Securing Contractual P.E.P. (Procurement Excellence Platforms)

Team Building for Collaborative Research

Dr. Carl A. Moore Jr.

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Presentation Outline

• Motivation
• Example of Successful Collaboration
• Defining the Collaborative Research Team
• Opportunities and Dangers
• Potential Payoffs
• Conclusions
Who I am & What Brought Me Here?

• Been involved with and lead collaborative research projects

• Some collaborations were great; some not so good

• Interested in:
  • Producing effective teams for future research collaborations
Who Wants to Work with Others?

TODAY YOU'LL LEARN HOW TO WORK INDEPENDENTLY.

IN THIS EXERCISE, I WANT YOU TO PUT YOUR ARMS AT YOUR SIDE, CLOSE YOUR EYES, AND FALL BACKWARD.

AND IT'S STILL BETTER THAN WORKING WITH OTHER PEOPLE.

THUD THUD THUD
Support the FAMU Vision!!

• Florida A&M University will become a nationally recognized research institution with an efficient infrastructure that supports the administration of research activities that foster relevant research, intellectual discovery, creative problem solving and the dissemination of knowledge.
• Currently FAMU generates $52,000K+ grants and contracts
• Our goal $100,000K!!

Grand Total: $50,262,706.83
How Can We Reach $100,000K

• Develop more graduate programs
  – Math MS and PhD, Chemistry PhD, fdas, etc.
• Reduce teaching loads for research faculty
  – More TA’s, greater faculty-student ratio
• Increase graduate tuition waivers
  – Reduces grant impact, relieves student budgets
• Secure more contractual research per faculty
  – Improve grants per faculty and funding per grant
Securing More Grants and Increasing Funding Levels

• Not just working harder...
• But working smarter!!
• Smarter??
  – Addressing bigger problems (real-world)
  – Thinking less myopically (u don’t know it all)
  – Arriving at bigger solutions (more $)
• How??
  – Less disciplinary and individualistic thinking
  – More multi-disciplinary collaboration
3 Reasons to Engage in Multi-Disciplinary Research

1. Follow the questions
   - Many of the most interesting problems lie at and beyond the margins of existing disciplines
   - Extensive disciplinary specialization can limit innovation; multidisciplinary research leads to meaningful advances in science
   - Multi-disciplinary research is more oriented to dealing with "real world" problems

"Nature don't know disciplinary boundaries."

-- Comment from a biologist during a meeting at NSF in late 1991
3 Reasons to Engage in Multi-Disciplinary Research

2. Follow the people
   - Exposure to researchers from other disciplines can lead to fruitful collaborations – given mutual interests and compatibility

3. Follow the money
   - As an example: NSF allocates $22.5 million annually to human environment research (approximately the same as the NSF economics program budget)
Heard It Before? Of course!

• NSF and NIH have embraced collaborative or **Team Science** approaches to solve the difficult, multifaceted problems that the country faces.

• Team Science engage investigators from many different disciplines to perform **complex coordinated investigations**.

• The topics they address are far ranging and include the challenge of **global warming**, **nanoscience**, the creation of **renewable energy** sources, addressing **health disparities**, and the development of **innovative cancer treatments**.
So, Our Reasons to Collaborate...

- Access to expertise or particular skills
- Access to equipment or resources
- Cross-fertilization across disciplines
- Improved access to funding
- Obtaining prestige, visibility or recognition
- Enhancing trainee education

(Gabriele Bammer)
Example: Army Research Laboratory (Nearly Autonomous Unmanned Systems)
Army’s Goal for Robotic Systems

Develop perception technologies that allow robotic vehicles to understand their environment

Develop intelligent control technologies enabling robotic systems to autonomously plan, execute, and monitor operational tasks undertaken in complex, tactical environments

Develop human-machine interfaces that allow Soldiers to effectively task robotic systems and minimize operator workload
ARL’s initial investment in 2001 was $40 million with FAMU receiving approximately $500K/yr for 8 years ending in 2009. Recently ARL has instituted a new CTA for an additional 7 yrs!
Accomplishments: ARL Robotics CTA

Providing key technology for future Army unmanned systems

## Academic Accomplishments

<table>
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<tr>
<th>Metric</th>
<th>FY 02-07</th>
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<tbody>
<tr>
<td>Scholarly Papers</td>
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<td>Invention Disclosures</td>
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<td>Graduate Students Supported</td>
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**DEMO XUV (eXperimental Unmanned Vehicle)**
So, What is a Collaborative Research Team?

.....think of it as a continuum.....

Investigator-initiated research
Investigator works on a scientific problem – largely on his or her own.

Research Collaboration
- Group works on a scientific problem, each bringing some expertise to the problem.
- Each member works on a separate part, which are integrated at the end.
- The interaction of the lead investigators varies from limited to frequent with regard to data sharing or brainstorming.

