Averting the Big Bang

By Kevin Dressler, Lorraine Mulfinger, and Niki Page

Defining the Problem

If all faculty were as organized and self-disciplined as the fictional Sheldon Cooper (CBS' Big Bang Theory), wouldn't our jobs as Research Administrators (RAs) be simpler for the typical research grant application? Where is the episode that shows us how the diverse and interdisciplinary science team of Sheldon, Leonard, Amy, Raj, Bernadette and Howard sit down to write a grant together? Even with Sheldon Cooper's compulsive need for organization and attention to detail, we imagine the "Winning the Big Grant" episode of the Big Bang Theory to end in total chaos and frustration. Can you picture it? At 4:59 PM, everyone is huddled into the RAs office, holding their breath and waiting for the Grants.gov spinning disk to release a tracking number. Only to receive the fatal error message that leads to a missed deadline and an emotional "Big Bang". In the real-world of proposal development, the disastrous result of this illustration is all too possible. Large interdisciplinary proposal development offers complex challenges and, although many elements and challenges are similar to single investigator proposals, the volume and complexity is arguably more difficult to balance given the collaborative nature and time constraints in grant submission. Thus, task timelines are proposed as a means to avoid chaos and errors in the submission process.

Planning to Plan

Developing a plan is the first step toward successfully reaching any major milestone, and grant writing is no different (Russel and Morrison, 2011). The major U.S. funding agencies all caution applicants on planning, some more succinctly than others. The National Institutes of Health (NIH) clearly lists as a preparatory step in the grant writing process to, "*Develop a feasible timeline with draft application deadlines. Be realistic about the time it can take to write and revise the application*" (U.S Department of Health and Human Services, 2012). The National Science Foundation (NSF) mentions among "Other Considerations" to *"Organize a good working team. Distribute duties and develop a firm schedule of activities needed to prepare the proposal in time to meet the proposal deadline*" (NSF, 2004). While neither NIH nor NSF suggest the length of time necessary to develop a good proposal, the 90 day window that is minimal for many special calls from the NSF suggest that no less than 12 weeks should go into the planning of any proposal application. The following process challenges us to think about distinct proposal phases, key players and submission timelines.

While putting together a credible proposal in only 12 weeks is a challenge for any experienced single investigator who is pre-equipped with data and references, the difficulty can easily compound when a mid-career investigator steps forward to orchestrate his/her first large multidisciplinary proposal development team. The mix of multiple research units, institutions, complex budgets, cost share, and management plans can push even the best PI over the edge. With the 12 week challenge in mind, we set out to devise a model timeline (Table 1) that identifies the major tasks involved in the development of large, multidisciplinary proposals. As the timeline was developed, it became clear that the roles and responsibilities of participating faculty and RAs needed to be considered as coordination that is central to the success of concentric activities.

We acknowledge that a "one size fits all" concept cannot be applied to research administration or grant development at all institutions, but the basic tenets are transferrable. Keeping this in mind, the three phases of the timeline and understanding the type of work in each of those phases are the transferrable concepts. We envision the Principal Investigator (PI) using this model to prevent "task slippage" that will ultimately lead to an insurmountable backlog of work in the last 5 days of the deadline. Guarding against such a pressurized time window is a central challenge that drives the typical RA and Development Specialist (DV) as both project managers and catalysts in the process (Porter, 2005).

Three Phases of Proposal Development

Our timeline is divided into three distinct phases (Table 1; Framing, Collaboration and Refinement). The phases are nominally broken into equal time periods; however, overlaps do occur, and they are provided as a high-level way of understanding whether a team is "behind" or "ahead" in planning resources. Thus, the phases

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Table 1. 12 Week timeline for large interdisciplinary proposal development.

Goal Proposal Process – 12 Week Example	Framing Phase				Collaboration Phase				Refinement Phase			
Week:	1	2	3	4	5	6	7	8	9	10	11	12
Analysis and Planning												
Distribute RFP; Gather Intelligence; Recruit PI	Univ/DV											
Finalize Key Participant & Potential Collaborator Lists			PI									
Problem Development												
Define Vision & Goals; Identify Themes/Discriminators	PI											
Develop Proposal Outline & Estimate Budget			PI/RA									
Cost Share Discussion w/ Advocate			PI/RA/DV									
Identify Resources for Complex Admin Issues (e.g., IP)"			PI/RA/DV									
Assess Needs and Coordinate Institutional Data			PI/RA/DV									
Refine Outline with Project team				PI								
Identify & Draft Potential Graphics			PI									
Program Officer Input												
Contact Program Officer/Advisors for Feedback				PI								
Refine Outline/Themes with Project Team				PI/DV								
Partnerships												
Recruit External/Internal Partners			PI/DV									
Refine External/Internal Partner Involvement					PI/DV							
Solicit and Obtain Support Letters							PI/DV					
Management/Personnel												
Identify Management Structure					PI							
Collect and Edit Biosketches/C&Ps/Appendices						PI/RA						
Final Check on Participant List						PI/RA/DV						
Write and Secure Internal Commitment Letters								PI/RA/DV				
Budget												
Construct 1st draft of Internal (PSU) budget			PI/RA									
Determine External Partner Needs and Distribution				PI/RA								
Determine Cost Share Needs (if any); schedule MCM						PI/RA						
Refine Overall Budget							PI/RA					
Secure Cost Share (if any)									PI/RA			
Final Budget and Justification									PI/RA			
Proposal Writing												
Assign writing sections				PI								
Write Section Components						PI/DV						
Compile Draft 1							PI/DV					
Writing Team Edit								PI/DV				
Red Team Review									PI/DV			
Address Red Team Comments										PI/DV		
Editing Iterations									PI/DV			
Compliance Checks and PIAF Signoff												All

