Successfully Getting Your Work Funded

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Strategic Initiatives and Proposal Development
Three Phases of Funding Success

1. Capture Planning
2. Proposal Planning
3. Proposal Development
Capture Planning

“Capture Planning is the process of identifying opportunities, assessing the competitive environment, and devising winning strategies oriented towards winning a specific funding opportunity.” (Shipley Associates Capture Guide v. 3.0, 2014)

Capture Planning is doing your homework to understand funding sources/agencies and your potential competitors, and coming up with ways to make your time and effort investment worthwhile.
Identify Funding Opportunities

Pivot Funding Database
• Database of funding opportunities
• Access using @fsu.edu email address
• Works exactly like any journal database

Other Ways to Find Funding
Colleagues/Strength of Weak Ties
Agency Newsletters
Google
Understand Funding Opportunities and Funding Agencies

The goal of a funding opportunity is to help a funding agency achieve its mission. To be successfully funded, your interests and the funding agency’s mission must align. In order to ensure a match, you must study:

- Funder’s Website (About Us, Priorities, History, etc.)
- Strategic or Annual Reports
- Speeches/Presentations by Top Officials
- Previous Awards or Awardees
- The Funding Opportunity Announcement

Build a relationship with Program Officers! They can provide invaluable insight into the fit and competitiveness of your projects.
Why Bother with Capture Planning?

The goal of Capture Planning is to improve a seller’s position with buyers, making a proposal more likely to be funded.

**Unknown Position:** Finding an opportunity and submitting a proposal

**Known Position:** Aligning your goals with the funders, and connecting with funding agency representatives

**Improved Position:** Understanding likely competitors and devising strategies to enhance their weaknesses and demonstrate your strengths

**Favored Position:** Building long-term relationships with funding agencies by demonstrating successful projects and participating in strategic planning workshops.
Proposal Planning

Read and “Shred” the Funding Opportunity
Establish a proposal writing schedule
Identify Features, Benefits, and Discriminators, and develop proposal themes
Develop a Proposal Outline and draft content
Read the Request For Proposals
Understand EXACTLY what is required

Read the RFP (or FOA, Solicitation, Announcement, etc.)

Re-read the RFP

“Shred” the RFP by reading line by line developing a checklist of each requirement
   Every question, every request for description, every “shall”, “will”, “must”, “should”
   gets its own checklist item.

Developing this checklist is the best way to ensure that you address every requirement
Establish a Proposal Schedule

Work backwards from proposal due date to establish a timeline

Using the proposal checklist, develop a list of specific tasks for the project, and establish start and end dates for those tasks

Work around “hard” deadlines first (e.g. Sponsored Research 3-Day Rule, IRB, etc.)

Be realistic in your estimates!

Do not count weekends, holidays, etc. as working days (this is your contingency time)

Plan time for reviews and feedback

Developing and sticking to a proposal schedule decreases stress and anxiety, increases your ability to ask for help, and ultimately increases proposal quality.
Identify Features, Benefits and Proposal Themes

Features: Separate aspects of your proposed project (i.e. methodology, research direction, etc.)
Benefits: The ways in which your Feature solves a problem that the buyer cares about
*Discriminators: Features that you have, that no one else has

Proposal Themes: Statements that specifically connect a feature with a benefit

Themes convey the most important information to reviewers
Funders buy benefits, not features

Focus on identifying and specifying your features and benefits, and communicate them via the theme
Draft Proposal Outline and Content

If an agency (or RFP) specifies or suggests an outline, you **MUST** follow that outline.

If none is specified, try to find a successful example proposal and follow that outline.

If all else fails, follow Heilmeier’s Catechism:

1. **What are you trying to do?**
2. **How is it done today, and what are the limitations of current practice?**
3. **What’s new in your approach, and why do you think it will be successful?**
4. **Who cares? What difference will this make?**
5. **What are the risks?**
6. **What are the mid-term and final checks for success?**
Why Bother with Proposal Planning?