Integrated Research Team
- Team works on a research problem with each member bringing specific expertise to the table.
- There are regular meetings and discussions of the team’s overall goals, objectives of the individuals on the team, data sharing, and next steps.
- One person takes the lead while other members have key leadership roles in achieving the goal.

Level of Interaction and Integration

Low

High
Challenges
Collaboration Introduces Threats

Group-Identity

Self-Identity

Independent

Interdependent

Status

Power

Autonomy

High Interaction and Integration

Multiple Interdependent Leaders
All of Us Have Loss Aversion

• People attach greater weight to prospective losses than gains, making them reluctant to trade concessions even where it is mutually advantageous

• People are very attuned to loss of face, status, and ego
  – Thus, framing a proposal so as to invite the other side to give something up rather than to receive something in return may inadvertently raise recipients’ reluctance
So, no matter what type of collaboration...

Collaborative partners face potential pitfalls:

- Poor Listening and New Languages
- Time – It’s not on your side!
- Competition for Influence
- Balancing individuals needs with group needs
- Getting agreements from large diverse group
- Different research platforms and goals
- Achieving fair allocation of resources
- Institutional Disincentives
To Succeed: Many Elements Must Come Together
Forming the Research Team

• Identify the disciplinary needs; find collaborators who are well qualified and passionate about what they do
  – Do background checks regarding their past participation in collaborations

• Recognize the importance of personality
  – Work with people who are not only smart, but also nice
  – Find people who are open-minded and who do not prejudge other disciplines

• Be who you are -- don't try to become someone else
  – Recruit experts in appropriate fields to fill gaps

• Understand the potentially different roles of team members
  – For example, securing the grant versus getting the work done
Model of Team Development

Forming

Team is formed top down or bottom up.

Stroming

Members establish roles usually resulting in turf battles.

Norming

Members begin to work together, build trust, and comfort with each other.

Performing

Team works together efficiently and quickly resolves issues that emerge.

Adjourning and Trasforming

Team dissolves naturally at project conclusion or takes on new project.

Bruce Tuckman, 1965, 1977
Avoiding the Pitfalls

• Select a good team
  – An ideal team member is highly accomplished, smart, refreshingly modest and always open-minded
  – Aim for a smaller team with lots of complementarities

• Invest in project management
• Agree on responsibilities at the outset
• Ensure project meets disciplinary and multidisciplinary objectives
• Be patient and persistent; practicing grace and openness
In Practice: Many Elements Must Come Together

- Leadership
- Fun
- Building a team
- Managing diversity/differences
- Team Dynamics
- Trust
- Getting and Sharing Credit
- Shared Vision
- Communication
Collaboration Requires 
Letting Go and 
Embracing Change 
- Loss is Risky

Trust Provides Safety 
- Building Trust Takes Time
What is Trust?

Degree of risk one is willing to take, or the extent to which one is willing to rely on another person based on assessment of their ability to perform, their honesty, their reliability, and/or their intentions, including their willingness to take into account the interests of another.

Kurt Dirks and Donald Ferrin
Two Types of Trust

• *Calculus based trust* – built on calculations of the relative rewards for trusting or losses for not trusting
  – When you have calculus based trust you believe that the other person will do what they say they will as part of their commitment to preserving the work relationship

• *Identity based trust* – built on an assumption of perceived compatibility of values, common goals, emotional/intellectual connection
  – A sense of mutual understanding and appreciation of each others needs, approaches and values

• Establishing calculus-based trust provides a strong foundation for developing identity based trust
Trust

- Underpins the success of the team
- Enables open communication and debate
- Provides an environment where opinions are shared and consensus can be reached
- Facilitates data sharing and discussion of next steps
- Team members are willing to train and teach each other to further the mission of the group
- Colleagues believe others’ motives are for the greater good
Trust – How To Build

• Build trust slowly over time with shared experiences
• Engage in activities that build trust:
  – Weekly data meetings or case conferences
    • Present data and receive feedback
    • Hear data and give feedback
  – Scientific debate and exchange
    • Challenge ideas with the goal of reaching consensus
  – Teach and train others, and receive instruction and assistance from others
  – Develop a process to handle disagreements (Prenuptial Agreement)
  – Acknowledge that team members follow through on their commitments
In Practice: Many Elements Must Come Together
Shared Vision: How To

• Ensure everyone in the team can describe the “big picture”

• Encourage each individual team member to state his/her research goal and how it relates to the “bigger picture”
  – Depending on role, team members may or may not understand the “big picture” at the same level as the leader

• Have the group discuss each member’s accomplishments and challenges in achieving the goal – and how they relate to the overall mission

• Instill in team members a sense of ownership of their roles and responsibility for attaining them

• Encourage team members to accept responsibility and accountability
In Practice: Many Elements Must Come Together
"I make a pretty good team!"
Leadership

