

Presented by Dave Trinkle, Erica Whitney, and Kim Baeten from BRDO. See separate document for notes on faculty panel discussion.

The Berkeley Research Development Office, or BRDO, is a unit under the Office of the Vice Chancellor for Research that provides various types of support for PIs on their proposals. While BRDO supports a wide range of proposals, its reason for being is helping with large, complex, or strategic proposals such as center grants. As a result, having worked with many teams pursuing these centers over a number of years, BRDO staff have compiled a number of observations about effective practices. One observation is that PIs nearly always wish they had more time to develop their concepts, teams, and proposals.

This presentation was built around the theme of preparing for center opportunities, in two primary ways:

1. We hope to help *prepare* more faculty to make the leap from individual research grants to leading (or participating in) larger, more collaborative team efforts
2. We provide some tools to help faculty prepare their research concepts and teams early, even before there is a call for proposals.



Scope of this presentation

We will focus primarily on:

- Research centers (principles apply broadly)
- Early concept and team development
- Brief introduction to funding strategy
- ...But not proposal writing

For more on proposals:

- *Proposal resources that we mention later*
- *Future events on proposals; specific opportunities (e.g., NSF Science & Technology Centers)*

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See slide 31 for more information on support for proposal development from BRDO or staff in some colleges, schools, and centers, and see the BRDO website for proposal resources (<https://vcresearch.berkeley.edu/brdo/proposal-resources>).



What is a center?

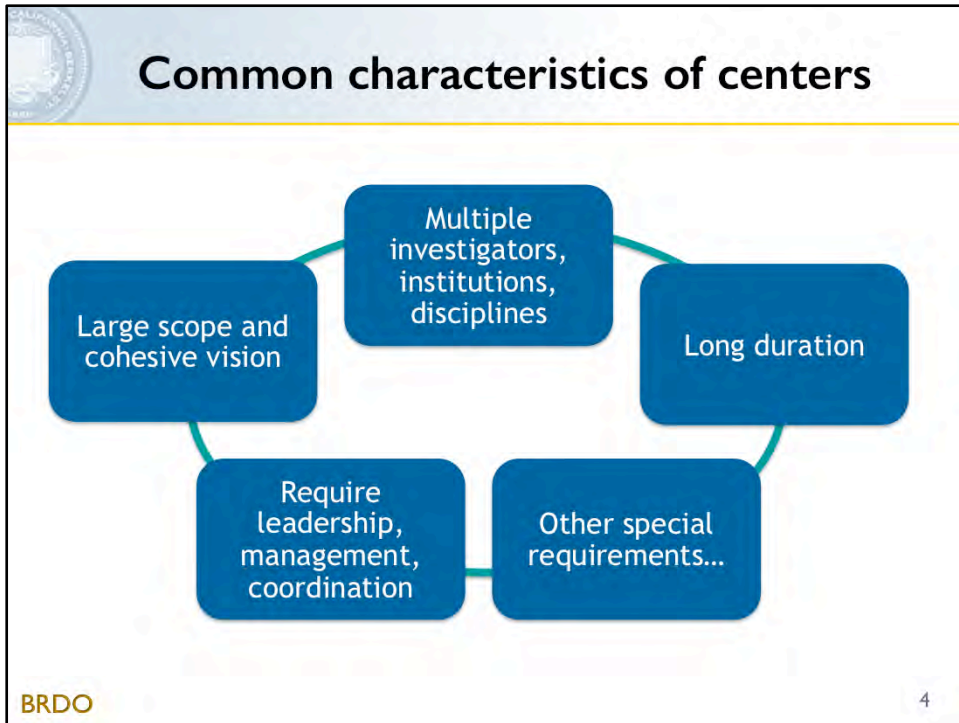
Generally speaking, centers are long-duration, collaborative clusters, intended to support a cohesive portfolio of research and other activities



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In addition to the summary provided on the slide, note that the larger size and scope of a center lets you accomplish what can't be done with single-PI grants.



Some characteristics are common across center types.



Other special requirements and expectations

- Expect more attention from the funder:
 - Extra focus on deliverables, timelines, accountability
 - Sponsor may have a say in the direction of the center
- Some expectations will vary:
 - Alignment with national/agency priorities
 - Societal impact/broader impacts
 - Workforce development and education
 - Outreach and diversity
 - Inclusion of stakeholders (such as industry)
- Often an interest in sustaining the center

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With the greater scope of center awards comes more attention from the funder. So you can expect to have to demonstrate accountable leadership, to assess how various aspects are working, and adapt as needed. The funder will have a say in the direction of the center, especially when the award is a cooperative agreement.

