Institute of Health is readily apparent in this data, as is the more recent plateau of that support.

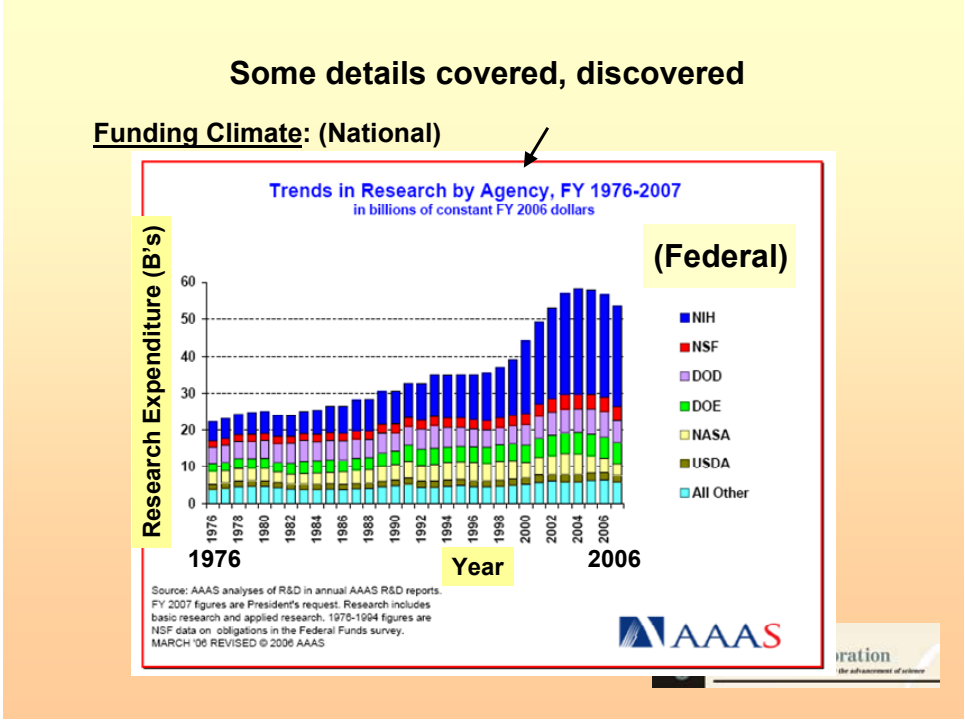


Figure 5. Research expenditure by each of the major Federal agencies that support scientific research – in constant FY 2006 dollars. Again here, the rise in National Institute of Health support is visible, and the recent plateau in such support is seen by the loss in purchasing power. There is substantial support for an increase in the budget of the National Science Foundation, but previous pledges have not been delivered on. None to less, just recently (early 2007) legislation did increase the NSF budget in a difficult funding climate that left many agencies flat-funded or worse.

