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**A Celebration of the 20th Anniversary of the National Science Foundation's
Industry University Cooperative Research Centers Program January 11-12, 1994**

Future Directions for Multimember Research Collaborations: The Best Path for Industrial Research?

New Jersey Institute of Technology, University Heights, Newark, New Jersey 07102

November 30, 1993

Dear Member of IRI:

The Industrial Research Institute, in partnership with the National Science Foundation, New Jersey Institute of Technology, and the Engineering Foundation, is organizing a national conference addressing fundamental issues and concerns about the future of industrial research in this country. The January 11-12, 1994, conference in Washington, D.C. will focus on the roles of industry, government and academic institutions in meeting industry needs through collaborative research initiatives.

You should have received a brochure about the conference a few weeks ago, but I want to provide you some additional information about its purpose and expected results. In this time of resource constraints, I know there is interest by the industrial community in effective outside sourcing of technology. The major objective of the conference is to explore and provide hands-on information about multimember collaborative research entities as a resource. Plus, the conference will develop an action plan for federal support and activities that can improve the ability of collaborations to deliver useful results to industry. I believe the conference will be strengthened by your participation. I also believe that your organization will benefit from the information shared and the new contacts made.

The conference is titled "Future Directions for Multimember Research Collaborations: The Best Path for Industrial Research?". The subject is timely due to the current evolution of the federal strategy for supporting the United States manufacturing base and its worldwide competitiveness. The new expectations of NIST and ARPA programs, for example, build upon collaborative efforts among companies, governments, and academic institutions. Competition for available federal support will be helped by informed understanding of how multimember collaborations are formed, what they can do, and the relationship between specific types of collaborations and individual research and development activities and accomplishments.

The conference will provide three focussed sessions addressing major issues:

What Can Multimember Research Collaborations Achieve:

Includes topics such as economics, international comparisons, organization for optimum personnel involvement, and regulatory and legal implications.

Co-sponsored by



Engineering
Foundation



Industrial
Research
Institute



National
Science
Foundation

Different Types of Multimember Research Collaborations:

Includes presentation and discussion of four different types of collaborative research organizations; Government/Industry Collaboration, National Science Foundation Industry/University Cooperative Research Centers, State Sponsored Collaboration, and Multi-industry Collaboration.

Participatory Meeting with Policy Makers from Congress and Administration:

Policy Makers will provide perspective from the governmental groups they represent and will respond to questions and suggestions from participants.

As keynote and theme speakers, Senior Executives from the Federal Government and the Private Sector will provide perspective and suggestions about the importance of research to industry and of effective roles for the federal government in helping and supporting collaborative research in response to current needs. Mary Good, Undersecretary for Technology, Department of Commerce, and Robert Kavner, CEO of AT&T Multimedia Products and Services Group, have committed to speak. Other senior government officials, including John Gibbons, Science Advisor to the President, and managers at NIST and ARPA have been invited and are expected to be represented at the conference if they cannot attend personally.

The Conference commemorates the 20th Anniversary of the National Science Foundation Industry/University Cooperative Research Center Program, a successful example of federal government support for the creation and nurture of industry/university/government research collaborations. Representatives from each of the 50 Industry/University Cooperative Centers will be present to showcase their research programs and share information about their specific research agendas and how the individual centers address industry research needs and interests.

The Conference has the potential to affect dramatically the federal role in advancing industrial research needs. Besides gaining hands-on knowledge about organizing and operating collaborative research organizations, attendees in the participatory session will have a key role in proposing a federal agenda for the future. This agenda will serve as an action base for enhancements, refinements, and new initiatives in federal programs for the further advancement of industrially relevant research in the United States.

I have enclosed information about conference registration and hotel information, and more details about the conference agenda, including the distinguished experts who will be addressing the conference. Please note that the deadline for making reservations at the hotel is December 15, 1993. If you have any questions or need additional information please call me at (201) 596-3465 or the Conference Office at (201) 642-4385. I look forward to seeing you in Washington in January.

Very truly yours,



Daniel J. Watts
Executive Director
Emission Reduction Research Center
New Jersey Institute of Technology

**FUTURE DIRECTIONS FOR MULTIMEMBER RESEARCH
COLLABORATIONS:
THE BEST PATH FOR INDUSTRIAL RESEARCH?**

JANUARY 11, 1994

8:30 a.m. - 8:45 a.m. :

Welcome - **Dr. Neal Lane**, Director of the National Science Foundation

9:00 a.m. - 9:45 a.m. :

Keynote Address - **Dr. John Gibbons**, Director - Office of Science and Technology
Policy, Science Advisor to the President (invited)

9:45 a.m. - 10:00 a.m. :

Coffee Break

10:00 a.m. - 12:00 noon :

Panel: Multimember Research Collaborations: What Can They Achieve?

- Inter-disciplinary panel will explore the effectiveness of consortia in general from a variety of perspectives.

Dr. Howard Aldrich - University of North Carolina - Chapel Hill

C. Richard Deininger - Director of National Resources - SEMATECH

Dr. Bela Gold - Claremont Graduate School

Dr. Al Link - University of North Carolina - Greensboro

Dr. Lois A. Peters - Rensselaer Polytechnic Institute

12:00 Noon - 1:30 p.m.

Lunch/Industry Keynote Address - **Robert M. Kavner**, CEO of ATT Multi-Media
Product Services

1:30 p.m. - 3:00 p.m.

Panel : Different Kinds of Multimember Research Collaborations

- Representatives from 4 different models of Collaborative Research Centers will make overview presentations.

I/UCRC - **Edward Haug** and **Denis Gray**

MCC - **Craig Fields**

Edison Welding Institute - **Karl H. Graff**

USCAR - **Don Walkowicz**

3:00 p.m. - 3:30 p.m. - Break

3:30 p.m. - 4:30 p.m.

Interactive question/answer/discussion session among panelists and the audience

4:45 p.m. - 6:45 p.m.

Cocktails, Hors D'oeuvres, I/UCRC Showcase Exhibition

Exhibits will include: Manufacturing; Electromagnetics, Electronics and Optics; Materials; Computers--Hardware and Software; Environment and Health.

6:45 p.m. - 9:00 p.m.

20th Anniversary Dinner, Celebration, Partnership Recognition Ceremony

- Speaker honoring the I/UCRC Program - **John White**, Dean of Engineering, Georgia Institute of Technology
- Speaker leading the Partnership Recognition Ceremony - **S. George Walters**, Rutgers University

JANUARY 12, 1994

7:00 a.m. - 8:00 a.m.

Continental Breakfast

8:00 a.m. - 9:00 a.m.

I. Roundtable Discussions

Will develop such themes as intellectual property, determining project selection, anti-trust and other regulatory issues

9:00 a.m. - 10:00 a.m.

II. Participatory Meeting

Designated speaker from each of the roundtables and from the floor will present policy makers with issue and concerns which arise from the discussions

Moderator - **John Warren**, Research Triangle Institute

Policy Panelists - **Dr. James Wilson** - House Subcommittee on Science,

Patrick Windham - Senate Subcommittee on Commerce, Science and

Transportation, **Skip Johns** - OSTP, in addition representatives from OMB and ARPA.

10:00 a.m. - 10:15 a.m.

Coffee Break

10:15 a.m. - 11:30 a.m.

Continuation of the Participatory Meeting

11:30 a.m. - 12:00 noon

Final Theme Speaker - **Dr. Mary Good**, Undersecretary for Technology,
US Department of Commerce

**A Celebration of the 20th Anniversary of the National Science Foundation's
Industry University Cooperative Research Centers Program January 11-12, 1994**

Future Directions for Multimember Research Collaborations: The Best Path for Industrial Research?

New Jersey Institute of Technology, University Heights, Newark, New Jersey 07102

Anne S. McMahon
Deputy Project Director
National I/UCRC Conference
New Jersey Institute of Technology
University Heights
Newark, New Jersey

August 30, 1993

Mr. Skip Johns
Office of Science & Technology Policy
17th & Pennsylvania Avenue, NW
Washington, DC 20500

Dear Skip:

I would like to thank you for agreeing to participate in our conference, "Future Directions for Multimember Research Collaborations: The Best Path for Industrial Research?".

This conference, co-sponsored by the National Science Foundation, the Industrial Research Institute, the Engineering Foundation and the New Jersey Institute of Technology will be held at the Hyatt Regency on Capitol Hill in Washington, DC on January 11-12, 1994.

With this conference, we intend to identify the many problems industry faces in maintaining a strong research program, e.g., high cost, modest success rate, weak technology transfer, too long an incubation period for ideas to become process and products. Having identified the problems, we intend to show how various types of collaborative centers contribute to their solutions.

January 12, the second day of the conference will be composed of three sessions devoted to the future of multimember research collaborations. The first session will include roundtable discussions on the issues which concern collaborative research. During this session participants will be expected to formulate a series of questions with which to address the policy panel.

Immediately following the roundtable discussions, will be the participatory meeting in which you have agreed to be a panelist. In many ways this is the high point of the

Co-sponsored by



conference. Joining you will be Dr. John Warren from the Research Triangle Institute, who has agreed to moderate this session. In addition, Dr. James Wilson from the House of Representatives Subcommittee on Science and Mr. Patrick Windham from the Senate Subcommittee on Science, Technology and Space have been invited to be on the panel.

