



# WRITING MODULE

Faculty Scholar Academies

California State University, Northridge

# BUILDING UP YOUR FUNDED PROFILE

- Start with developmental grants first NSF RUI, NIH R03, R21, R15
- Move up in \$ and time, # of people involved, complexity

# LIMITED SUBMISSION

- Proposals (herein referring to proposals, pre-proposals, letters of intent, statement of qualifications, etc.) submitted to programs that place **institutional limits on the number and/or type of submissions** will require pre-approval from the Office of Research and Sponsored Projects (ORSP). To ensure fairness and equity and to improve competitiveness, ORSP will seek guidance from Colleges in this process. This guiding document outlines the procedures for gaining approval to submit a proposal to any limited submission opportunity.

# BOILERPLATES

- CSUN > Academics > Research and Graduate Studies > ORSP > Proposal Development
- Describing CSUN
- Local boilerplates for colleges, departments, other units
- Data Sharing Plan
- Resources

# TIMELINE FOR WRITING

- Begin with the deliverables you want to accomplish
- Work backward from your deadline, giving yourself a pad of at least a week
- Identify all pre-writing requirements: Letter of intent, letters of support from collaborators and supports

# ROLE OF STUDENTS

- Undergraduates
- Graduates
- Postdoc
- Work plan, impact instruction or maturation

# SUGGESTED REVIEWERS

- People from similar institutions, realistic about what is possible at a CSU

# WRITING A FEDERAL GRANT: CREDIBILITY

- Data-driven
- Document every statement
- Tight linkages among all sections
- Stay close to the mission of the funder
- Innovative
- Structure matters – coherence throughout



# SCENARIO: R21

- Beginning-level grant but allows for \$275,000 over 2 years
- Pilot projects, smaller innovations
- Often less competitive
- Can lead to other larger funding sources

# ALIGN MISSION AND GRANT

## Purpose

**The Exploratory/Developmental Grant (R21)** mechanism is intended to encourage exploratory and developmental research projects by providing support for the early and conceptual stages of these projects.

## What this tells me

**Exploratory** means **innovation** – you're using a new method or a new perspective or ....

**Developmental** means you're **new** to the field or new IN a field, you're just getting started for whatever reason (including a gap in your research career!)

# ALIGN MISSION AND GRANT

## Purpose

**The Exploratory/Developmental Grant (R21)** mechanism is intended to encourage exploratory and developmental research projects by providing support for the early and conceptual stages of these projects.

## What this tells me

Early and conceptual stages means that your project will be **judged less harshly by evaluators**; they understand you're relatively new.

BUT this is no excuse for not using the most well-thought out ideas and methods with strong documentations

# ALIGN OBJECTIVES AND GRANT

## R21

- By using the R21 mechanism, the NIH seeks to foster the introduction of novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to substantially advance biomedical research.

## What this tells me

- Distinguish clearly what is NEW in your project
- Maintain credibility
- What will I substantially **advance**?
- What makes this project **biomedical**?

# ALIGN SOURCE WITH YOUR GOALS

## R21 – 6 pages

- Match with mission
- 2 year grant
- \$275,000

## My Goals

- Check!
- Keep goals **simple**, conceptual, pilot-like! Many grants tank because they're unrealistic. **Coherent, integrated, complete, where does it lead?**
- University large grant policy, minimize salary, maximize students, mission-based goals
- WILL I HAVE ENOUGH?

# GRANT STRUCTURE, LENGTH, DETAILS

- Always attend to all instructions, details; write down in a place that's readily accessible
- (# of pages, font size, # characters/inch, type and length of sections)
- R21s may be 6 or 12 pages
- Know scoring criteria, keep these accessible
- Keep running record of all references, documents

# BUILDING AN ORGANIZATIONAL FRAMEWORK

- Outline grant structure
- Start with structure typed into document with direct instructions below the section
- Use their words for headings if possible (e.g., under significance, they say as for past, present, future of the phenomenon)
- Align with feasibility analysis (time, money, mission)

# OVERALL IMPACT

- **Overall Impact.** Reviewers will provide an overall impact/priority score to reflect their assessment of the likelihood for the project to **exert a sustained, powerful influence on the research field(s) involved**, in consideration of the following five core review criteria, and additional review criteria (as applicable for the project proposed).