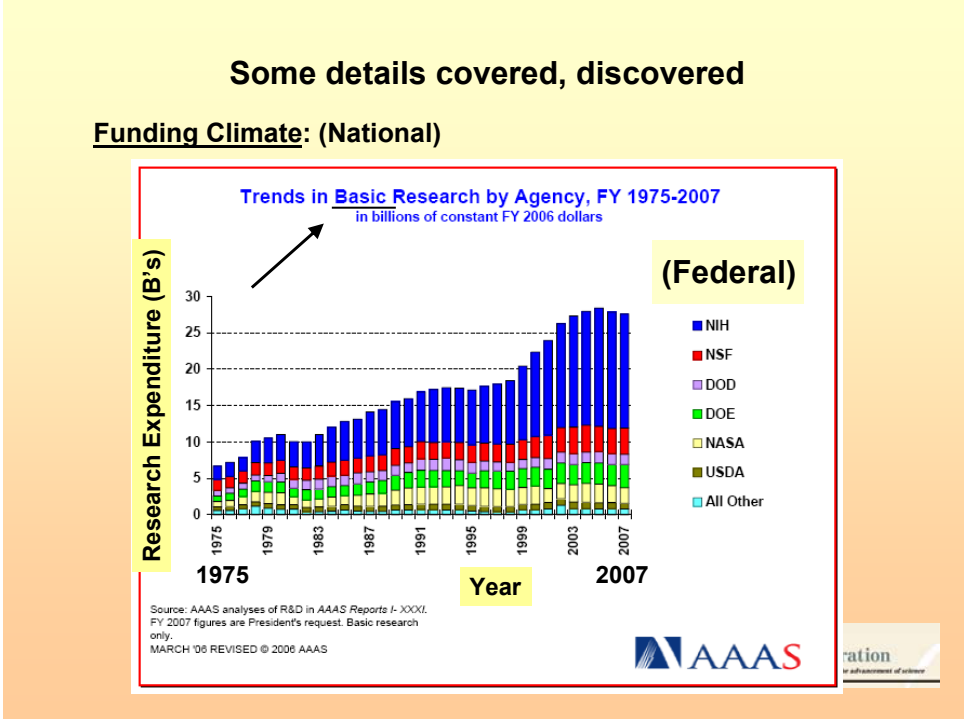


Figure 6. This data set appears similar to the previous chart but here the research expenditures are in the category of "basic research". This excludes applied research. So, for example, if you discover a new material, you are generally doing basic research; if you find a use for that material in a device, you are generally doing applied research. Proposals to the agencies typically make clear which is relevant, but there are grey areas where the two overlap.

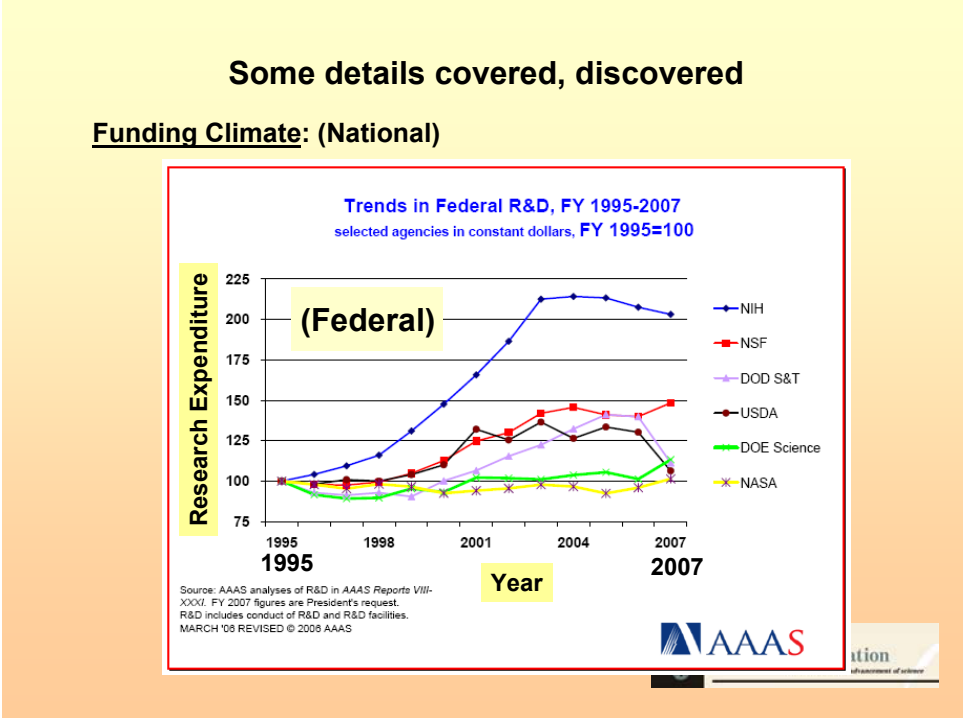


Figure 7. Similar data on the trends in Federal support, but this time expressed in terms that allow quick percentage comparisons. So, here each agency is defined at 100 units in FY1995 and this show the relative growth in support among the different agencies. So, NIH went up 213 % from 1995 to 2003, with there never being a decrease. NSF, on the other hand, suffered a small decrease in 1997 and by 2003 was at about 140 percent of its 1995 funding level.