Having a plan saves time and effort, and increases the quality of your proposal.

Planning is critical for collaborative and team projects.
Proposal Development

Proposal Development = Proposal Writing
Project Description

I. Overview and Significance of the Proposed Project

Research. The development of solid electrolytes for all solid-state rechargeable Li|Na-ion batteries faces a few major challenges, including high interfacial resistance, low electrochemical and thermal stability, microstructure-induced short-circuit, and poor mechanical properties. Glass-ceramics, with significant advantages over conventional glass or ceramic alkaline-ion electrolytes (Fig. 1), have emerged recently as a new solution to address these challenges. Glass-ceramics combine the benefits of high ionic conductivity, absence of inter-particle transfer resistance, and good stability. However, the properties of glass-ceramics are highly dependent on structures, phase compositions, and ion dynamics in these two-phase composites. The optimization of these parameters largely relies on the trial-and-error approach at this stage. In addition, current glass-ceramic electrolytes are limited to Na superionic conductor (NASICON)-based structures. This proposed work aims to understand the dynamic structure-property-performance relationships of glass-ceramic electrolytes with in situ synthesis and in operando characterizations. The objective of the in situ synthesis is to achieve predictive and controlled synthesis of glass-ceramics with high Li|Na ion mobility and to expand the variety of suitable glass-ceramics beyond NASICON-based structures. The tools for in situ synthesis include high-temperature high-resolution NMR facility set up by the PI’s group at the National High Magnetic Field Laboratory (NHMFL), complemented by in situ synchrotron-based X-ray and neutron diffraction at national user facilities. The combination of NMR and diffraction techniques allows probing both long- and short-range structures, which is particularly useful for glass-ceramics containing both ordered ceramic particles and amorphous glass phase. NMR is capable of determining both structure and ion dynamics simultaneously, which permits real-time structure-ion mobility correlation and fast screening of kinetically stable phases for good ion conductors. In addition, first principles calculations will be carried out, in conjunction with experiments, to ensure accurate structure determination with property prediction of ion conduction. The objective of the proposed in operando characterizations is to determine suitable structural and compositional characteristics of glass-ceramics for fast ion conduction, low interfacial resistance, and good stability when they are used in all-solid-state batteries. In operando characterizations will be mainly performed at the NHMFL with NMR/MM, complemented by high-resolution transmission electron microscopy (TEM) and X-ray photoelectron spectroscopy (XPS). With these tools, the structure, composition, and homogeneity will be non-invasively probed in the bulk of the glass-ceramic electrolytes and the electrolyte/electrode interface during battery operation and will be correlated with the changing interfacial resistance and long-term stability. The new knowledge in the real-time relationships between structure/composition/homogeneity and conductivity/stability, obtained from in situ and in operando characterizations, will facilitate the development of high-performance Li|Na glass-ceramic electrolytes for the next-generation all-solid-state Li|Na rechargeable batteries.

Education. The proposed educational activities are derived from the proposed research component and the outcomes of the educational plan will in turn support the research. The objectives of the educational component are to engender self-sufficiency, to promote broad participation in scientific research, and to enhance critical thinking skills of the participants. The first proposed activity is to train young scientists national wide how to make, modify, and repair probes for NMR/MM. This activity is motivated by two realities: i) almost every institution has at least one NMR facility or is in the processing of acquiring one; ii) the monopoly of the NMR probe market by a single vendor, the limited permission from the NMR vendor for modifying the probe, and the high-cost, long waiting time for repair. Probe workshops will be organized.
CREST Center for Complex Materials Design (CoManD) for Multidimensional Additive Processing