Other requirements are specific to certain funders (e.g., broader impacts requirements at NSF) and specific solicitations.

Funders often expect centers to continue find other funding sources to help sustain its activities after their initial funding runs out.

Centers on our campus represent a wide range of sponsors, purposes, and sizes

The diagram illustrates the following categories and associated centers:

- Federal (Green box):** Includes Synberc, E3S, BSAC, TRUST, DS421, CGER, CERCH, Vision Core, MCF, CGS, CERC-WET, DIL, CUBES, and ISEES.
- State (Red box):** Includes CITRIS, QB3, CalSWEC, Kavli, and ENSI.
- Hybrid (Grey box):** Includes HWNI, BWRC, BiGCB, BCGC, IGI, EBI, and UPCR.
- Donor (Purple box):** Includes Blum Center, Bixby Center, Center for Bangladesh Studies, and Townsend Center.
- Foundation (Blue box):** Includes CLTC, Haas Institute, Simons Institute, and BID.
- Industry (Orange box):** Includes CARA.

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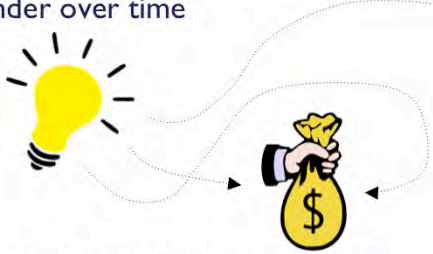
Some are federal, such as NSF and NIH research centers and training grants (circled). Other federally funded centers shown are supported by the U.S. Department of Energy, NASA, the U.S. Department of Education, and USAID. The state has funded a number of multi-campus mega-centers, in the form of California Institutes for Science and Innovation, including QB3 and CITRIS. Others resulted from Donor gifts or Foundation grants, which fund more of our centers in arts and humanities than other funders do. Yet more campus centers are funded by Industry.

Each of these centers has its own story of how it was first envisioned, and what it took to get it off the ground.



Paths from concept to funding

- Find/search for appropriate solicitations
- Anticipate expected/recurring solicitations
- Develop concepts without a known funder:
 - Be ready for sudden windows of opportunity
 - Socialize concepts with funder over time
 - Influence funder
- Consider multiple paths
- Repeat; iterate
- Request a consultation on funding strategies



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Talking about all these different funding sources raises the question of how one goes from having a concept to get funding to implement it. How to find funding is a topic that could easily be a presentation in itself, so this discussion is a broad overview.

It is common for faculty to develop their center concepts as a response to a specific solicitation. That can certainly work, but there are ways to be more proactive.

1. You can search for solicitations using tools like Pivot (see <https://vcresearch.berkeley.edu/brdo/funding-opportunity-databases>). Pivot lets you set up searches, which it can then automate and alert you of new opportunities as they appear. You can also do some homework at funder sites to understand likely funding sources. Who has funded topics like yours? What has a specific foundation or program funded in past?
2. You can also familiarize yourself with recurring solicitations, to be ready for the next round of NSF STCs, etc. (See funding opportunities handout.)
3. There can also be a lot of value in developing ideas without a specific solicitation or funder in mind.
 - Some solicitations provide inadequate turnaround time to respond;
 - Sometimes donors or foundations approach the VCR or deans for concepts worthy for gift funds, so it helps to have ideas already prepared; and
 - Sometimes you can discuss your ideas with foundations or donors or agency program managers, and even influence their agendas.

People on campus that can help you brainstorm your funding strategies include:

- Your colleagues;
- BRDO or Sylvia Bierhuis from Foundation Relations and Corporate Philanthropy (sometimes jointly); and
- Development staff or proposal staff from your units.

 Different center opportunities address different needs			
Type	Purpose	Fund research?	Fund non-research staff?
Research centers	Fund collaborative research	Yes!	Yes
Research cores	Provide shared facilities and resources for other awards	No/limited	Yes
User facilities	Operate something for the user community	Not always	Yes
Coordination centers	Provide a national or regional service for the sponsor	Often no (may allocate research funds)	Yes
Training grants	Support training of students and postdocs	Indirectly, via fellowships	Some
Administrative centers	Provide administrative resources	No	Yes

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Different types of centers are meant to serve different purposes, and not all provide funding for research.