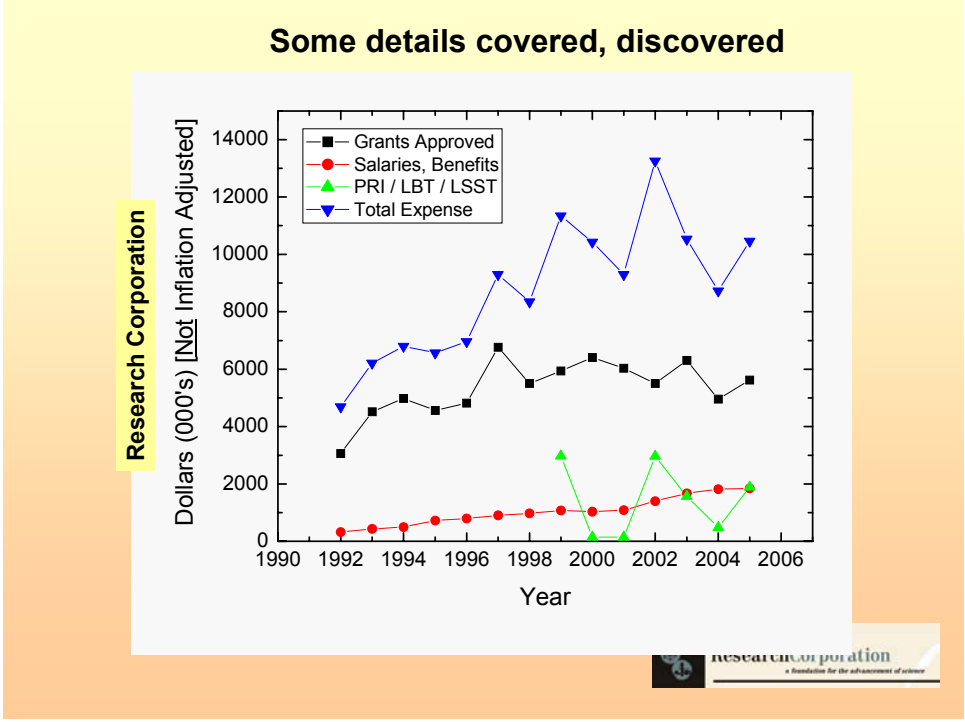


Figure 8. Research Corporation expenditures in dollars that are not inflation adjusted in the four areas of (1) grants approved, (2) salaries and benefits, (3) program related initiatives, e.g. LBT and LSST, and (4) total expenditures.

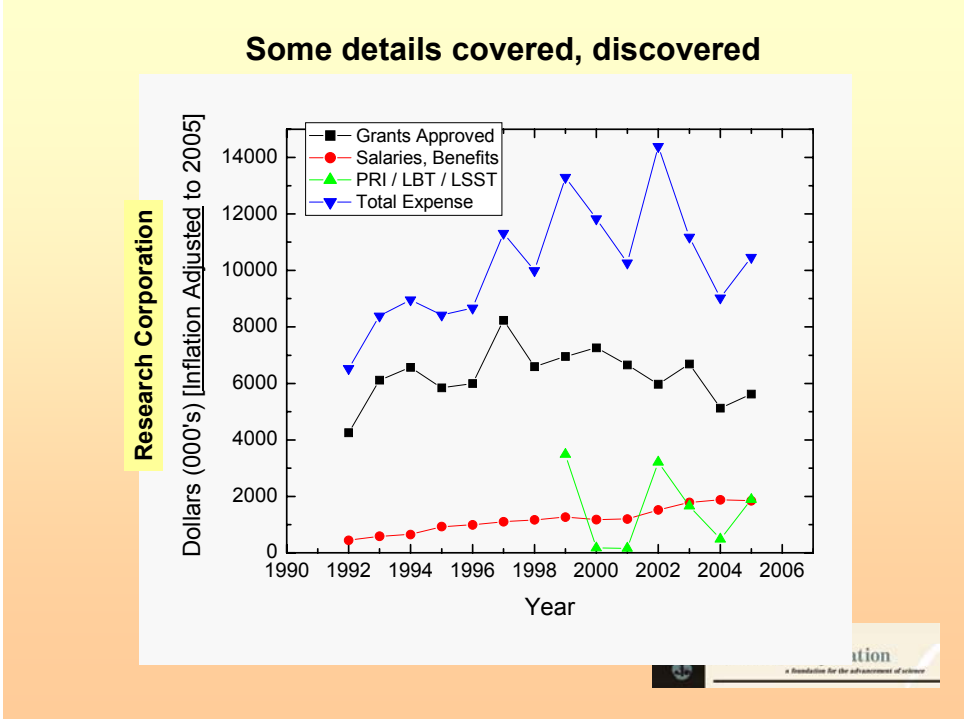


Figure 9. Research Corporation expenditures in dollars that are inflation adjusted (to FY 2005) in the four areas of (1) grants approved, (2) salaries and benefits, (3) program related initiatives, e.g. LBT and LSST, and (4) total expenditures.