**Project Description**

A driver for CREST Center: The aim of the CREST Center for Composite Materials Design (CoManD) is to create an innovative design of novel materials and devices, with an effort towards ab-initio fundamental understanding of material-property relationships that govern the working forces behind high-rate applications for bio, energy, and production of light-weight structures. Additive processing holds great promise towards reducing costs of production and will help solve key manufacturing challenges to make materials of interest[11]. The PI's at Florida Agricultural & Mechanical University (FAMU) individually are experts in their fields, and are funded to investigate the chemistry, physics, and engineering of soft materials in the areas of organized structures at the mesoscopic (Ramakrishnan, Mateeva), energy and electronic devices (Dickens) and biomedical research (Sachdeva). It is our goal in CoManD to combine the expertise of the faculty at FAMU to develop an integrated research and education program on additive manufacturing which not only meets the technological demands of the 21st century but also trains the next generation of multidisciplinary scientists. As a part of the CREST Center, we expect to produce 15-20 African American PhD's, directly impact 30-40 undergraduates and have an influence on ~100 graduate students and ~300 undergraduates through research collaborations and coursework. This would be a significant increase in FAMU's training of engineers and would help to assist them in the field at CoManD to develop an integrated education and mentoring network for FAMU faculty and students.

**Subproject 1: Macro-Structuring**

- **Magnet-based materials**
  - Stabilization of magnetic materials in particulate media
  - Dynamic processing of magnetic materials

- **Soft magnetic composites**
  - Stabilization of high magnetic characteristic of magnetic materials

- **Magnet-based materials**
  - Stabilization of magnetic materials in particulate media
  - Dynamic processing of magnetic materials

**Subproject 2: Energy devices**

- **Energy storage devices**
  - Application of energy storage devices
  - Design and fabrication of energy storage devices

**Subproject 3: Bio-devices**

- **Biological engineering**
  - Use of biological engineering in medical applications
  - Design and fabrication of biological devices

**Research activities**

- **FAMU - CoManD Center: Sustainable Research Enterprise Platform**

**Feedback Education**

**Figure 1: Schematic for CREST center CoManD**

The aim is to integrate research and education to produce novel materials/devices for different applications using additive processing and at the same time get a fundamental understanding of the manufacturing process.

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B. Description of the Research Objectives of the Center: The ability to pattern multiple materials (on micrometer length scales) in three dimensions is critical for several technological applications including composites, microfluidics, photonics, and tissue engineering, which are of interest to the different fields of nanostructured materials research. Several challenges still remain to achieve high-resolution, high-quality, high-inertial performance, which will ultimately decide the direction of future applications[12]. The key challenges are to combine different materials and to control the minimum feature size down to the submicrometer-length scales (e.g., feature sizes down to 1-10μm are critical for creating intermediate microbattery architectures or biocompatible scaffolds). It is our aim in the CoManD Center to assemble novel materials (by self-assembly) and further control assembly from the micro to macro scales by field induced flow, electric and mag fields) assembly and additive manufacturing. In addition to manufacturing it is also of interest to address fundamental issues of how different materials are assembled into useful structures resulting in interesting macroscopic properties. Such fundamental studies will result in novel design rules for materials and manufacturing processes. A schematic for the overall plan of the CREST center is given in the following diagram. We envision that the CREST center at FAMU will: a) continue to strengthen our collaborations with NSF funded centers/programs at NMMF/LSU, Harvard University (MRSEC), MIT, ANL and AFRL to further integrate research and education for STEM minorities and women and b) enhance our involvement in the research infrastructure at FAMU, including collaboration with the NMMF/LSU, the School of Engineering at FAMU.

The proposed research of CoManD will be greatly aided by the recent securing of a Department of Defense Equipment (Defense University Research Instrumentation Program - DURIP) grant (1-34K) for a high end 3D printer for manufacture of materials of interest to the department of defense (Air Force). The nScript 3DN series is a digital manufacturing platform with the ability to host up to five printing heads or devices to print on curved surfaces, build 3D structures, pick and place a component, and micro-milling/girdling. Performance is achievable with a motion control accuracy of ±5 microns and repeatability of ±2 microns in XY. The 3DN-HP series uses a high precision platform with motion control accuracy of ±5 microns and repeatability of ±0.5 microns. This enhanced precision of the 3DN-HP series provides the flexibility associated with high precision applications requiring close tolerances, such as medical, oil and gas, and electronics applications. The unit is equipped with a high precision 3D vision system for automated measurement of the printed materials. The unit is equipped with a high precision 3D vision system for automated measurement of the printed materials. The unit is equipped with a high precision 3D vision system for automated measurement of the printed materials.