When you consider a specific center opportunity, it's important to look past how much money will be provided overall, and pay close attention to what that funding is meant to support. It could be that you want to operate a user facility—there are many reasons to do so. But if your main goal is near-term funding for your research, it may not be the ideal funding opportunity.



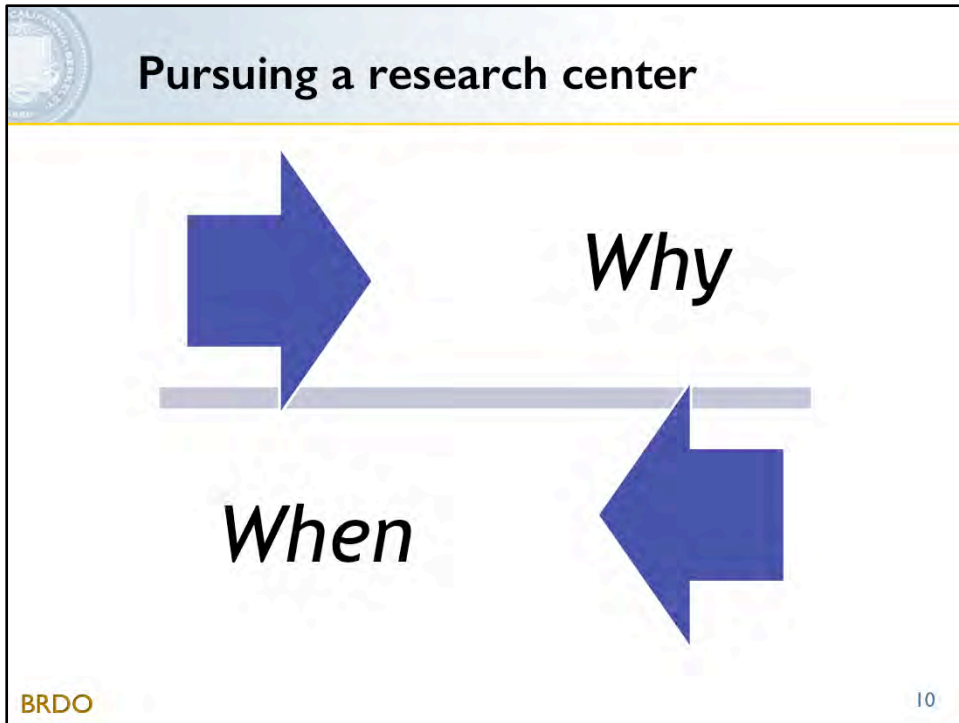
Overall, keep in mind...

Research centers enable research that couldn't be done with smaller grants.

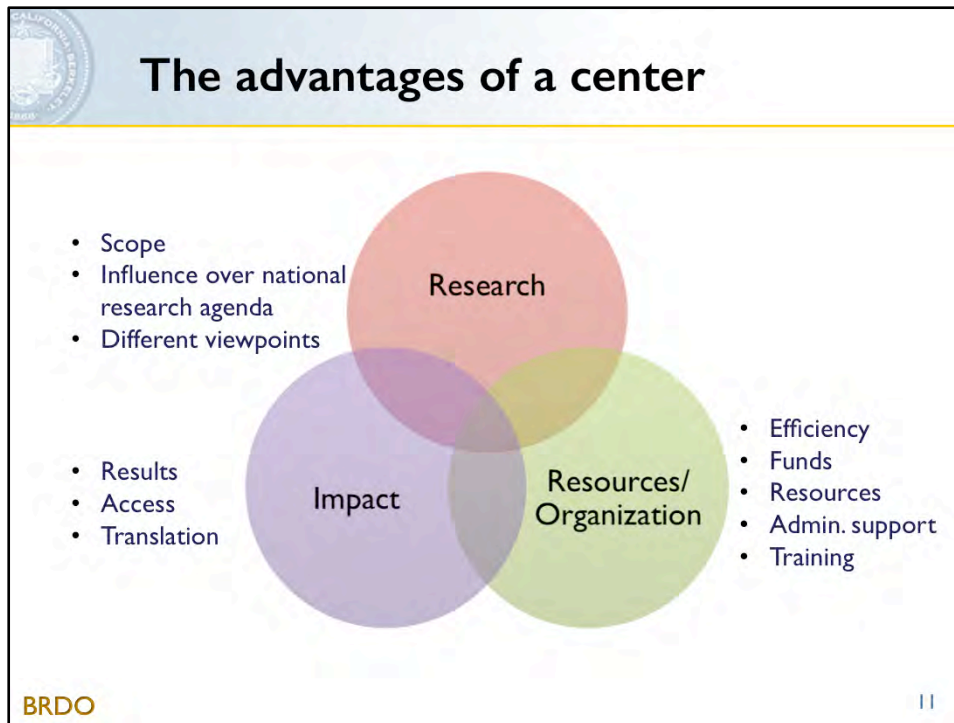
They also go beyond research activities:

- Because they must
- But also because they can

Research centers permit research that you could not accomplish with smaller, single-PI grants. They go beyond research because the funder expects more from them, but the non-research activities represent an opportunity and a benefit for the researcher, the research, and the institution.