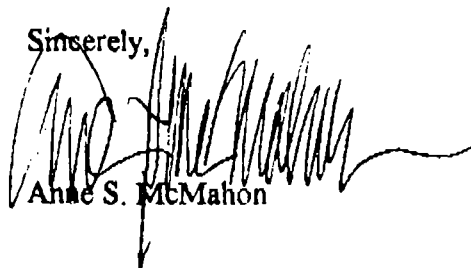
This particular aspect of the program is based on the design President Clinton used in his Economic Conference, with attendees invited to make a statement pertinent to the topic of the meeting before the policy panel. These would be short statements -- no more than three minutes in duration -- which might prompt comments or questions. The panelists and the moderator will be expected to respond to the members of the audience who come forward and encourage discourse back and forth. At the end of this session, you will be given an opportunity to offer closing remarks.

Dr. Mary Good, the Undersecretary for Technology of the Department of Commerce has agreed to close the conference with a summation of the most provocative ideas that emerged from the participatory session and share her thoughts on the role such collaborations might play in our nation's future.

Attending the conference will be approximately 500 professionals, including at least 250 vice presidents and directors of research from industry. The remainder of the audience will be media representatives, senior academics and representatives from the Executive and Congressional branch of government.

I am enclosing a short piece on the objectives of the conference and a copy of the program. Once again, on behalf of all of our co-sponsors, thank you for agreeing to participate. I will be in touch with you in the next few weeks to discuss the details of the program. In the meantime, if you have any questions I can be reached at (201) 596-6077 or fax (201) 596-6454.

Sincerely,



Anne S. McMahon

**FUTURE DIRECTIONS FOR MULTIMEMBER RESEARCH
COLLABORATIONS:
THE BEST PATH FOR INDUSTRIAL RESEARCH?**

FIRST DAY:

8:30 a.m. - 8:45 a.m. :

Welcome - NSF Director (Identifies NSF and other organizations as sponsors of this Conference in honor of the 20th anniversary of the I/UCRC program).

Welcome - Appropriate representative from other major sponsor(s) of Conference.

8:50 a.m. - 9:00 a.m. :

Introduction of Keynote Speaker by NSF Director

9:00 a.m. - 9:45 a.m. :

Keynote Address

- What research challenges (needs) are facing industry today (accelerate industrial research into practice; insist on collaboration between research and production so that useful research outcome will be used to benefit the corporation; reduce direct and overhead costs of doing research and thus, allow more risk taking; expand the range and quality of experts available).

- How are we trying to respond to these challenges (e.g., a new strategy --multimember research collaborations)

9:45 a.m. - 10:00 a.m. :

Coffee Break

10:00 a.m. - 12:00 noon :

Panel: Multimember Research Collaborations; What Can They Achieve?

- What are criteria that should be satisfied in order to establish a multimember collaboration?

- Articulate criteria for successful collaborations (establish a benchmark).
- What do we require multimember research collaborations to achieve?

(A fifteen minute question period at the end of session)

12:00 p.m. - 1:30 p.m.

Lunch

Keynote Industry Speaker

1:30 p.m. - 4:30 p.m.

Panel: Different Kinds of Multimember Research Collaborations

- Government /University/ Industry -- I/UCRC
- Government / Industry -- MCC
- University / State -- Edison Welding Institute
- Multi-Industry Collaboration -- US CARS

[Each panelist will (1) describe collaborations, (2) identify the nucleating mechanism which brought the collaborating organizations together, (3) describe why they are successful - what they achieve that single company efforts can't (don't) achieve, (4) identify what and how improvements can be realized]

(A fifteen minute question period after each talk)

4:30 p.m. - 4:45 p.m.

20th Anniversary Celebration of the Establishment of the I/UCRC Program

- Announcement of celebration and brief history of the I/UCRC Program

4:45 p.m. - 6:45 p.m.

Cocktails, Hors D'oeuvres

(The bar and hors d'oeuvres table will be placed in the midst of the tabletop exhibits so that it will be natural for participants to wander through the exhibit area. The tabletop exhibits will be arranged in five generic research areas: Manufacturing; Electromagnetics, Electronics and Optics; Materials; Computers--Hardware and Software; Environment and Health. A mapping of the tabletop exhibit area will be provided for each participant.)

6:45 p.m. -8:00 p.m.

Anniversary Dinner (desert will be birthday cake.)

8:00 p.m. - 8:30 p.m.

Speaker Honoring Center Program

--I/UCRC history

--their successes

-- Their contribution to industrially relevant research

8:30 p.m. - 9:00 p.m.

Recognition Ceremony -- Presentations made by representatives from the Industry Research Institute and the Engineering Foundation.

***Recognition of the industries, agencies and individuals that have made the I/UCRC program a success**

FUTURE DIRECTIONS FOR MULTIMEMBER RESEARCH COLLABORATIONS: THE BEST PATH FOR INDUSTRIAL RESEARCH ?

SECOND DAY

7:00 a.m. - 8:30 a.m.

Continental Breakfast

8:30 a.m. - 9:30 a.m.

Future Role of Multimember Research Collaborations (I)

- Audience will be seated in the plenary meeting room at roundtables accommodating 15 to 20 participants each. At each roundtable there will be seated a discussion leader and a scribe who will lead a discussion of the topic. Each roundtable group will identify the most important issues they have discussed and will appoint a member of their roundtable group to formulate a series of questions to address to the policy makers during the following session. A list of possible issues of concern to the roundtable groups is given below. Notes of the discussion will be taken. The notes will be transcribed after the conference and sent to each participant. The notes will also be included in the proceeding of the conference.

- * Limits to the growth of the model
- * Funding mechanisms; are they adequate?
- * Nucleating mechanisms (multicorporations, other)
- * Dealing with intellectual property
- * Could the research be made even more relevant to industrial needs while protecting the integrity of the university's mission?
- * Could the collaborations even more effectively promote technology transfer

9:30 a.m. - 10:15 a.m.

Future role of Multimember Research Collaborations(II)

Participatory Meeting

A moderator and a group of policy makers will open with a brief 10 minute introductory. Ideally the policy makers would include: an OSTP representative, appropriate staff members from the Senate and the House, including a member of the minority staff. These statements would be followed prepared, but provocative statements/questions from the IRI and the Engineering Foundation, which will be answered by members of the policy panel before going into the break.

10:15 a.m. - 10:30 a.m.

Coffee Break

10:30 a.m. - 11:30 noon

Participatory Meeting

The moderator will open this session, calling upon the designees from each of the first session round tables to come forward and ask the policy makers to respond to one of the questions which their round table had formulated. (Each rountable will be told prior to Session I that they should formulate several questions to avoid getting gonged by the moderator for redundancy.) Audience members will also be encouraged to come forward and speak for no more than three minutes. The speakers and the moderator will be expected to respond to the members of the audience who come forward and encourage discourse back and forth. In addition, a group of predetermined participants with prepared questions and comments -- selected from the registration applications -- will be standing by to ask their questions. The session will be closed with brief summations from each of the policy speakers.

11:30 - 12:00 noon

Future Role of Multimember Research Collaborations (III)

Theme Speaker:

- * Role multimember research collaborations might play in our Nation's technology policy.
- * The role they might play in American competitiveness.
- * Future global challenges multimember research collaborations.

FUTURE DIRECTIONS FOR MULTIMEMBER RESEARCH COLLABORATIONS: THE BEST PATH FOR INDUSTRIAL RESEARCH?

Facing the challenges of a rapidly changing global economy, universities, government and industry are reexamining the role of collaborative research & development in helping the US maintain its competitive edge. To bring these groups together and provide a forum for discussion, the National Science Foundation's (NSF) Industry/University Cooperative Research Center (IUCRC) in conjunction with the Industrial Research Institute, the Engineering Foundation and the New Jersey Institute of Technology will be hosting a conference at the Hyatt Regency Hotel in Washington, DC on January 11-12, 1994. This Conference will also serve to honor the 20th Anniversary of the IUCRC program.

Conference participants will have an opportunity to share their substantial experience and analyze the effectiveness of multimember research collaborations in stimulating economic growth as they develop the following themes:

- An overview of the problems and opportunities for economic growth in an intensely competitive global economy.
- An assessment of the overall contributions to growth that consortial centers have played dealing with issues such as: When are consortial centers appropriate? What are the issues of organization and governance? and What are the measures of success that are appropriate?
- Specific examples of the lessons learned from each of the major types of consortial centers.
- An open discussion with the panelists representing policy making bodies on the future of consortial centers.

Exploring specific models of consortia will reveal how multimember research collaborations are among the most cost effective vehicles for industry to promote growth and stay competitive. This is illustrated by the IUCRC model which was created in 1973 by the NSF to produce long term interaction between industries and universities. IUCRC programs are based upon the needs and interests of industrial members, but are developed in such a way that both industry and university enjoy mutual benefits

Today the IUCRC program has more than 50 centers at more than 60 universities throughout the United States. Its current total industrial membership is 700, up 600% from the initial 100 members in 1973. All totaled annual center expenditures are \$54 million with about \$25 million coming from industry. Individual center research budgets range from \$285,000 to \$9.5 million.

Even in these uncertain economic times, when in house R&D programs are shrinking, center programs are enjoying continued and increased industry support. In Fiscal Year 1990, IUCRC research resulted in at least \$34.6 million in R&D investments back in member company labs, \$7.9 million in individual contracts with industry and \$3.1 million in other outside contracts, for a total of at least \$45.6 million in "follow-on" funding investments by member firms. The total industrial R&D investment attributable to the IUCRC came to more than \$100 million.

While research by its very nature, has a tendency to conflict with the bottom line orientation of industry, these R&D investment figures clearly indicate industry satisfaction with the IUCRC program. Center programs provide an environment that is conducive to innovation and that effectively facilitates technology transfer. Consider some of the new products and process which have recently emerged from the IUCRC program and have resulted in industry savings and growth:

Improved Handling of Materials A major electronic manufacturer had decentralized its sourcing for components across a number of plants in a large metropolitan area. The result was a high rate of between plant transport, large inventories and an uncertain supply of parts. Using technology developed at an IUCRC devoted to material handling research, the company modified its material supply to use a central hub and spoke configuration, is reported that the changes in operation due to Center Development reduced the work-in-process inventory by \$100 million, reduced personnel cost associated with material s handling by \$3 million per year and saved an additional \$10 million per year on carrying cost.