**Targeted Aims/ Center Research Subprojects (CRS):** Our aim in all three subproject areas is to (1) gain a fundamental understanding of the materials assembly and processing through a combination of experiments, simulations and theory. (2) Develop and use characterization tools for the proposed materials/devices and (3) use additive manufacturing to make these structures/devices. We are our goal to develop an integrated framework for the three different subprojects mentioned in this proposal. The goal of such an integrated effort will help in developing design rules for processing of a wide variety of materials. In fact, the fundamental experiments/simulations developed for energy materials will help build better biomaterials and even structural magnetic materials (synergistic efforts). There is significant interest in combining these concepts and is the focus of several projects proposed within the CREST Center program. For example, fundamental understanding of polymer/particle/
Present Your Ideas Simply

The more simply an idea is presented, the more understandable and credible it is to readers. “Big” Words obscure meaning and increase the mental resources necessary for reading comprehension.

Examples of “Big” Words and Phrases:

“ This project will elucidate the theory of science”

“education activity allows students to experience visual impressions of a working lab”

“At the present moment in time we would like to call attention to the fact that”

“More specifically,...”

Always define acronyms on first use, and remind the reader periodically!
Avoid Grandiose Language

Grandiose language is hard to support, and is often subjectively applied.

Instead, be as specific as possible about expected outcomes.

Examples of Grandiose Language:

“The proposed project will revolutionize the field of science”
“The proposed research represents a total paradigm shift”
“This research will solve climate change and end world hunger”
“This project will be the most important work in physics since the days of Einstein”
“With this single $100k grant, I will...(lists tasks that would require $1M)”
Avoid Run-on Sentences

Each sentence should present a single idea.

- Acquaintance with ongoing research projects at FSU related to electric ship technologies, superconducting power systems, and cryogenic systems, as well as the development efforts in collaboration with many Navy contractors, provide opportunities for the students in the Program to connect their individual research efforts to powerful future superconducting ship technologies, and prepare them for future engineering careers in these fields which are rapidly expanding due to the needs of a 21st century Navy which is faced with evolving geopolitical threats.

- This book takes as its point of departure the simple thesis that surveillance as we know it in contemporary American culture is both unimaginable and unintelligible without a critical appreciation of the work of a network of corporate leaders, moral crusaders, and ideological policemen, motivated by preserving a specifically Protestant way of life, who helped build the machinery of private and public surveillance that simultaneously sustains and challenges the public sphere as we understand it today.
Avoid Walls of Text

Walls of Text are easy to get lost in, and lead to lower retention of detail.

BAD

GOOD
Be Specific

Do not leave room for interpretation, because it might not be what you meant

BAD

1. “Based on this prior research, the next step is obvious.”
2. “Once Process A has been completed, we will then begin work on Process C”
3. “The results of Process A are shown in Table 1.”
4. “We expect our work to yield important results.”
5. “We will work with our partners to complete the project”

GOOD

1. “Based on this prior research the next step is *(state the next step)*”
2. “Once Process A is complete, we will begin Process B, which leads to Process C.”
3. “The results of Process A are shown in Table 1. *These results mean...*”
4. “We expect our work to yield important results. *(specifically state the important results)*.”
5. “We will work with our partners to complete the project. *Specifically, we will conduct process A, they will conduct process B, and we will collaborate on Process C.*”
Use Graphics Appropriately

Graphics draw readers attention, and increase their understanding and retention of content

- Charts show relationships/flow between ideas
- Graphs show data correlations, trends, comparisons, etc.
- Photos show realism, or tangibility
- Illustrations convey specific features/details while removing confusing details
- Maps/drawings show relationships and scale
- Tables emphasize the absolute value of numbers.