● = Advocate Approval; Note: Blue Coded text Indicates Advocate Involvement

⬟ Final Budget (external partners included) 1 week prior to deadline ■ Final technical pieces and supplemental documents 48 hours prior

Table 2. Roles and responsibilities by phase of proposal timeline.

Player	Phase 1: Framing	Phase 2: Collaboration	Phase 3: Refinement
Principal Investigator (PI) *Needs to be supportive of the 12-week plan. Ultimately controls the process, but relies on key players to complete tasks and stay on the timeline.	• Finalize key participant & collaborator list; Recruit partners • Define proposal outline (incl. Vision, Goals, & Themes) • Start writing assignment outline • Identify graphics • Draft/estimate budget • Identify necessary University resources (Admin Issues, Space, Data, Cost Share) • Interpret solicitation, and identify appropriate teaming strategies	• Refine partner participation; identify external commitment letters • Finalize writing assignments • Identify management structure • Refine budget and cost share • Identify internal commitment letters • Compile technical plan draft text and prepare for University review	• Track writing assignments & follow-up with missing contributions • Finalize management structure • Finalize budget, justification and cost share • Finalize Commitment Letters (internal/external) • Review technical plan and make final edits based on University review • Verify that Institutional approvals have been obtained to submit the proposal
Advocate (AV) *Needs to be identified by University and PI. We recommend an institutional administrator (i.e. Research Dean, Institute Director, Department Head)	• Participate in University limited submission process • Contact with PI to verify necessary University resources (space, cost share, admin support) • Verify that the PI has completed initial proposal vision/goals outline	• Verify writing assignments and draft text components are on track. • Support the PI	• Participate in the proposal University review • Support the PI • Verify that University approvals have been obtained to submit the proposal
University	• Organize limited submission process • Select and support PI/Advocate with necessary resources		
Development Specialist (DV) *Are typically Masters or PhD-level professionals who serve as catalysts in the proposal process and participants in writing/ editing	• Serve as a catalyst in University limited submission process • Assist PI in conceptualizing Draft/estimate budget • Identify necessary University resources (Admin Issues, Space, Data, Cost Share, outreach, diversity) • Interpret solicitation, and identify appropriate teaming strategies	• Refine partner participation • Coordinate drafts for non-technical proposal pieces • Assist w/ commitment letters (internal/external) • Help compile technical plan draft text and prepare for University review • Edit text if necessary	• Assist w/ finalizing commitment letters • Coordinate and make final edits based on University review
Research Administrators (RAs) *University authority for proposal submission. Assist w/ compliance, budget and administrative functions.	• Draft/estimate budget • Identify necessary University resources (Admin Issues, Space, Data, Cost Share) • Interpret solicitation, provide feedback; contact sponsor if necessary	• Contact participants for Biosketches, Current/Pending Support, CIO tables, Appendix material • Refine budget and cost share • Assist w/ commitment letters (internal/external) • Compile draft text	• Finalize budget, justification and cost share • Assist with finalizing commitment letters • Review proposal text for compliance issues • Verify that University approvals have been obtained to submit the proposal