• Teams have clear leaders
• Leaders articulate their scientific and research vision to the team and, in turn, the team becomes committed to that vision
• Common characteristics of strong leaders:
  – Willing to “lead”; decisive; shares information and communicates well; well-organized; strongly supportive of staff at all levels; models the collaborative process; links team to others
• Leaders select members who will fit into the team’s culture. One size does not fit all!
In Practice: Many Elements Must Come Together

- Leadership
- Fun
- Managing diversity/differences
- Building a team
- Team Dynamics
- Getting and Sharing Credit
- Trust
- Shared Vision
- Communication
The Value of Diversity

Diversity is an asset when it is assumed that insights, skills, and experiences developed as members of different identity groups are a valuable resource that the workgroup can use to rethink its primary tasks and strategies.
Managing Diversity: Harnessing Differences

- Essential Differences – disciplinary world-views, methodologies, technologies, criteria for credit and authorship.
  ✓ Require integration

- Incidental Differences – personality styles, work habits, identity factors – race, gender, etc.
  ✓ Require effective management but depends on degree of scientific integration
What did you say?

http://www.youtube.com/watch?v=PbODigCZqL8

2.30 - 3.10
What about your Institutional Climate?

Perception that the Univ/College/Dept does not support team science

leads to

A collective vision that team science is not supported

leads to

An “us” vs. “them” mentality

• How can this cycle be reversed? Or stopped?

• What can individuals, institutes and leaders do to demonstrate commitment to team science such that the community will trust in it?

• Are there tangible mechanisms to recognize and reward the “team” as opposed to the individual?
Preemptive Approach

• Develop scaffolds for the establishment of trust: personal and institutional

• Written agreements serve as scaffolds
  – Prenuptial agreements
  – Tenure Track offer letters or review agreements

• Develop policies, procedures and criteria that explicitly support collaboration

• Institutional self-awareness: what is the institution doing to promote or discourage team science?
Getting Started
(Producing a Collaborative Proposal)

- The research team and central research question(s) flow from the RFP
- The team and the questions are jointly determined
Crafting a Competitive Proposal

• In principle, this is no different than a disciplinary-based grant proposal...

• However,
  – Identifying an integrated and compelling research question is (much) more difficult in an interdisciplinary setting
  – Forming, engaging and managing the research team is (much) more difficult in an interdisciplinary setting
Identifying the Research Question

• Focus on questions that are important in your own and others’ fields
  – Identify theoretical foundations that are shared or that are complementary and can be integrated

• Develop an overarching integrative question from which specific sub-questions or tasks (that may be more disciplinary based)

• Use a simple diagram to show linkages among component parts
Enhanced Student Learning via Innovative Industry Partnership

- FAMU-FSU College of Engineering
- College of Science, Technology and Mathematics
- College of Agriculture
- School of Business and Industry
- Office of Technology Transfer, Licensing and Commercialization

Undergraduate Research and Development Center (URDC)

- Academic Affairs / University Relations
- Undergraduate Research & Development Center
- Dr. Rogers (STEM)
  - Design Projects
  - Research
  - Capstone Projects
- Dr. Burney (Non-STEM)
  - Undergraduate Research & Development Center
  - Internships
  - Research Symposiums
  - Capstone Projects
- Professional Development
- Global Leadership
- Green Technology
- Entrepreneurship
- Thermal Modeling and Management
- Fuel Cells, Power density
- Reconfigurability of energy flows

- More Electric/All Electric Vehicles
- Thermal Management
- Advanced Materials
- Standoff Sensors
- Autonomous Systems
- Power Generation
- Sustainable Biofuels

Technologies Leverage:
- Electric Aircraft/Micro UAV
- Electric Ship/Ground Vehicles
- Robotic Research/Fault Tolerant Controls
- Sustainable Biofuels
While Writing the Proposal...

• Learn as much as you can about others' interests, perspectives, and approaches
  – Can your goals be improved by another’s paradigm

• Feel comfortable saying "I don't understand" ... and don't fret when other say that to you
  – Your strategies may be new to some team members

• Seek to understand in order to be understood: Spend 90% of your time listening and 10% of your time talking
  – Suspend “disbelief” you may find an answer to your issue
Potential Payoffs to Collaboration Research!!

• Professional growth
  – Exposure to different perspectives and approaches builds are own understanding and knowledge

• Additional resources
  – Funds to support own research program
  – Lasting collaborations
  – Additional opportunities for external funding

• Research impact
  – Interdisciplinary journals have bigger impacts (e.g., compare impact factors of Science (30.3) and Nature (31.2), to your disciplinary journals)

• Ability to deal more effectively with “real world” problems
  – Enhanced interactions with practitioners, stakeholders, policymakers
  – Resulting in longer term payoffs from more substantial contributions
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Howard Gadlin (GadlinH@OD.NIH.GOV) and Michelle Bennett (LMBennett@NIH.GOV)  

Elena Irwin (irwin.78@osu.edu)  
www.cfare.org/media_events/Irwin_webinar_slidesx.pdf

Questions?