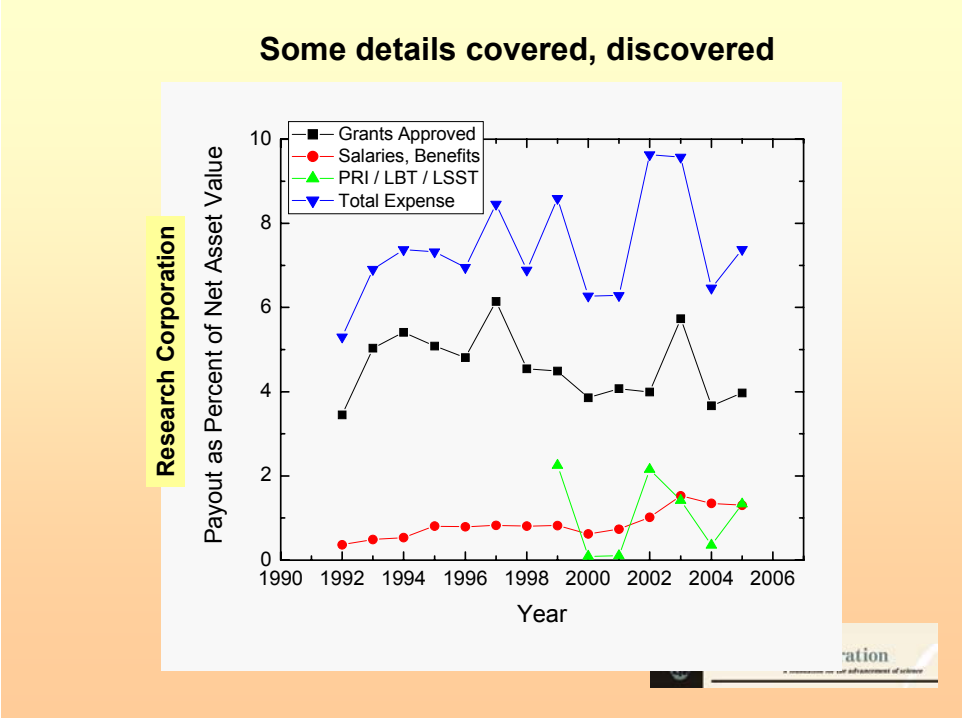


Figure 10. Expenditures of Research Corporation as a percent of net asset value in the same four categories as in previous figures. To get these data, the expenditures in each category were simply related to the net asset value in that particular year.

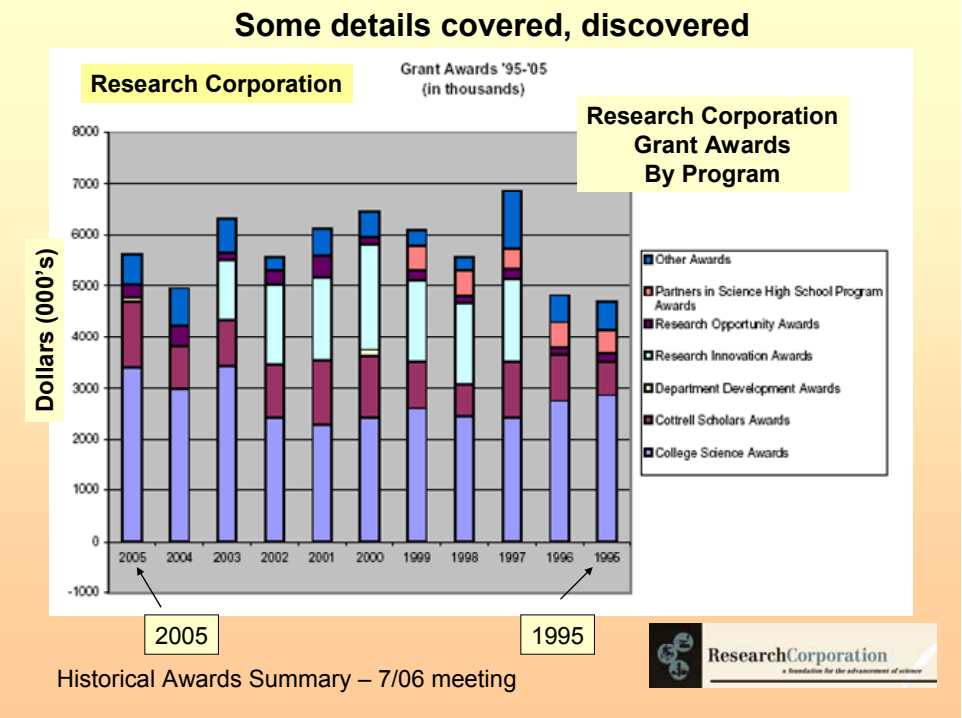


Figure 11. Expenditures in the various Research Corporation grant programs by year. This shows the shifts in expenditures among the various programs from year to year.