Plastics Recycling A plastics recycling research center developed a large scale (5 million lbs. per year) pilot plan for recycling plastic bottles and licensed the process to 21 licensees. One licensee invested \$10 million in a 60,000 sq. ft. recycling plant that processes 40 million lbs. per year of reclaimed plastics from the northeastern United States.

Process Control for Glass-Making Glass making, an ancient art relying more on sight and trial and error, than on science moves into a new era with the adaptation of computers to the process. One IUCRC has developed a statistical process control program for glass batching and melting, which is the first program to be available to the entire glass-making industry. Two Center member companies broke a tradition of secrecy in this industry to share their batch and oxide data with the Center, making research possible.

Other models of multimember research collaboration to be explored in greater depth include multi-industry/government models such as SEMATECH. This multimember collaboration was recently described by the General Accounting Office as demonstrating that "a consortium can help improve an industry's technological position while at the same time protecting the Government's interest in having the consortium managed well."

States such as Ohio, Michigan and Pennsylvania have recognized that multimember collaborations are proven effective in sparking economic growth and development. As a result, these state governments have nucleated and funded consortial centers which focus specifically on local needs and concerns.

In addressing the problems that industry faces in maintaining a strong research program, this conference will demonstrate how multimember research collaborations provide viable solutions to keeping US industry competitive. In addition, it will look to the challenges facing US industry tomorrow, and consider the future global role of multimember research collaborations and how they can be used in setting the Nation's technological policy, public policy and environmental policy.

December 9, 1993

To: Federal S&T Committee Members
Subject: Next Meeting, January 14, 1994

< The FST Committee will meet on Friday, January 14, 1994, from 8:30 am to 3:30 pm at IRI Headquarters in the first floor conference room.

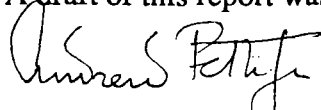
The agenda will include:

- Update on technology legislation Pat Windham
(Senate Commerce, Science
& Transportation Committee)
- Review of the DOC ACTS report * Graham Mitchell
- CRADA harmonization - update Jon Paugh (Commerce)
- Next IRI federal laboratory visit Andrew Pettifor
- Council on Competitiveness Innovation report Rich Barth
- Federal Government Liaison Committee FGLC members
Issues and Reports

As part of this last item, we plan to invite Dr. Arati Prabhakar, Director of NIST to discuss the Administration's ATP plans and other NIST priorities as well as Dr. Neal Lane (the new director of the National Science Foundation). A more detailed agenda will be provided in the New Year. Please think about the technical area(s) you would like to see as the focus for the next IRI federal laboratory visit. Please return the attached attendance plan fax to Margaret Grucza before January 5, 1994, and let either Margaret or me know if you have any comments or suggestions on the agenda.

I wish you all very happy holidays, and look forward to seeing you in Washington in January.

* A draft of this report was mailed to the IRI representative in late November.



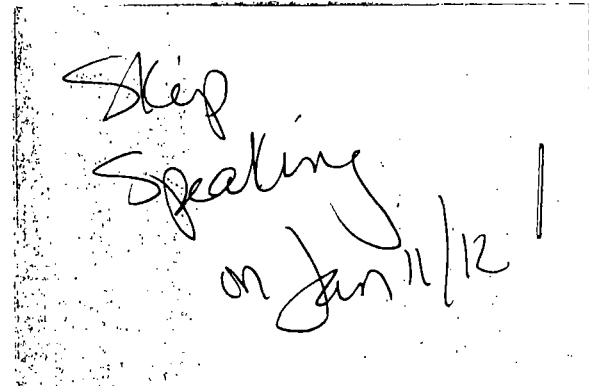
Andrew H. Pettifor, Chair
Federal Science & Technology Committee

AHP:cjd

cc: M. Grucza

Attachments:

- Meeting RSVP form
- Minutes from FST meeting, Charleston, SC





Industrial Research Institute, Inc.

December 17, 1993

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To: **Federal Government Liaison Council**

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Siegfried S. Hecker
Lionel S. Johns
Martha A. Krebs
Neal F. Lane
Arati Prabhakar
Alan Schriesheim

Subject: **JANUARY 14TH FST MEETING AT IRI HEADQUARTERS**

You recently received the attached memo from Andy Pettifor, Chair of IRI's Federal Science and Technology (FST) Committee, concerning the Committee's meeting scheduled for January 14, 1994 at IRI Headquarters (first floor Conference room, 1550 M Street, NW, Washington, DC).

As a member of our Federal Government Liaison Council, we would like you to be with us for the entire day to interact informally with Committee members as well as to give a brief presentation to the group. On the other hand, we recognize the realities of your hectic schedule and that it may not be possible for you to be with us for the entire meeting. Therefore, I would like to coordinate our agenda with your calendar for that date to ensure that you have an opportunity to raise issues of interest to and obtain input from our members.

Please return the attached form indicating which time slots would work best for your schedule and fax it to me no later than December 30. I will confirm a time with your office for a brief presentation by you (plus time for discussion) as soon as I hear from you. Thank you, and I look forward to seeing you in the New Year!

Sincerely,

Margaret R. Gruzca
Staff Liaison
Federal Science & Technology Committee

MRG:srp
Enclosures

Minutes of the Meeting of the Federal S&T Committee
October 31, 1993
Charleston, SC

Present:

Andrew Pettifor	Rockwell
M. Raymond	Rhone-Poulenc
A. Schriesheim	Argonne
Gene Stark	Los Alamos
Beverly Berger	FLC
Dave Sanders	Great Lakes Chemical Corporation
Ed Nemeth	Aristech Chemical Corporation
Ed Stear	Boeing
Chuck Bishop	A.O. Smith
Skip Johns	OSTP
Peter Boer	WRGrace
Harry McVeigh	Mobil
Marvin Garfinkel (for L. Edelheit)	GE
Wayne Burwell	Emeritus - UTC
Lois Perrolle	National Research Council
Richard Delasi	Grumman
Auzville Jackson, Jr.	Emeritus
Lee Rivers	NTTC
Rich Barth	Council on Competitiveness

1. Federal Government Liaison Committee (FGLC):

Andy Pettifor reviewed acceptances for membership on the FGLC:

DOE: Martha Krebs
Sig Hecker (LANL)
Alan Schriesheim (Argonne)

DOC: Mary Good
Arati Prabhakar (NIST)

OSTP: Skip Johns (Assuming White House Counsel agrees).

Pettifor reported that invitations had been issued to:

NSF: Neal Lane [subsequently has accepted]

Congress: Pat Windham (Commerce, Science and Transportation
Committee) [subsequently has declined]

Pettifor called for suggestions for members from NASA and DOD. Lee Rivers agreed to write to Dan Goldin to solicit appropriate NASA representation. Pettifor reported that because of the ongoing political uncertainties surrounding the ManTech program, which were unlikely to be resolved in the near future,

Chuck Kimzey, DOD, had tendered his resignation from the FGLC. Pettifor noted that Anita Jones and Gary Denman had both been suggested for membership, as had Jack Bachkovsky, Jones' career deputy.

2. IRI Visit to LANL and Sandia:

Chuck Bishop reported on the generally positive feedback from the September IRI sponsored visits to Sandia and Los Alamos National Laboratories. It was noted that the complexity of CRADAs remains an issue. Pettifor raised the issue of future IRI sponsored visits. Alan Schriesheim noted that, on the one hand they provide an opportunity for participation as part of a formal group, but on the other, members are free to visit on their own initiative at any time, and visit preparations are costly of lab time and resources. It was agreed that visits that focused on particular technologies or areas of specialty would be valuable. Alan noted that generic open meetings result in very few hits, Wayne Burwell argued that focus and follow-up are the key to success. IRI can help members articulate what they hope to gain strategically from these meetings (i.e. what their focus should be) and then help to maintain the dialogue to make it happen by targeting lab core competencies.

The use of data bases to identify federal laboratory capabilities was also the subject of considerable discussion arising from this question of how industry could provide more market pull to guide the labs' technology push. Skip Johns described OSTPs program to build a data base to characterize the federal government's R&D activities. Beverly Berger from the Federal Labs Consortium and Lee Rivers, NTTC, also briefly described their federal R&D data base activities. Beverly reported that most technology areas identified can usually be matched in the FLC data base. Lee Rivers cautioned large companies, with good contacts in one or two labs, not to assume that they therefore were familiar with all the federal labs' capabilities. Burwell and Marvin Garfinkel noted the problem of the impedance mismatch between lab technologies and industry needs, which again argued for close lab-industry ties and a strategic focus by industry. Peter Boer asked if any data were available on the effectiveness of the data bases as technology locators. Skip Johns indicated that the OSTP data may become available to industry on line on Internet in due course.

Action: None, but FST will proceed with plans for targeted future federal lab visits.

3. FGLC Reports:

Alan Schriesheim reported on the recent successful initial public offering (IPO) by an Argonne spin-off, Illinois Superconductor, and the key role of ARCH in effecting the necessary technology transfer. He also noted Argonne's participation in the Clean Car Initiative.

Gene Stark reported that 15% of LANL's staff took early retirement last week, but that many key people are leaving and will have to be replaced. He also reported that unlike Argonne, LANL can take an equity position in spin-off companies through its UC parent, but there has been only one significant spin-off venture to date.