Why would one want to pursue a research center rather than go along your merry way as an individual researcher? And when is the right time to pursue one? The “why” and when questions have many answers, and these answers differ from the perspective of the individual as a PI, the needs of the research, and the needs of your institution.



Centers have distinct advantages over single-investigator projects. These advantages can be broken down into 3 main categories: research, resources and organization, and impact, but these all flow into and influence each other. The most important characteristic of a center is that it allows you to do research that you can't do on your own. It's like compacting a person's entire research career into a 5 year period through the collaboration of multiple people. Centers are necessary because of the complexity of the scientific problem being addressed, disciplines required to address the problem, value-added benefits team research brings to solving the problem, and the capacity to develop new technologies, innovate, and translate results. The center structure serves as an integrator to enable synergistic benefits, not just for the research but for all of the other activities that make up a center as well, e.g., education and training, technology development, innovation, commercialization, etc. For example, by bringing together different viewpoints you access new approaches, creative and innovative ideas, broad and deep expertise, access to more stakeholders, and so on. In a center you have increased efficiency toward research progress, through shared resources and the ability to develop new resources, and you also have funding for administrative support, which is rarely provided by smaller grants. Centers provide a unique environment for training program elements, giving you the flexibility to create training opportunities that match the proposed research. You'll have greater access to other constituencies for translation when you work with a more diverse group. Most importantly, your overall impact is going to be greater. Funding agencies view themselves leading the national dialogue on research and education topics and directions. However, by enacting your research within the scope of a center, you have a similar opportunity to drive the national agenda.



Some challenges...

- More complex to manage
- More viewpoints
- Other requirements can be time consuming
- Must share recognition, credit, power, etc.
- Can take more time to start-up, manage, etc.
- Dependence upon others




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Karin
"Hey, Sisyphus, when you've got a minute I'd like to discuss this progress report with you."

Some of the same things that we hold out as being the advantages of a center can also bring about challenges. Being the PI can seem like a Sisyphean challenge at times. With more people and more viewpoints, the project is more complex to manage. The other requirements that make centers advantageous can also be very time consuming. When you do research within the context of a center, you won't always be the first or last author on your papers---you'll be sharing recognition and credit with others. Similarly, you may be dependent upon others to fulfill their parts of the research program so that you can do yours. And, while in the long run the productivity of a center is greater than a single-investigator grant, Centers can be slower to start up because there are so many moving parts.



Questions to ask yourself


- Why do I want to do this?
- What do I hope to gain?
- Who do I want to do this with me?
- What agenda do I want to push forward?



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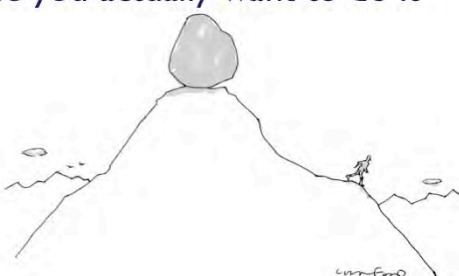
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Often, the path to becoming the PI of a large center grant consists of several transitions of scale, from smaller grants to larger grants. Other administrative service at the university can also be a pathway to leading larger research efforts. It is worth doing a strategic assessment of your career trajectory to evaluate what you need and where you need to be in your career to bring about the research impact that you desire. There is not a single leadership style that is effective in all contexts, so it is not that one person is a “good” leader and another lacks the right characteristics. You strategically accumulate knowledge and skills as you undertake different research and administrative duties. In their report on Enhancing Team Science, the National Academies “noted that deliberate practice is a very important component of leadership development, as is fostering a sense of identity as a leader, which can lead to greater interesting in learning about leadership and improving leadership skills.” Consider also that there are many ways to be a leader in center-based research aside from being the PI.



Why be the PI?