Figure 1. Schematic of interactive pathways of abiotic and biotic factors of fish in the Gulf of Mexico
Don’t Use Graphics JUST to Use Graphics

Figure 1. The Gulf of Mexico

Figure 1. Advanced Aeronautical Applications
Use Captions Instead of Labels
Captions interpret the visual and provide the connection between the features and benefits

![Diagram of co-curing lay-up procedure]

Label
Figure 1. The proposed co-curing lay-up procedure

Caption
Figure 1. The co-curing lay-up procedure bonds a ceramic composite layer to the outside surface of CFRP composites. This results in stronger, yet lighter, structural components for use in advanced aeronautical applications.
Use Captions Instead of Labels

Figure 1. The Coefficient of thermal expansion (CTE) for CFRP Composites (left) vs SiC composites (right).

Our CFRP composite demonstrates a lower CTE, resulting in less expansion at high temperatures. Materials with low CTE are necessary to enable next-generation supersonic aircraft.
Proposal Structure
Emphasize the future

Science was first studied by the Ancient Greeks, and since then has evolved to........

(long explanation of the field of science with many citations)

The proposed project will add to the field of science by....

The proposed project will add to the field of science by....

This is an important advancement in the field of science because...

Science was first studied by the Ancient Greeks, and since then has evolved to........

(Concise* explanation of the field of science with most important and relevant citations)

(*enough to let them know that you know what you are talking about, and that what you are proposing to do is supported by prior research)

People tend to best remember the FIRST and LAST things they read.

The proposal should state within the first paragraph exactly what you are proposing to do.
Write Specifically to Review Criteria

**Keep in mind that each section of the proposal text should be written in clear, concise language so that reviewers from any discipline will be able to understand what is being stated.**

Always read and understand the proposal review criteria before you start writing.
Write Specifically to Review Criteria

**Keep in mind that each section of the proposal text should be written in clear, concise language so that reviewers from any discipline will be able to understand what is being stated.**

Example 1: Project/Issue and Goals

• **Reviewer Criteria:**
  • “Is the project/issue the project will address important/significant in the PI’s area of research?”

• **Your Proposal:**
  • “(Insert topic) is an important area of research in (PI’s field) because....”

Example 2:

• **Reviewer Criteria:**
  • Are the research methods and/or creative activities appropriate in light of the goals/objectives of the project?

• **Your Proposal:**
  • “The proposed methodology was selected because...”
  • “These methods are appropriate to address the project goals because...”
Example 3: Broader Impacts

- **Reviewer Criteria:**
  - “Is the project clearly related to the PI’s long-term research goals?

- **Your Proposal:**
  - “The PI’s long-term research goals are......This proposed project helps to fulfill those goals by....”

Example 2: Differentiation from Dissertation Research:

- **Reviewer Criteria:**
  - Is the proposed project a substantive departure from or modification of the PI’s dissertation work?

- **Your Proposal:**
  - “This proposal represents a substantive departure from my dissertation by....”
  - My dissertation (title of dissertation) focused on X. The proposed project focuses on Y (or X+1).”
Budget Development
Ask for EXACTLY what you need

If you “pad” the budget with extra expenses, reviewers will call you on it
If you ask for too little, reviewers will question if you can accomplish your tasks

Make sure to budget for all tasks
“How are they going to do it if they don’t have any money?”

Work with your department/college financial staff to complete the budget according to the funding opportunity’s instructions.
A Complete Proposal

Proposals also require additional documentation beyond the project narrative.

Biosketches/CV’s, letters of support, equipment and facilities descriptions, data management plans, post-doc mentoring plans, etc.

These will take longer than you think to collect and format.

Not completing these as instructed can get you rejected without review.
Questions?

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