He also noted that they had been sponsoring workshops on commercialization for the laboratory staff, with 60 graduates to date.

4. FLC Report:

Beverly Berger provided several handouts to the meeting, including an annotated and up-to-date reprint of the laws governing CRADAs, and a summary of the various mechanisms available for federal lab/industry interactions. She repeated the FLCs technology matching capabilities and noted that the most effective way to speed up a CRADA was to find a compatible precedent!

5. NTTC Report:

Lee Rivers reported on NTTC's progress and customer base. He also noted their establishment of an industrial extension training program.

6. OSTP Report:

Skip Johns provided an excellent overview of current OSTP activities and concerns.

- Budget situation: Despite the government's \$76b R&D budget, new initiatives need new money. Hence the government has to be able to set R&D priorities so that old programs can be cut off if necessary. FCCSET has begun a cross-cut of the R&D budget by subject area, and industry advice will be sought in the 10 major cross-cut areas through the interagency committees that are in charge of each.

- Organizational structure: The Critical Materials Institute and the Space Council have both been folded into OSTP.

Johns noted that OSTP had traditionally been a marginal player in the highest policy levels of the White House because of concern for the perceived vested interests of scientists and engineers (their first loyalties are seen to lie with their fellow professionals rather than to the President). He announced the establishment of a National S&T Council with Presidential decision authority to be announced in early November, to work with the National Economic Committee on defense issues and as an equal to other White House Councils to give S&T a voice in all high level policy decisions. FCCSET would be absorbed into this new group, which will be fully in place by next spring.

- New Initiatives:

- Space Station: The old design was too expensive and Congress would not approve it. However, it is essential for the U.S. to be able to continue its space activities. He noted that if the \$2b planned for the revised station was not used here, it is unlikely Congress would allocate it to other S&T programs.

- NASA: Four new working groups are being set up. A national space policy is expected by the end of next year. He noted that the Titan is obsolete and the Shuttle is "barely affordable", but these are the key elements of our space launch system.

ATP: Budget has been tripled, and it is being reorganized along ARPA lines.

IRP: \$140M awards have been announced.

Clean Car Initiative: This took six months to arrange because the auto industry could not believe it could trust the government. Mary Good is in charge.

CRADAs: If necessary, the Administration will seek legislation to harmonize agency CRADA procedures, but there is evidence that it is happening already. He noted that as long as "march in" rights are agreed to, then exclusive industry rights to a technology can be accepted.

7. DOE Request for IRI Assistance and the Interagency Working Group on Technology Transfer:

Chuck Larson briefly summarized the request to IRI from Bill White, Deputy Secretary of DOE, for advice in improving the quality of work performed by DOE research managers. Chuck noted a particular interest in the areas of effective project selection and evaluation. Alan Schriesheim reported a DOE concern with benchmarking and the development of performance indicators. Graham Mitchell noted that such activities have to be implemented as part of a broad strategy rather than just in their immediate narrow context. Alan was particularly concerned that a narrow focus on R&D performance indicators could be dangerous. On the other hand, as Skip Johns noted long term output measures of R&D are important to help the taxpayer understand why their dollars are being used in this way for social benefit. Peter Boer argued that careful involvement in this area is timely for IRI. Government needs a better understanding of how business operates, but quantifying R&D value is highly dependent on the quality of the assumptions built in, which in turn depends on who is making them and is often political.

Action: Chuck Larson should continue to pursue IRI assistance to DOE, but this should emphasize anecdotal, company specific experience. IRI should not attempt to develop prescriptive or normative courses on R&D evaluation for the federal labs, i.e. seminars, yes; tutorials, no. The FST will support the Interagency Working Group in its efforts to develop effective measures.

8. CRADAs:

Andy Pettifor summarized a letter from Fritz Kokesh at Phillips Petroleum describing actions by the University Relations Directors Network to set up a joint working group with the FS&T Committee to develop an improved CRADA approval system. Andy also mentioned Sen. Rockefeller's bill, previously sent to all FS&T Committee members for comment, to revise the IPR provisions to grant industry exclusive rights to jointly developed technologies.

It was noted in response to Fritz Kokesh's letter that several groups, including OSTP and the FLC, are already working this issue, and a separate IRI effort would not be helpful. Auzzie Jackson reported that because IPR agreements with the government are so fraught with legal difficulties, many companies won't even begin to discuss them. He urged that whatever is done to improve the

CRADA process should maintain flexibility, rather than insisting on a "one size fits all" fixed format.

It was also agreed that while the intent of Sen. Rockefeller's bill is good, it probably raises new problems. Further FS&T committee member inputs to Sen. Rockefeller's staff were encouraged.

Finally, Andy reported on a request from the American Chemical Society for IRI help in responding to an OSTP request for advanced manufacturing technology priorities. Andy proposed to circulate the letter to IRI chemical industry members and let them respond on their own initiative unless someone wanted to volunteer to coordinate a response. There were no volunteers.

Action: Andy Pettifor to send a letter to Fritz Kokesh declining participation in the working group proposal.

9. Council on Competitiveness:

Rich Barth asked to attend the January FS&T Committee meeting to talk more about a new COC project on managing innovation. The study will analyze what works and what doesn't work by analyzing innovation in six industrial sectors, including computers, software, aerospace, pharmaceuticals, electronics, and financial services. The study will draw public policy recommendations.

10. R&D and Trade Policy:

Tom Ratchford described the issue of R&D subsidies in the GATT negotiations as unresolved: The U.S. position is no subsidies; the EEC disagrees. Part of the reason for this stand-off is that the trade policy and technology communities do not know each other. IRI's 1992 Roundtable and the COC's recent study on this issue, chaired by Eric Garfinkel, were very helpful to the policy makers. Peter Boer mentioned IRI's participation in last year's American Foreign Service Association workshops as another approach to bridging this gap. IRI could also help by identifying trade issues of concern to R&D managers.

Action: Andy Pettifor to follow up with Ratchford on next step.

11. Patent Policy Update:

Auzzie Jackson summarized some recent developments of interest in the patent world:

1. The new Patent Commissioner, Bruce Lehman, is committed to patent harmonization, but not unilaterally. This means bilateral discussions with Japan will be necessary before any new policy is agreed to by the U.S. The NAFTA treaty will also require some changes, which will be announced shortly.

2. Billion dollar patent cases. Several cases have been settled recently for in excess of a billion dollars. Auzzie see this trend as likely to continue and as another indication of the growing value and importance of IPR.

3. Multiply-owned technology. This is another trend, due in part to the compression of technology development cycles, which means that many patents have not expired by the time that the technology is commercialized. The huge royalty requirements in such cases may make commercialization non-viable. The law regarding joint inventorship is "murky".

12. NRC Report:

Lois Perrolle summarized the NRC Industrial Liaison Program, and invited members to a S&T Policy Forum at the Academy on December 14.

13. Next FST Meeting:

Andy Pettifor announced that the date and agenda for the January Federal S&T Committee meeting would be sent out in a few weeks. Among the topics to be considered are: CRADA harmonization; the role of the government in fostering innovation, drawing on recent ADL and NAE reports; and IRI's role in developing R&D management seminars for the Federal labs.

The meeting was adjourned at 5:25 pm.

A handwritten signature in cursive script, reading "Andrew Pettifor".

Andrew H. Pettifor, Chairman
Federal Science & Technology Committee

FROM IRI, INC

(TUE) 01.11.94 14:49/ST. 14:49/NO. 3560002226 P 1



**Industrial
Research
Institute, Inc.**

Suite 1100, 1550 M Street, NW
Washington, DC 20005-1708



Date 01/10/94
Total Pages 4

From Margaret Grucza
Fax 202-872-6356
Phone 202-872-6355

Committee
File

To FST COMMITTEE MEMBERS

SKIP JOHNS

Fax 202/395-4155

We have a terrific agenda planned for the January 14th FST Committee meeting.
(attached copy.) As noted on the agenda, the meeting will be held in the
First floor Conference room at 1550 M St. NW, and will begin at 8:30 a.m.

Also attached are 2 pages of information for the discussion at 10 a.m. with Jon Paugh.

Look forward to seeing you this Friday.

Margaret

PRELIMINARY AGENDA**Federal Science & Technology Committee Meeting****INDUSTRIAL RESEARCH INSTITUTE**

1550 M Street, NW, Washington, DC

First Floor Conference Room

January 14, 1994

- | | |
|--------------------|---|
| 8:30 - 9:00 a.m. | Andy Pettifor, FST Chair
Introductions, Announcements, Fed Lab Visit |
| 9:00 - 9:30 a.m. | Mary Good, Commerce
Commerce ACTS Report |
| 9:30 - 10:00 a.m. | Graham Mitchell, Commerce
Other Commerce Initiatives |
| 10:00 - 10:30 a.m. | Jon Paugh, Commerce
Commercialization of Federal Labs |
| 10:30 - 11:15 a.m. | Skip Johns, OSTP
Update on OSTP Activities |
| 11:15 - Noon | Martha Krebs, DOE
Office of Energy Research |
| Noon - 1:00 p.m. | WORKING LUNCH
Pat Windham, Senate Commerce Committee
Technology Legislation |
| 1:00 - 1:30 p.m. | Al Tiedman & Peter Lyons, Los Alamos
Industry Fellow Program |
| 1:30 - 2:00 p.m. | Gregory Reck, NASA
Overview of NASA Initiatives |
| 2:00 - 2:30 p.m. | Ken Flamm & Chuck Kimzey, DOD
Technology Cooperation between U. S. & Japan |
| 2:30 - 3:15 p.m. | Arati Prabhakar, NIST
ATP, other NIST Activities |
| 3:15 - 3:30 p.m. | Andy Pettifor, FST Chair
Action Items, Future Agenda Items, etc. |

Jon Paugh
Dept. of Commerce

TECHNOLOGY COLLABORATION: MEASUREMENT AND POLICY

I. PROPOSED MEASUREMENT SYSTEM

A special working group including the Departments of Agriculture, Energy, Defense and Health and Human Services and the National Aeronautics and Space Administration, has developed a draft set of data to be provided from the federal laboratories, through their respective agencies, to the Department of Commerce. The data essentially characterize significant technology interactions with industry. Major categories include the type of collaboration (CRDA, grant, consultation, etc.), the type of research involved (basic, applied, etc), the technology area, and the characteristics of the partners (size, type of entity, location, etc. A brief summary of the data elements to be requested from industry partners follows.