- Influence the national research agenda
- Create something larger
- Facilitate collaborations
- Stretch your disciplinary boundaries
- Increase access to resources
- Because you actually want to do it



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Being a leader isn't the only aspect of becoming the PI of a center. There are other reasons to do so than a desire to step into a leadership role. You really need to understand why you want to be the PI and what you want to get out of it for your experience to be a success. What would it feel like to be Sisyphus finally getting the boulder to the top of the mountain?

As mentioned on slide 11, one of the advantages of a research center is that it can influence the national research agenda. If you are the PI of a center and are taking the lead on creating the central vision of your center, you are in the position to be able to put your research agenda on the national agenda, or push the national agenda with respect to your research. If you believe that there is a certain approach or perspective that your field should be focusing on, you can harness the increased influence that a center provides to centralize your position.

You may want to create a larger legacy than what you could create in your own research program. You may want to move the field in such a way that requires collaborating with other faculty, within your institution or across institutions. You may want to do more work at the boundaries of your discipline or work across disciplines, and centers provide a focused system for integrating multiple people and multiple viewpoints toward a common goal. It may be that in order to do the type of research that you and your students want to do you need access to resources that you don't already have. Maybe these resources exist in other places. Maybe you need to work together with others to bring those resources here to Berkeley.

When to consider a center

- When the field is ready
- When you are ready
- When the team and their research is ready
- When your institution is ready

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Any decision to submit a center grant proposal must be grounded by doing a candid assessment of your ability to develop a competitive proposal and perform the proposed research. You have to consider when the field is ready, when you are ready, when the team and their research is ready (see slides 21 and 22), and when your institution is ready for it.

- To consider whether your field is ready, look at what's going on in your field. Is this a hot topic or on the way out? Are you able to take advantage of a new technique? Is the agency ready to fund it? Do you have a thorough understanding of the agency's mission and culture?
- To consider when you are ready, consider where you are in your career, who you have to help you, when your research needs the collaborative approach, when you have the time with respect to your other obligations, and when you have the support of your administration.
- To consider when your institution is ready, look to when it has the correct resources needed, and when you have the support of your dean/chair/administration.



How to prepare for a center

This session:

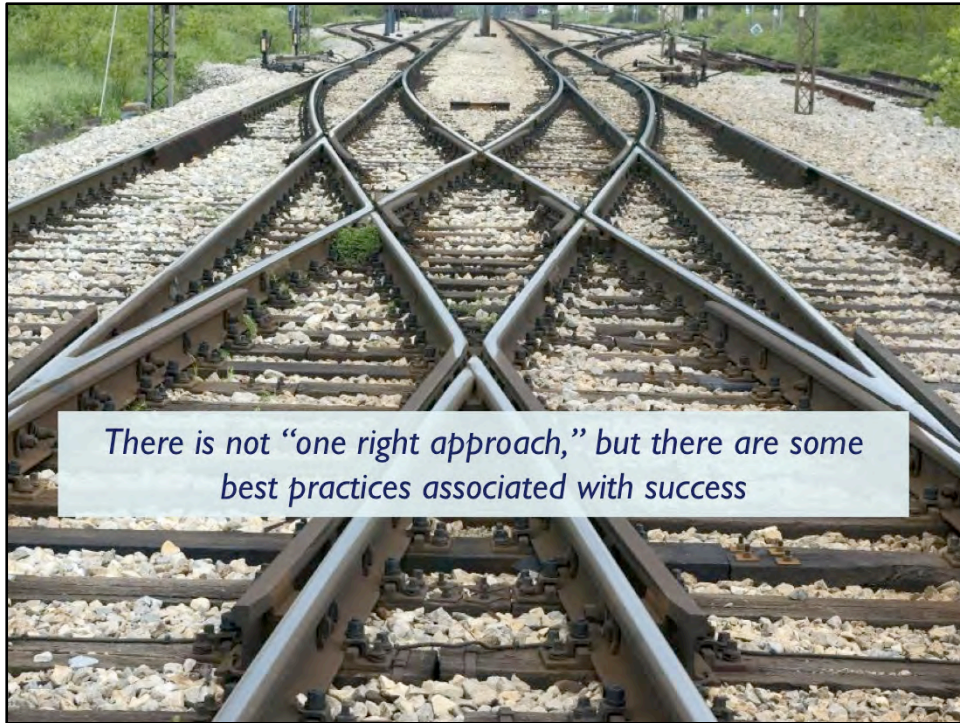
1. Major considerations in planning for research centers versus individual research projects
2. Highlights from team science to facilitate collaborative process and increase efficiency
3. Next steps and resources
4. Panel discussion

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* “Team Science” refers to practices for doing research in teams, and the “science of team science” is a field of study in the social sciences.