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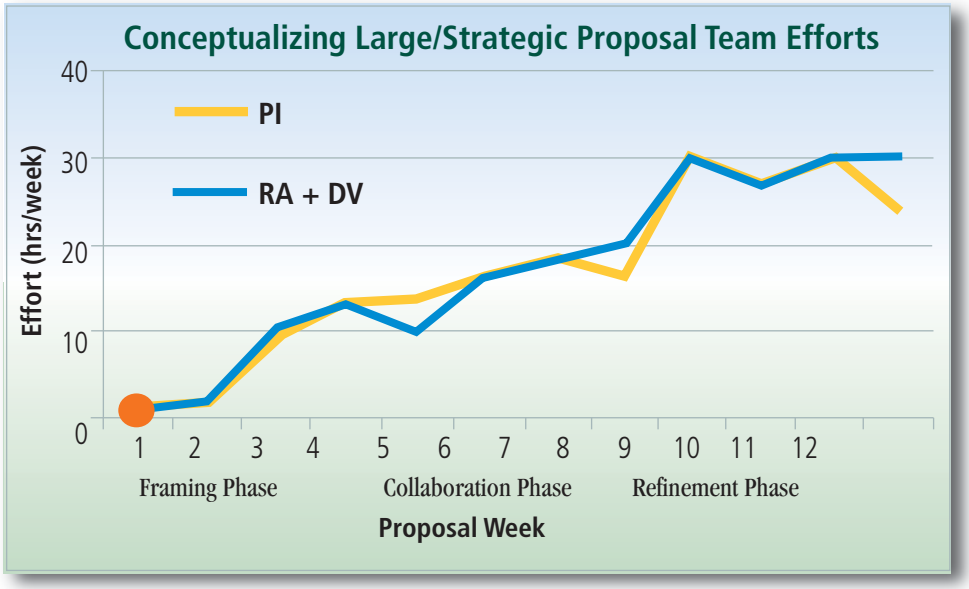
represent a macro-planning guide in which the PI, DV, RA and Advocate (AV), can monitor major milestones and detect delay in the process. For example, notice the three blue triangles in Figure 1. In each phase there is a natural point at which the AV can give feedback to the PI and/or make decisions about future resource investments in the proposal. In the framing phase, a good time for AV involvement is immediately after the goals, vision, themes and discriminators have been defined. In this way, the AV remains engaged at critical feedback points in the collaboration and refinement phases.

Each participant has distinct roles and responsibilities throughout the three planning phases (Table 2). Depending on the type of institution and specialized needs within the proposal, adjustments could be made to these descriptions at the beginning of any proposal planning process to better coordinate and improve the chances of success.

Sustainable Process

To translate the idea of a sustainable proposal development model, in terms of personnel resources invested, we have conceptualized the amount of effort that might be required of both the PI and the RA+DV support team (Figure 1). We lump RA and DV by adding them together to show the macro differences between the faculty (PI) effort and the combined effort of administration-related functions. In this figure, the personnel time commitments in Table 1 (above) were equally weighted and transferred into a 40-hour work week for a hypothetical well-managed team. Team member effort may vary greatly across different types of proposals, but few would disagree with the realization that procrastination by team members early in the process leads to long work days in the last week and increases the likelihood of errors and missed opportunities in the application. Figure 1 demonstrates that even minor reductions in activities during Framing and Collaboration Phases could create workloads significantly exceeding a 40 hour week in the Refinement Phase, if you were to shift those earlier unspent hours and add them to the hours already needed in the Phase. This "shortening" of Refinement Phase activities introduces a risk in proposal quality by reducing or eliminating the precious time necessary for improving proposal drafts and securing collaborative involvement, considered valuable for success. Further, last minute work typically involves more distracted effort due to the need to interrupt planned work schedules for other proposals and responsibilities that were designed around efficient scheduling.

Figure 1: Graphical representations of the efforts of the PI, RA, and DV members of a hypothetical proposal development team for a steady, coordinated effort.



Final Thoughts

This model timeline is not intended as a "one size fits all" approach, but the three distinct phases serve as modules that are transferrable and may be adapted to any specialized institutional or proposal needs. Our focus on planning is a topic every research office deals with and discussion converges to a universal tenet: *Careful planning and conscientious attention to timelines help avoid the all-nighters the week before submission and proclivity for errors or missed opportunities in proposals*. We hope the 12 week planning guide: 1) Serves as a starting place for planning of personnel and other resource decisions for a sustainable proposal process, 2) Gives the RA a tool for assisting PIs in understanding the differences between single-investigator and large multidisciplinary efforts, and 3) Provides a time and content guided framework for collaboration among a diverse set of professionals… all in an effort to avoid the Big Bang.

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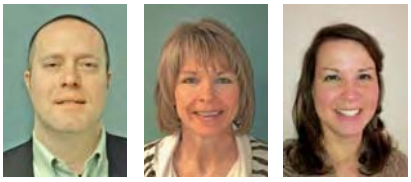

Kevin Dressler, PhD, *and* **Lorraine M. Mulfinger, PhD,** *are proposal development specialists in the Strategic Interdisciplinary Research Office (SIRO) at The Pennsylvania State University, and* **Niki Page,** *is the Lead for Pre-Award Administration and Proposal Submission of SIRO. Together they share responsibility for directing and supporting multidisciplinary teams in the development of technical and cost proposals for large and strategic research-related initiatives. Kevin can be reached at kxd13@psu.edu while Lorraine can be reached at lxm14@psu.edu. Niki can be reached at nlg4@psu.edu.*

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