In significant (formal rather than informal) collaborations, the partner would be requested to provide this data as well as a customer satisfaction survey both at initiation and when the collaboration is complete. Information designated proprietary would be tagged as such and not released except in aggregated form or with specific permission of the source.

II. MAJOR DATA ELEMENTS

A. CHARACTERISTICS OF THE PARTNERS: FOR-PROFIT COMPANIES

- Company Address
 - State
 - City
 - Zip Code
 - Telephone and fax numbers
- Standard industrial classification (SIC) code(s)
- Technology area(s) of the firm
- Number of employees
- Sales (gross, last annual report)
- Export status
- Ownership (private, public, partnership, government, non-US entity)
- Year of formation
- Minority/woman ownership
- Firm description (text, 100 words)
- R&D expenditures (annual)

B. TECHNOLOGY AREA

The group is still deciding what taxonomy of technologies to use in categorizing the collaboration.

C. TECHNOLOGY DEVELOPMENT PHASE

Basic Research	Development
Applied Research	Commercial

D. PARTNER SURVEY

A survey of each partner engaged in a CRDA with a federal lab is

contemplated. The group would like data such as the following:

- Satisfaction with the collaboration
- Major barriers/dissatisfaction
- Outcomes of the interaction (products, jobs, research data, etc.)
- Estimated dollar value invested in the project
- Would you do it again?
- Recommendations for improved process

E. TRANSFER MECHANISMS

- Consulting
- Exchange Programs
- Research and development contracting
- Grant
- Cooperative Research and Development Agreement (CRDA,
CRADA)
- Cooperative Agreement
- Other Transaction
- Technical Assistance
- Work for others
- Use of Facilities
- License
- Collegial interchange/conference
- Publication

Under each of these, certain data would be supplied, such as:

- Investment contributed by federal lab
- Investment contributed by partner
- Dollars paid to federal lab
- Labor hours expended in direct support of the project
- Other partners
- Date approved
- Projected completion date
- Actual completion date
- Patents filed (by each partner)
- Copyrights filed
- Licenses granted
- Companies formed (Name)
- License fees paid (per year)
- Royalties paid (per year)
- etc

FROM IRI, INC

(TUE) 01.11.94 14:49/ST. 14:49/NO. 3560002226 P 1



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INFORMATION



Industrial
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Tel. (202) 872-6350 • Fax (202) 872-6356

January 21, 1994

To: Member Company Representatives and Alternates

Subject: **RTM ARTICLE ON THE 1993 IRI R&D SURVEY**

Enclosed for your information and analysis is an article, **"Meet Your Competition: Data from the IRI R&D Survey,"** published in the January-February 1994 issue of **RESEARCH • TECHNOLOGY MANAGEMENT**.

This article summarizes results of the first annual IRI/CIMS survey on industrial R&D. Data on 16 industry categories are presented for F.Y. 1992. The results can be useful in establishing a dialogue with your top management by comparing data on your company with those for your industry. **Building business leader's understanding of R&D was one of the issues noted most prominently in the recent IRI mission development survey.**

Survey forms to collect F.Y. 1993 data will be mailed to member company Representatives in March. **IRI's Research-on-Research Committee and Board of Directors urge all member companies to plan now to participate in this year's survey.** Wider participation will make the results even more useful. Moreover, tracking the data several years into the future will provide valuable insights on the effectiveness of various R&D management practices.

I commend the article to your careful review and look forward to your participation in the second R&D survey this spring.

Sincerely,

Charles F. Larson
Executive Director

CFL:pt
Enclosure

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Publications have not been scanned in their entirety for the purpose of digitization. To see the full publication please search online or visit the Clinton Presidential Library's Research Room.

Meet Your Competition: Data from the IRI R&D Survey

Information on R&D spending and performance is available for the first time at the level of individual firm business segments.

Michael F. Wolff

True or False?

1. The more a company's R&D department depends on the business units for its funding, the less support it is likely to get.
2. Only a few exceptional companies can boast that 25 percent of their current sales come from products that didn't exist five years earlier.
3. The trend away from basic research toward more product development and technical service, first detected in the late 1980s, is reversing.
4. Small companies spend proportionally more on R&D than big companies.

All four statements are false, according to an analysis of the Industrial Research Institute's first annual R&D survey.

The IRI survey, conducted in cooperation with the Center for Innovation Management Studies (CIMS) at Lehigh University, has been designed to acquire quantitative data on the source and allocation of R&D funds at the business segment level of the firm. In most cases, the business segments are members of specific industries defined at the 4-digit SIC level (see box, next page). This is the first time that such detailed information has become available, according to CIMS director Alden S. Bean.

"The previous studies that CIMS has carried out in conjunction with the IRI have asked either for opinions about trends or for qualitative information from which we were able to compute some quantitative data. We have never before asked for quantitative information directly, and we have never gotten quantitative data by business segments," Bean explains.

Adds Gary E. McGraw, vice president for development at Eastman Chemical Co., Kingsport, Tennessee, "This is the kind of data that will allow myself and other research directors to respond meaningfully when our CEOs ask how the firm's R&D expenditures—and the results they are getting from these expenditures—compare with those of competitors." Although similar data have been collected before, explains McGraw,

"now we can compare actual business segments, which is much more meaningful to us."

McGraw chairs the IRI's Research-on-Research (RoR) committee, which began designing the survey in 1991 specifically to provide R&D executives with information to support a constructive dialogue with their top general managers.

What CEOs Want

The need for such dialogue has been clear since 1989, when McKinsey & Co. management consultants undertook a study to determine what CEOs expected of their R&D organizations. The study revealed a growing desire among CEOs for information about the strategic direction of—and the value contributed by—technology in the business (1-3). One CEO summed up the problem by citing the need for "suitable measures of current R&D productivity and of R&D 'output'." He called for developing "a common language with which R&D and corporate management can communicate."

The new survey begins to provide the grounds for such a common language. Developed and tested over a two-year period by 30 IRI member company representatives on the RoR committee, it relied heavily on the IRI Finance Directors' Network to make sure that terms like "R&D support" were defined so that results could be compared across firms.

The survey questionnaire was mailed to 253 U.S. member companies in March 1993. It requested quantitative data about the source and allocation of R&D funds at three levels: the firm level, the business segment level for one or more segments, and within the corporate or largest laboratory of the firm.

The survey also requested information about R&D performance or outcomes at the firm and business segment level.

What follows is a summary of the findings, based on preliminary analysis by Bean and CIMS associate Roger L. Whiteley. CIMS administers the survey under IRI guidance and serves as the repository for the survey data in order to protect objectivity and confidentiality, Bean explains.



Industrial Research Institute, Inc.

November 9, 1993

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DAVID SARNOFF RESEARCH CENTER, INC.

EXECUTIVE DIRECTOR
CHARLES F. LARSON

Dr. Lionel S. Johns
Associate Director for Technology
Office of Science & Technology Policy
Executive Office of the President
Washington, DC 20500

Dear Skip:

We were delighted to receive your acceptance to serve on the Federal Government Liaison Council to our Federal Science and Technology (FST) Committee. Our FST Committee meets once or twice a year, in addition to the Sunday afternoon Committee meeting held during IRI's Semi-Annual Meetings. The next meeting will be held in Washington, DC in late January. We will notify you as soon as a definite date is selected. For your calendar, our next two Semi-Annual Meetings will be held May 1-4, in Palm Desert, CA, and October 23-26, in Williamsburg, VA.

As a member of the Federal Government Liaison Council (FGLC), you will receive all of the regular mailings of the Institute, including our "Who's Who" directory; our journal, **RESEARCH • TECHNOLOGY MANAGEMENT**; and announcements of management development programs, including Study Groups, Seminars, Tutorials, Workshops, Roundtables, and others. Please let us know if you would like to designate one other person on your staff to receive our mailings. You or any of your associates are welcome to participate in our management development programs, which provide excellent opportunities to interact with counterparts from industrial research.

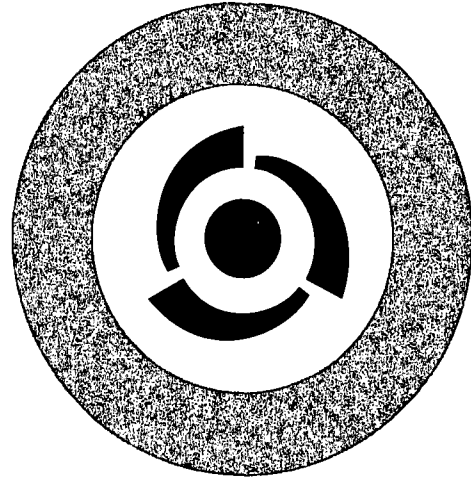
Dr. Andrew H. Pettifor, Director, Research Assessment and Planning, Rockwell International, Thousand Oaks, CA, is the current FST Committee Chair and will keep you informed directly of the Committee's meetings and activities.

Welcome to the Federal Government Liaison Council. We look forward to working with you.