The concepts that follow are helpful when preparing for a research center early on, even before applying for funding, but most are also relevant throughout the grant writing process and when you’re actually running the center. Similarly, tips for team science can also be useful for smaller collaborations, or even within your own research group.



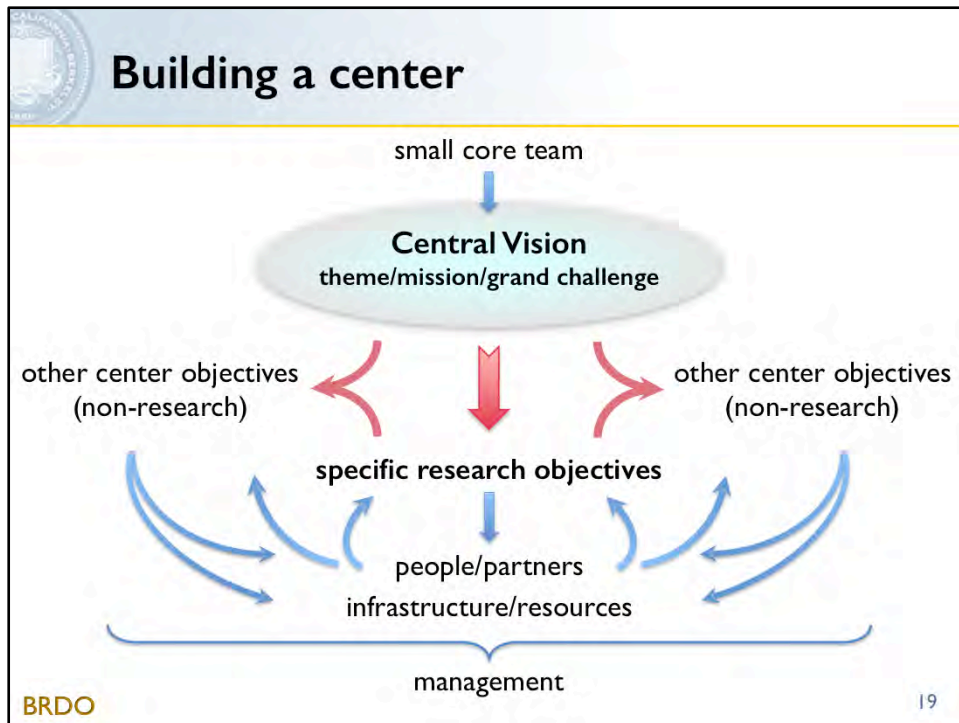
There is not “one right approach,” but there are some best practices associated with success

This presentation highlights best practices and is based on publications by federal funding agencies and the National Academies.




Aspects of a successful center

- Same as for individual research project
 - Interesting question/problem (significance)
 - Solid approach
 - Innovation
 - Feasibility/credibility (preliminary data, expertise)
 - Facilities/environment
- And more
 - More activities (research and non-research)
 - More people (multiple disciplines and institutions)
 - ➡ Need to be cohesive and integrated around vision



The ideal scenario for building a center is to:

1. Start by defining the overarching central vision, and let everything else follow from there.
2. The vision will help you articulate achievable research goals and objectives.
3. The vision and the specific research objectives will then inform the other center goals that go beyond the research, such as your education and outreach activities, or the direction of your industry relationships.
4. Once you have an idea of the various components, it will become obvious who you have to bring in to make any of this happen, as well as what resources you may need.
5. This is of course an iterative process, because as you bring in the right domain experts, they will be able to help refine the goals and objectives, and formulate the approach, and as things evolve, more people may be brought in, etc.
6. Once you have defined the key elements of your center and have a good idea of who your team members will be, it will also be easier to formulate a management structure that makes sense for your center.



Planning multiple program activities

- Same as for individual research projects:
 - Define problem/need
 - Design approach
 - Line up people and resources
- Remember:
 - Consider the vision of the center
 - Choose something that you like/suits your team
- Seek input from experts
- Follow best practices, funder guidelines

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As you plan the various program activities, keep in mind that *each* activity, whether they are research or non-research program elements, should be strong and meaningful. A good way to accomplish this is to design each element as you would an individual research project. Thus, whether you're designing the 4th research thrust, your management plan, or an education and outreach component, the strongest plans have identified a specific problem or need to be addressed, a suitable approach, and the people and means needed to make it happen. For example, one of the things successfully managed centers do is adapt to changing circumstances by adding promising projects and sunsetting underperforming ones – you need a plan for how you will do this.