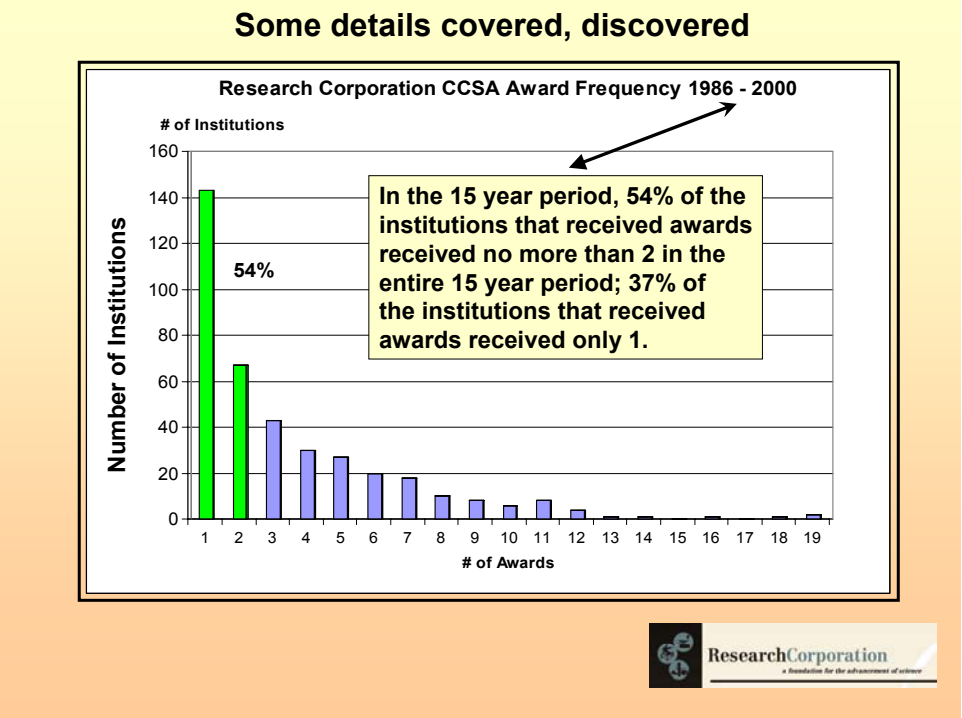


Figure 12. A substantial number of institutions that have received grants from Research Corporation have only rarely received such an award. The commentary that accompanies our recommendations comments on this and the need for care when attempting to understand the relevance.

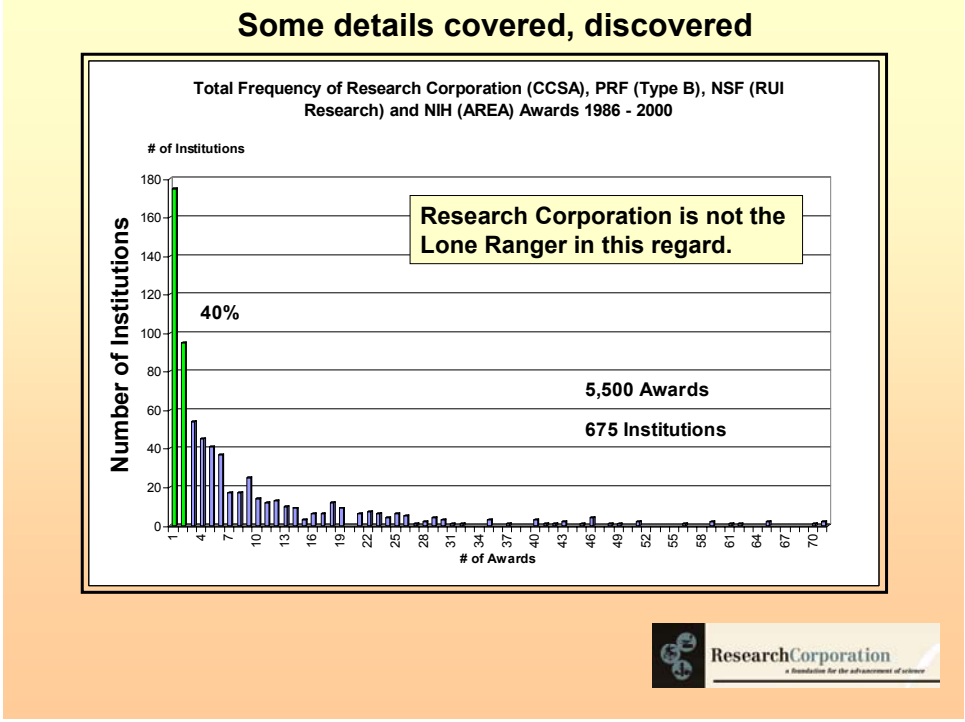


Figure 13. Research Corporation is not an isolated agency when it comes to rare awards. Many other agencies have the same funding profile in this regard.

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