Sincerely,

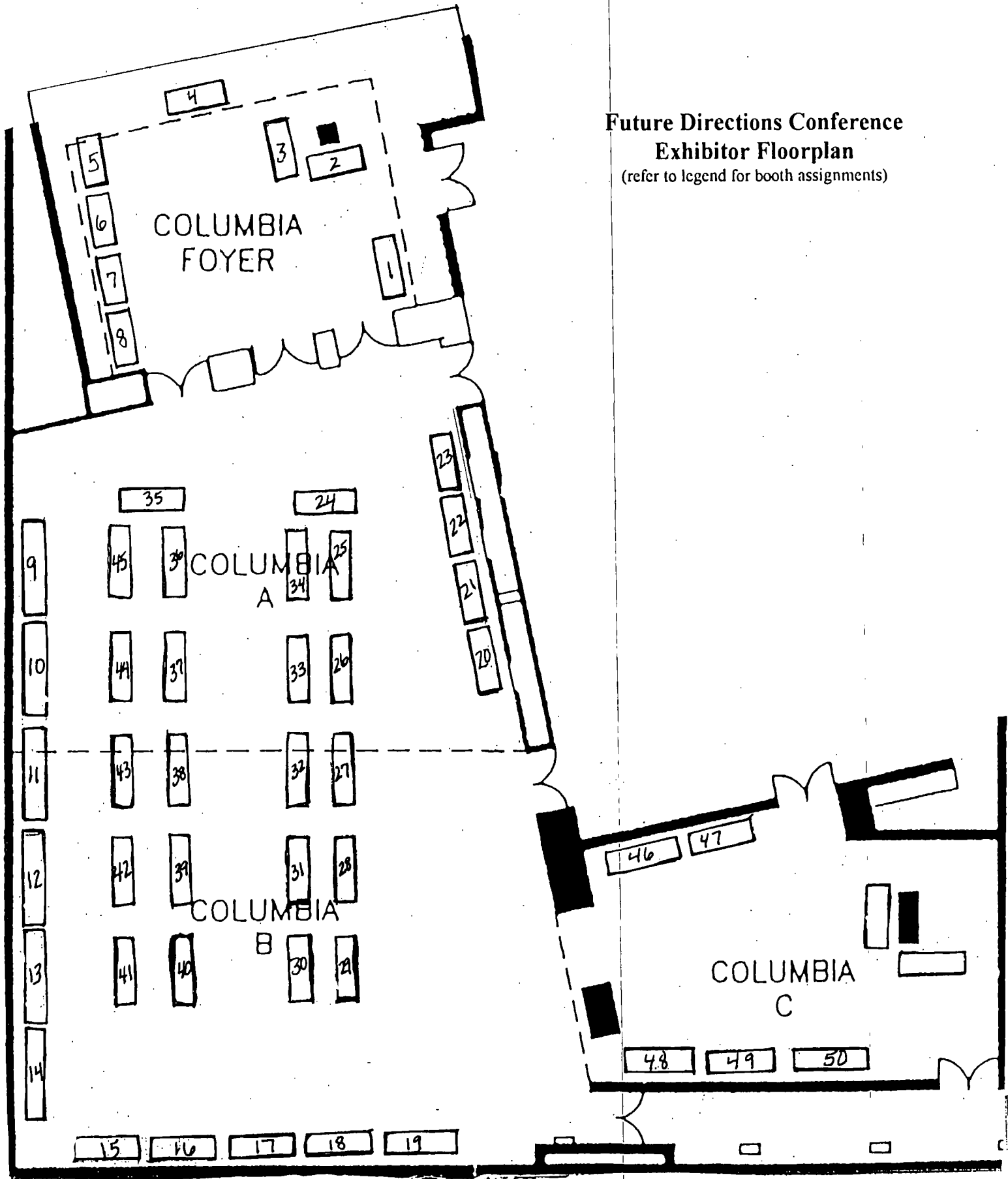
Charles F. Larson
Executive Director

CFL:srp
cc: **A. H. Pettifor**
E. W. Cantrall



**FUTURE DIRECTIONS FOR
MULTIMEMBER RESEARCH
COLLABORATIONS:
THE BEST PATH FOR
INDUSTRIAL RESEARCH?**

**Future Directions Conference
Exhibitor Floorplan**
(refer to legend for booth assignments)



Exhibitor Legend Listed by Category and Table Number

CATEGORY	TABLE NUMBER	CENTER	INSTITUTION
Computers: Hardware and Software	1	High-Speed Image Processing	University of California/Irvine
Computers: Hardware and Software	2	Information Management	Georgia Institute of Technology University of Arizona
Computers: Hardware and Software	3	Parallel and Distributive Intelligence Systems	University of Pittsburgh
Computers: Hardware and Software	4	Simulation and Design Optimization of Mechanical Systems	University of Iowa
Computers: Hardware and Software	5	Software Engineering	Purdue University University of Florida
Electromagnetics, Electronics, and Optics	6	Advanced Communications	Villanova University
Electromagnetics, Electronics, and Optics	7	Advanced Electron Devices and Systems	University of Texas/Arlington
Electromagnetics, Electronics, and Optics	8	Analog/Digital Integrated Circuits	Washington State University
Electromagnetics, Electronics, and Optics	9	Communications and Signal Processing	North Carolina State University
Electromagnetics, Electronics, and Optics	10	Dielectric Studies	Pennsylvania State University
Electromagnetics, Electronics, and Optics	11	Electromagnetics Research	Northeastern University
Electromagnetics, Electronics, and Optics	12	Microcontamination and Control	University of Arizona
Electromagnetics, Electronics, and Optics	13	Optical Circuitry	University of Arizona

Exhibitor Legend Listed by Category and Table Number

CATEGORY	TABLE NUMBER	CENTER	INSTITUTION
Electromagnetics, Electronics, and Optics	14	Sensors and Actuators	University of California/Berkeley
Electromagnetics, Electronics, and Optics	15	Wireless Information Networks	Rutgers University
Environment and Health	16	Advanced Air Conditioning and Refrigeration	University of Illinois/ Urbana-Champaign
Environment and Health	17	Emission Reduction	New Jersey Institute of Technology
Environment and Health	18	Hazardous Substance Management	New Jersey Institute of Technology
Environment and Health	19	Integrated Pest Management	North Carolina State University
Environment and Health	20	Ocean Technology	University of Rhode Island
Manufacturing	21	Aseptic Processing and Packaging Studies	North Carolina State University
Manufacturing	22	Building Performance and Diagnostics	Carnegie Mellon University
Manufacturing	23	Chemical Process Modeling and Control	Lehigh University
Manufacturing	24	Dimensional Measurement and Control in Manufacturing	University of Michigan/ Ann Arbor
Manufacturing	25	Innovation Management Studies	Lehigh University
Manufacturing	26	Manufacturing Automation	University of Southern California
Manufacturing	27	Material Handling	Georgia Institute of Technology
Manufacturing	28	Measurement and Control Engineering	University of Tennessee/Knoxville

Exhibitor Legend Listed by Category and Table Number

CATEGORY	TABLE NUMBER	CENTER	INSTITUTION
Manufacturing	29	Microwave and Millimeter Wave Computer-Aided Design	University of Colorado/Boulder
Manufacturing	30	Process Analytical Chemistry	University of Washington
Manufacturing	31	Separations Using Thin Films	University of Colorado/Boulder
Manufacturing	32	Web Handling	Oklahoma State University
Materials	33	Advanced Steel Processing and Products	Colorado School of Mines
Materials	34	Biological Surface Science	SUNY/Buffalo
Materials	35	Nondestructive Evaluation	Iowa State University
Materials	36	Coatings Research	Eastern Michigan University
Materials	37	Composite Design	Stanford University
Materials	38	Corrosion in Multiphase Systems	Ohio University
Materials	39	Engineering Tribology	Northwestern University
Materials	40	Glass Research	Alfred University
Materials	41	Grinding Research	University of Connecticut
Materials	42	Micro-Engineered Ceramics	University of New Mexico
Materials	43	Nanostructural Materials	University of North Texas
Materials	44	Ceramic Research	Rutgers University
Materials	45	Plastics Recycling	Rutgers University
Materials	46	Polymer Biodegradation	University of Massachusetts/Lowell
Materials	47	Polymer Interfaces	Lehigh University
Materials	48	Thin Film and Interface	Brown University

Exhibitor Legend Listed by Category and Table Number

CATEGORY	TABLE NUMBER	CENTER	INSTITUTION
Miscellaneous Exhibitors	49	National Science Foundation	
Miscellaneous Exhibitors	50	I/UCRC Evaluators	

Important Information

Future Directions Conference

January 11 & 12, 1994

Washington, D.C.

Hotel

The Hyatt Regency on Capitol Hill
400 New Jersey Avenue, N.W.
Washington, D.C. 20001
(202) 737-1234 for messages or
(800) 233-1234 for reservations.

Check-in is at 3:00 p.m.
Check-out is at 12:00 Noon

Parking & Transportation

Special Conference valet parking is available for \$9 per day on January 11 & 12. Please reference the NSF Future Directions Conference to receive the special rate.

The Hyatt is located 10 miles from Washington National Airport and 45 minutes from Dulles Airport. From National, a cab will cost approximately \$8 - \$10 per person. From Dulles, the Washington Flyer bus makes a stop at 15th & K, which is only a short cab ride from the Hyatt. The Washington Flyer costs \$16 per person, one way, to the downtown D.C. area.

Conference Registration

Registration will take place on the Ballroom Level of the Hyatt Regency, outside the Ticonderoga Room. Please pick up your conference packets at the registration area between 5:00 p.m. - 7:00 p.m. on Monday, January 10, and from 7:30 a.m. to 10:30 a.m. on Tuesday, January 11. Packets will include the final conference program, your nametag, and other conference related items.