Please remember to (1) make sure that each activity fits with your vision so that you present a cohesive and integrated center rather than a collection of independent activities, and (2) make sure that you choose something that you **WANT** to do! (You may be doing it for the next 10 years or so.)

As always, seek advice from domain experts as needed, and follow best practices and funder guidelines. By now, centers have been around and evaluated for decades and sponsors and reviewers are understanding more and more what may be needed for success.



Assessing team readiness

- Are you ready to successfully work together?
 - Past collaborations among team members
 - Past interdisciplinary successes
 - Ability of people/disciplines to work together
 - Preliminary data
- Are you ready to hit the ground running?



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One of these things funders and reviewers will be looking for is if the team is ready to work together successfully. This is typically easiest to establish if there is some past experience of productive collaborations, at least among some of the members, or other interdisciplinary success that aligns with what you propose. If you're suggesting a novel interdisciplinary approach, you may want to include preliminary data to show feasibility.

How ready you are can vary widely depending on how far out of the box your vision and concept is at this point in time; ask yourself if you're ready to hit the ground running. If you conclude that you're not ready yet – and that's ok – you can get there!



Becoming a *team*

- Get together
 - Group meetings
 - Workshops
- Consider planning/pilot phase
 - Identify needs (activities and people)
 - Apply for funding for planning, meetings, pilots
- Use best practices for team science

And an important part of getting there is to become a *team*. You can organize group meetings or workshops to hone your ideas and bring team members together, or you can have a more extensive planning/pilot phase. And, you can use some best practices for team science, is the second part of this session.



Define the central vision

- What do you want to accomplish?
 - Ask: What would success look like?
 - Generate big ideas (brainstorm, creative thinking, “What if...”)
- How will you get there?
 - Identify barriers
 - Identify people and approaches to overcome them
- Get feedback



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We recommend that you get feedback early on as your concept develops. This is always a good idea, but it is especially so for a center, because of all the effort you and your team members would have to devote. Thus, talk to your trusted colleagues, and if you already have a funding source in mind, to the program officer if appropriate.



Attributes of the central vision

- Inspirational, but focused
- Complex
- Long lasting
- Significant
- Aligned with potential funder's mission
- Playing on your team's unique strengths

As you define your vision, create something that is:

- Broad enough to be inspirational, but focused enough to provide cohesion
- Complex enough to require a center approach
- Long lasting so that it can guide your center over time
- Significant, timely and broadly relevant
- Aligned with national priorities or funder's mission
- Plays to your team's *unique* strengths, so that if the funder wants to support something in this arena, *you* are absolutely the right people to do it



Build the right team

- Consider center goals, collaboration, creativity
- Use holistic approach:
 - Expertise and perspectives (complementary)
 - Bought into vision
 - Team player
 - Existing collaborators *and* new members
 - Diversity
- Other factors:
 - Team size
 - Geographic distribution
- Refine over time

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For expertise, consider both for the research and non-research elements.

Remember that “a team of experts does not necessarily make an expert team,” so consider using a holistic approach when inviting people to join your team.

For team players, this means not only people who like to work in teams and are good at it, but also who still have time to devote to *your* team.

Data have shown that to build an effective team that is also innovative, it helps if your team is a mix of existing collaborations and new members, and that your team is diverse. Diversity comes at all levels: discipline, career stage, gender, ethnicity, type of institution, etc.

For team size, more isn't always better: you will have to work together, and a seemingly large budget amount quickly becomes limited once you start dividing it all up.

For geographic distribution, there may be many reasons for creating a truly *national* (or even international) center, and some solicitations may even require it, but be mindful of the added logistical complexity.



Leadership attributes

- Articulate central vision
- Communicate clearly
- Ensure transparency and accountability
- Foster collaborative environment
- Seek input and advice
- Be decisive
- Delegate authority

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For leadership, there are many different leadership styles, and what works best will depend on your personality and that of the team, but there are some leadership attributes associated with successful centers.

For input and advice, consider both internal and external advisors, as appropriate.

For being decisive, remember that you cannot always please everyone – you need to keep the cohesiveness and integration of your center in mind.

For delegating authority, remember that depending on their size, most centers have a management *team* (org chart with assigned roles and responsibilities).