Please note that a check or money order will be required for on-site registration payment. Checks should be made payable to New Jersey Institute of Technology.

Tickets will be needed for dinner on Tuesday, January 11. Please bring your ticket for admittance.

Exhibitors

The Columbia Ballroom will be open at 1:30 p.m. on Tuesday for exhibitors to set up their displays. Packages will be delivered to the Columbia Ballroom at 1:30 p.m. for set-up, or you can pick up your materials when you check into the hotel. Any equipment that has been ordered will be set by 1:30 p.m.. **Note:** Exhibitors are responsible for all their own charges incurred with the hotel.

Please plan to vacate your materials from the ballroom by 1:30 p.m. on January 12. The Hyatt will be able to ship materials back to your Center, but will need instructions for billing. Bring a shipping label to ensure prompt return shipping.

Fire and Safety

In case of emergency in the hotel, please do not use the elevators. Vacate the hotel via the emergency exits, all of which are labeled with red exit signs.

Pool and Health Club

The new health club consists of a heated pool, men's & women's spas with steam room, sauna, showers and lockers, and an exercise room with modern weight equipment.

Please see the reverse side for area restaurant information.

DINING OPTIONS

Restaurants located on Massachusetts Avenue all within an 8-10 minute walk from Hyatt Regency on Capitol Hill

American Cafe

American cuisine, moderately priced. 227 Massachusetts Ave., NE, (202)546-7690

Armands

local pizza restaurant with moderate prices located within minutes of the Hyatt Regency. 226 Massachusetts Avenue, NE 547-6600

La Brasserie

serves French cuisine with moderate to expensive prices. 239 Massachusetts Avenue, NE 546-9154

Tortilla Coast

is a Mexican restaurant serving traditional fare with moderate prices. 201 Massachusetts Avenue, SE. 546-6768

Restaurants located in Union Station, 3 blocks from The Hyatt Regency on Massachusetts Avenue.

America

traditional American cuisine with moderate prices 682-9555

Pizzeria Uno

moderate priced pizza from Chicago 842-0438

Station Grill

moderately priced burgers 898-4745

Food Court

miscellaneous fast food options

FINE DINING OPTIONS

700 Water Street

considered the best seafood in town, moderately priced. 7th and Water Street, 554-7320

Filomena's

for Italian cuisine moderate to more expensively priced selections. 1063 Wisconsin, NW, 338-8800

La Colline

French cuisine. 400 N. Capital Street, 737-0400

Prima Piatti

Italian cuisine moderate to expensively priced. 2013 I St., NW. 223-3600

REST

Future Directions For Multimember Research Collaborations:
The Best Path for Industrial Research?

Your Opinion Please

You know your opinion counts with NSF and the Conference organizers!

PLEASE take a few minutes to evaluate the Future Directions Conference by completing this questionnaire and returning it to the Registration Desk outside the Regency Ballroom.

First, tell us who you are: ☐ Center Director ☐ Center Evaluator
☐ from Industry ☐ Other

About the Conference Program

Now, please check "Agree" or "Disagree" for each item below. If you check "disagree," we would appreciate your writing in at least one suggestion for how the Conference could have better met your needs in that area. And of course, your explanatory comments are welcome at any point.

Agree Disagree

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | a. The Conference presented a clear picture of the scope and direction of current trends in multimember collaborations. |
| ☐ | ☐ | b. The tabletop exhibits showcased significant research projects in an effective manner. |
| ☐ | ☐ | c. I had sufficient opportunity to develop new contacts with people from other Centers. |
| ☐ | ☐ | d. I had sufficient opportunity to develop new contacts with industry members, government officials and policy makers. |
| ☐ | ☐ | e. Conference participants have a good chance of influencing national policies about multimember collaborations. |
| ☐ | ☐ | f. I obtained information that I can use to improve my operation. |

OVER PLEASE

About the Conference Arrangements

Please rate the logistical arrangements at the Conference, with 1 being the best rating.

Great Poor

- | | |
|---------------|---|
| 1 2 3 4 | a. The food selection was appropriate. |
| 1 2 3 4 | b. The hotel accommodations were comfortable. |
| 1 2 3 4 | c. It was easy to locate sessions. |
| 1 2 3 4 | d. The registration process was efficient. |
| 1 2 3 4 | e. (for Exhibitors) It was easy to set up our Center's exhibit. |

What would have made it easier for you to "sell" the meeting to industry partners?

General Comments

Your feedback on any aspect of the Future Directions Conference is urgently invited.

Thank You for Completing this Evaluation Form

9. What are the factors which affect effective technology transfer between and within organizations?
 - * Cost
 - * Communications
 - * Management Strategies
10. How does government mission agency participation in a multi-member research collaboration as a member affect the operation of the collaboration?
11. Is there a need for industry and government members of multi-membership research collaborations, like the I/UCRC Program, to have their own membership group?
 - * The members provide most of the financial support for the collaboration and should be able to provide valuable feedback on how the collaborations are working and what can be done to improve them.
 - * How can a membership group be formed, supported, structured and utilized?

University Affiliated Consortia:

12. Do academic policies and procedures properly reward center directors and university researchers who perform research in support of multi-member research collaborations? If not, what needs to be changed?
13. What is the industrial relevance of fundamental academic research and its value to industry and the country? How can Congress and others be made more aware of what is being done or needs to be done in support of industrially relevant research like multi-member research collaborations?
14. What strategies are needed in the future for developing and maintaining industrial membership in academically based centers?
 - * Initial interest and justification
 - * Maintaining interest and continuing justification

International Issues:

15. International aspects of multi-member research collaborations
 - * Should foreign memberships be allowed?
 - * What types of international collaborations should be encouraged?
 - * Will NAFTA and GATT affect the multi-member research collaborations and the NSF I/UCRC Program in particular?
 - * Is the U.S. being out maneuvered by EEC strategies in the area of multi-member research collaborations and what needs to be done to correct an imbalance?

Please sign-up for roundtable themes at the corkboard near the Conference Registration Area.

National I/UCRC Future Directions Conference
Washington, D.C.

THEMES for ROUNDTABLE DISCUSSIONS on JANUARY 12

Please sign up for one of the following roundtable discussion themes by 5:00 p.m. on January 11, at the Future Directions Conference Registration Area. The sign-up sheets are posted on the corkboard. The roundtable discussions will take place on Wednesday morning, January 12.

Public Policy Issues:

1. What is the role and justification for government in support of multi-member research collaboration? What government policies and programs are needed to encourage and foster multi-member research collaborations?
 - * Incentives
 - * New Programs
 - * Support of Existing Programs
 - * Intellectual Property Issues
2. Federal, State and Local Government Programs: How much funding and direct support should government provide?
3. Coordination and cooperation among Government Programs: How can we avoid redundancy and achieve synergy among existing programs?
4. Are changes needed in regulatory and antitrust policies to encourage multi-member research collaborations?
5. What makes an initiative appropriate for multi-member research collaboration? (especially a government initiative)
6. How much is really known about multi-member research collaboration and is more thorough evaluation and assessment needed?
 - * Need
 - * How best accomplished
 - * Utilization of results

Membership Issues:

7. What are the incentives and disincentives within industry to partnering with other firms, the government, and universities for R&D and how should they be addressed?
8. What are the factors affecting investment in R&D and what should be done to enhance the support of basic and applied research?

(over, please)

**FUTURE DIRECTIONS FOR MULTIMEMBER RESEARCH
COLLABORATIONS:
THE BEST PATH FOR INDUSTRIAL RESEARCH?**

JANUARY 10, 1994

5:00 p.m. - 7:00 p.m - Ballroom Level

Conference Registration

JANUARY 11, 1994

7:30 p.m. -10:30 p.m. - Ballroom Level - Conference Registration

8:30 a.m. - 9:00 a.m. - Ballroom Level - Regency B,C & D:

Dr. Neal Lane, Director of NSF - Welcome and Co-Sponsor Recognition

9:00 a.m. - 9:45 a.m. -Ballroom Level - Regency B,C & D:

Mr. Skip Johns, Associate Director, Office of Science and Technology Policy - Keynote Address

9:45 a.m. - 10:00 a.m. - Regency Foyer:

Coffee Break

10:00 a.m. - 12:00 noon - Regency B,C & D:

Panel: Multimember Research Collaborations: What Can They Achieve?

- Inter-disciplinary panel will explore the effectiveness of consortia in general from a variety of perspectives.

Dr. Henry Shaw, Engineering Foundation - Moderator

Dr. Al Link - University of North Carolina - Greensboro

Title: To Collaborate or Not to Collaborate: Is That the Competitive Question?

Dr. Bela Gold - Claremont Graduate School

Title: Integrating the Contributions of Multidisciplinary Research Teams

Dr. Howard Aldrich - University of North Carolina - Chapel Hill

Title: Research & Development Consortia in the United States and Japan

Dr. Lois A. Peters - Rensselaer Polytechnic Institute

Title: Universities as a Resource for Industrial Innovation: An International Perspective

Mr. C. Richard Deininger - Director of National Resources - SEMATECH

Title: SEMATECH, a Successful Working Model of Government Industry Cooperative Research

12:00 Noon - 1:30 p.m. - Regency A

Lunch

Dr. Saul K. Fenster, President of New Jersey Institute of Technology will introduce:

Mr. Robert J. Ranalli, President of ATT Multi-Media Product Services - Industry Keynote Speaker

1:30 p.m. - 3:00 p.m. - Regency B,C & D

Panel: Different Kinds of Multimember Research Collaborations
- Representatives from four Collaborative Research Centers

Ms. Lynn Preston, Engineering Education and Centers, National Science Foundation - Moderator

Dr. Craig Fields, Chief Executive Officer - MCC

Dr. Karl H. Graff, Executive Director - Edison Welding Institute

Mr. Don Walkowicz, Executive Director - USCAR

Dr. Edward Haug, Center Director & **Dr. Denis Gray**, Center Evaluator - I/UCRC

3:00 p.m. - 3:30 p.m. - Regency Foyer

Break

3:30 p.m. - 4:30 p.m. - Regency B,C & D

Interactive question/answer/discussion session among panelists and the audience

4:45 p.m. - 6:45 p.m. - Columbia Ballroom

Cocktails, Hor D'oeuvres, I/UCRC Showcase Exhibition

Exhibits will include: Manufacturing; Electromagnetics, Electronics and Optics;
Materials; Computers--Hardware and Software; Environment and Health.