Team building

- Trust
 - Get to know each other
 - Present and share data
 - Be responsive
- Buy-in
 - *Shared* vision (~personal goals)
 - Sense of ownership
 - Recognition
- Communication
 - Common vocabulary across disciplines
 - Constructive feedback
 - Clear expectations (“prenup”)



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You can find these and many more ideas online and in the resources we list.


You want to build Trust, because in order to work well together people need to trust that each member will keep the *team* interests in mind. The panel also reiterated the importance and value of face-to-face meetings, of bringing everyone together in a room early on, even if that requires air travel. This will facilitate subsequent interactions, even if those are by email, phone, or video conference.

You want Buy-in, because it's going to take effort to collaborate, so you want, for example, a *shared* vision where people see how their contributions feed into the overall center vision, but also how the center activities help them progress towards their personal goals. The panel acknowledged that it may be hard to get buy in from faculty who are only playing a small part in the center, but they pointed to the importance of getting buy-in from the students and postdocs of those faculty as a way of keeping them engaged in the center.

And of course Communication will also be key. Especially if you are working across disciplines, it's important to create a common vocabulary – avoid or explain jargon and make sure similar terms means similar things to different people/disciplines. And you want to establish a healthy communication style, where people can enter into dialogue rather than conflict. One important tool for that is to set clear expectations from the start. For example, you can create a collaborative agreement, or “prenup” that outlines principles for things like assigning authorship and so on.



How long your planning phase is will depend on how early in the process you realize that those ideas you've been having are actually a center in the making, and how far from the current norm your big ideas are. A 2-year planning phase is not unusual, but it has also been done in a matter of weeks.



Next steps

- Apply for UC/CSU CREDITS Team Science Retreat (Application deadline midnight May 25)
- Apply for planning/pilot grant funding
 - Examples:*
 - UCOP MRPI (LOI deadline noon May 24)
 - NSF planning grants for ERCs (Deadline 5pm June 6)
- Work on your funding strategy
- Line up your *proposal* team

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The annual Team Science retreat for researchers across the UC that was advertised by Calmessage is a great opportunity to hone your leadership and collaboration skills. <https://oru.research.ucsb.edu/teamscience/>

These are two examples of planning grants with deadlines within two weeks of the event:

- UCOP MRPI (Multicampus Research Programs and Initiatives) if you have at least three UC campuses: <https://www.ucop.edu/research-initiatives/programs/mrpi/index.html>
- NSF's planning grants for Engineering research Centers (ERCs): <https://www.nsf.gov/pubs/2018/nsf18549/nsf18549.htm>

Funding strategy refers to paths mentioned earlier in this presentation (slide 7).

Your *proposal* team goes beyond your team members. It includes, for example, your research administrator (or person who helps you with budget, collecting admin documents, uploading in grant systems, etc.) – these grants are more involved than a single investigator research grant, so you need to pull them in early.



Proposal development support

- **Berkeley Research Development Office**
 - Dave Trinkle
 - Erica Whitney
 - Kim Baeten
 - Barbara Ustanko
 - Kate Spohr
 - Matthew Andrews
- **College/school/department/unit. *For example:***
 - Gail Easton (COE)
 - Lauren Goldstein (SPH)
 - Eva Seto (Matrix)
 - Leora Lawton (Popcenter)
- **Foundation Relations and Corporate Philanthropy**
 - Sylvia Bierhuis and her team
- **Others**

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We also recommend that you reach out for proposal development support; for these large and complex grants there is support available to you that goes beyond research administration. This could include help with strategy, concept development, project management, and writing and editing.

Support can come from different places: BRDO is a central office that provides support to PIs across campus. You can find out more about us at brdo.berkeley.edu. Additional support may be available from different places, depending on your home (or grant submitting) unit.

Resources

brdo.berkeley.edu

Dropbox

Google Drive

PPCO Method for constructive feedback

P(Plus) P(Potentiality) C(Concern) O(Overcoming)

Collaboration & Team Science: A Field Guide

Facilitating Interdisciplinary Research

A New Vision for Center-Based Engineering Research

Convergence

Enhancing the Effectiveness of TEAM SCIENCE

Creative Problem Solving

Clarify the Challenge

Generate Lots of Ideas

Tuckman's Model of group development

forming

storming

norming

performing

Team Effectiveness

Performance Impact

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These and other resources are available on the internet and on our website: <https://vcresearch.berkeley.edu/brdo/building-teams-and-centers>