6:45 p.m. - 9:00 p.m. - Regency A

20th Anniversary Dinner, Celebration, Partnership Recognition Ceremony

- **Dr. John White**, Dean of Engineering, Georgia Institute of Technology
Speaker honoring the I/UCRC Program
- **Dr. S. George Walters**, Professor Emeritus, Rutgers University
Speaker leading the Partnership Recognition Ceremony

JANUARY 12, 1994

7:00 a.m. - 8:00 a.m. - Columbia Ballroom

Continental Breakfast & Showcase Exhibition

8:00 a.m. - 9:00 a.m. - Regency B,C & D

I. Roundtable Discussions

Dr. Shirley Jackson, New Jersey Commission on Science & Technology & Rutgers University
Facilitator

Roundtables will develop such themes as: government role, research relevance, anti-trust and other regulatory issues

9:00 a.m. - 10:00 a.m. - Regency B,C & D

II. Participatory Meeting

Congressional Staff and Policy makers will open with a brief introductory statement

Policy Panelists:

Ms. Kitty Gillman, Office of Science & Technology Policy

Dr. Michael McGrath, Advanced Research Projects Agency

Dr. James Wilson, House Subcommittee on Science,

Mr. Patrick Windham - Senate Subcommittee Science Technology and Space

10:00 a.m. - 10:15 a.m. - Regency Foyer

- Coffee Break

10:15 a.m. - 11:30 a.m. - Regency B,C & D

Participatory Meeting (continued)

Mr. John Warren, Research Triangle Institute - Moderator

Joining the Policy Issues Panel to provide Industrial and Academic Perspective will be:

Dr. Al MacLachlan - DuPont R&D

Dr. Roy Herrenkohl - Lehigh University

Questions from the roundtables, as well as questions and issues which arise from the discussions will be presented to the policy makers and congressional staff. The panel will respond.

11:30 a.m. - 12:00 noon

Dr. David Roth, Jr. Allied-Signal, Inc. will introduce:

Dr. Mary Good, Undersecretary for Technology, US Department of Commerce

Final Theme Speaker

REGISTRATION

06-Jan-94

FIRST NAME	LAST NAME	AFFILIATION
Margaret	Adams Rasmussen	Alfred University
Daljit S.	Ahluwalia	National Science Foundation
Howard	Aldrich	Univeristy of North Carolina Chapel Hill
Stanley	Aman	Jacksonville State University
Paul	Anastas	US Environmental Protection Agency
Azzizan	Aziz	Carnegie Mellon University
Nader	Bagherzadeh	University of California Irvine
Robert	Baier	SUNY Buffalo
Marlene	Barmish	ERC for Plasma Aided Manufacturing - UW
Ernie	Baughman	Amoco Research Center
Alden S.	Bean	Lehigh University
Ann	Becker	Ann Becker and Associates
George A.	Beckey	University of Southern California
Barry A.	Benedict	Louisana Tech University
Sakarind	Bhumiratana	Thailand Research Fund
Craig H.	Blakely	Texas A & M University
Ronald A.	Bohlander	Georgia Institute of Technology
Piyawat	Boon-Long	Thailand Research Fund
Boonrak	Boonryaketm	Thailand Research Fund
Richard C.	Booton, Jr	Univeristy of Colorado Boulder
Christopher	Boughton	US Army Tank- Automotive Command
Edward	Boulos	Ford Motor Company
Sidney A. (Sid	Boyd	Ford Motor Company
Shannon	Breining	American Air Liquide
Ravelle	Brickman	Ravelle Brickman
Alphonse	Buccino	University of Georgia - Athens
Clark W.	Bullard	University of Illinois
Lloyd	Burgess	University of Washington
Robert E.	Burkart	Industrial Research Institute
Aubrey M.	Bush	National Science Foundation
John B.	Bush, Jr.	The Gillette Company
D. Anthony	Butterfeild	University of Massachusetts
Jeffrey	Callahan	URI/ Graduate School of Ocean Technolog
David P.	Cann	The Pennsylvania State University
Daniel	Cantu	House Appropriations Committee

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Kent	Carey	Hewlett-Packard Company
Lynne	Carter	URI/ Graduate School of Ocean Technolog
Robert	Center	University of Washington
Jack C.	Chang	Eastman Kodak Company
Daniel	Chavez	Vitro, Sociedad Anonima
Herbert S.	Cheng	Northwestern University
Kyung-K	Choi	The University of Iowa
Michael P.	Chouinard	DuPont
Grontkowski	Christine	Alfred University - College of Ceramics
Kenneth W.	Circiacks	Amoco Corporation
Marie	Cole	Delco Chassis NDH Division of GM Corp
Jerome J.	Congleton	Texas A & M University
Robert	Cornwall	The Pennsylvania State University
James G. (Jim	Crawford	American Standard - Trane
Mario	Dagenais	University of Maryland
Steven	Danyluk	Georgia Institute of Technology
W. Alan	Davis	University of Texas - Arlington
James T.	Davis, Jr.	Defense Logistics Agency
John	Dearden	SUNY Buffalo
John H.	Deasy	Defense Logistics Agency
Riccardo	Decenter	
C. Richard	Deininger	SEMATECH
Donna	Dengler	The Pennsylvania State University
Robert	Dennison	Boeing
Richard H.	Dewey	Edgewood Research & Development Cente
Annalise	Dickey	University of Washington
Liz	Dooley	Ann Becker and Associates
Joseph P.	Dougherty	The Pennsylvania State University
Harry	Dreicer	Los Alamos National Laboratory
Scott	Duvall	Pratt & Whitney
Mohamed S.	El-Aasser	Lehigh University
Donald E.	Elson	Black & Decker
Hestriati	Endrawanto	University of Indonesia
Richard J.	Farris	University of Massachusetts/Amherst
Saul K.	Fenster	New Jersey Institute of Technology
Craig	Fields	MCC
James	Flanagan	Rutgers University
Mitchell	Fleischer	University of Michigan - Ann Arbor

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Anne	Garvin	Carnegie Mellon University
Christos	Georgakis	Lehigh University
Edwin	Gerloff	University of Texas - Arlington
Joanne B.	Giles	North Carolina State University, Raleigh
Kitty	Gilman	Office of Science & Technology Policy
Thomas G.	Giolas	The University of Connecticut
Bela	Gold	Claremont Graduate School
Mary	Good	Department of Commerce
Phillip L.	Gould	Washington University
Karl	Graff	Edison Welding Institute
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John C.	Harlett	University of Washington
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Ching-Piao	Hu	National Science Council
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Jane	Krolewski	US Army Material Systems Analysis
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Neal	Lane	National Science Foundation
Charles F.	Larson	Industrial Research Institute
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Robert	Lazar	Union Camp Corporation
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Howard	Levine	University of California - Berkeley
Peggy	Lewis	Georgia State University,

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Michael	Mengelkamp	BMV
Andrew	Mercurio	Lehigh University
Gary	Messing	The Pennsylvania State University
David	Meyer	North Carolina State University
Anne	Meyer	SUNY Buffalo
Reischman	Michael	Penn State University
George N.	Miller	Martin Marietta
John J.	Mills	Automation & Robotics Research Inst
Robert	Mitchell	University of Texas - Arlington
Dennis E.	Mitchell	Sandia National Laboratories
Jose R.	Monte	Florida Atlantic University
Charles F.	Moore	The University of Tennessee
Karsten	Moritz	New Jersey Institute of Technology
Jerry L.	Morrison	Chevron Petroleum Technology Co.

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Glenn	Petrina	Defense Logistics Agency
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Mark C.	Piper	Cardinal Glass
Mary	Poats	National Science Foundation
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Richard	Powell	University of Arizona
Lynn	Preston	National Science Foundation
Bobby	Purkait	Mentor Corporation
Michael	Purvis	Glass Compositions
L. David	Pye	Alfred University
Philippe H.	Queille	Air Liquide
Sarah	Rajala	North Carolina State University Raleigh
Robert J.	Ranalli	ATT Multi-Media Product Services
Terry	Redmon	E.I. DuPont
Mark	Righter	McQuaide, Blasko, Schwartz, Fleming & Fa
John A.	Ringo	Washington State University
Catherine	Robinson	Western Research Network
David	Roth, Jr.	Allied-Signal, Inc.
Maher L.	Rouziek	University of Tennessee
Carolyn F.	Russell	Oak Ridge Associated Universities
Jean	Russo	Center for Social Research
Raymond	Saba	Rutgers University
Robert C.	Sanders	Lehigh University
Maria	Santore	Lehigh University
Terry E.	Say	Rhone-Poulenc
Theodore W.	Schlie	Lehigh University

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Alex	Schwarzkopf	National Science Foundation
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L. John	Sealock, Jr.	Battelle
Ivan	Seskar	Rutgers University
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