# SIGNIFICANCE

- Does the project address an **important problem** or a critical barrier to progress in the field?
- If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be **improved**?
- How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?

# INVESTIGATOR(S)

- Are the PD/PIs, collaborators, and other researchers **well suited** to the project?
- If Early Stage Investigators or New Investigators, do they have appropriate **experience and training**?
- If established, have they demonstrated an ongoing record of accomplishments that have advanced their field(s)?
- If the project is collaborative or multi-PD/PI, do the investigators have **complementary** and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?

# INNOVATION

- Does the application challenge and seek to **shift** current research or clinical practice **paradigms** by utilizing **novel** theoretical concepts, approaches or methodologies, instrumentation, or interventions?
- Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense?
- Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?

# ENVIRONMENT

- Will the scientific environment in which the work will be done **contribute to the probability of success**?
- Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed?
- Will the project benefit from unique features of the scientific environment, subject populations, or collaborative arrangements?

# APPROACH

- Are the overall strategy, methodology, and analyses **well-reasoned and appropriate** to accomplish the specific aims of the project?
- Are potential **problems**, alternative strategies, and benchmarks for success presented?
- If the project is in the early stages of development, will the strategy establish **feasibility** and will particularly **risky** aspects be managed?
- If the project involves clinical research, are the plans for 1) protection of **human subjects** from research risks, and 2) **inclusion** of minorities and members of both sexes/genders, as well as the inclusion of children, justified in terms of the scientific goals and research strategy proposed?

# RESEARCH PLAN

- Can vary by RFP, so beware! ALWAYS defer to the RFP if it's inconsistent with a general call for a grant
- Significance
- Innovation
- Approach

# SIGNIFICANCE

## R21

- **Explain** the importance of the problem or critical barrier to progress in the field that the proposed project addresses.

## Tips

- First -- define the problem clearly and concisely
- Second – why the problem is a barrier to progress
- Place in broader context – nation, culture, economics, etc.
- Evidence that the problem exists -- use statistics that are from federal sources if possible
- Identify specifically who or what is affected

# SIGNIFICANCE

## R21

- Explain how the proposed project **will improve** scientific knowledge, technical capability, and/or clinical practice in one or more **broad fields**.

## Tips

- Broad scope for scientific knowledge – philosophy, biology, deeper meaning
- (Karl Popper)
- Emphasize interdisciplinary, collaborative aspects
- Point to studies that can be done once yours is done, what advances can take place



# INNOVATION

## R21

- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or intervention(s) to be developed or used, and any advantage over existing methodologies, instrumentation or intervention(s).

## Tips

- Distinguish yourself! (value added model)
- Quality of health outcomes?
- Economic value? (Perry Preschool study)
- Accessibility?
- Efficiency?
- Comparative charts with data
- Specific documentation of why it's better

# INNOVATION

## R21

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.

## Tips

- Distinction (discussed under significance as well; can be brief)
- Whenever possible, use diagrams and charts

# APPROACH

## R21

- Describe the **overall** strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate.

## Tips

- Methodology and method – be knowledgeable about your field from many disciplines
- Early introduction of a graphic model of the overall design
- Be concise, be clear, cohesive
- **Keep terms consistent throughout!**

# APPROACH

## R21

- Describe the overall strategy, methodology, and analyses to be used to **accomplish the specific aims** of the project.
- Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate.

## Tips

- Refer to the specific aims regularly
- They must be measurable
- Provide a clear and documentable rationale for your method

# APPROACH

## R21

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the **data** will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate.

## Tips

- Document access to a data source
- describe population, sampling frame, inclusionary/exclusionary criteria
- use verifiable resources if possible;
- Discuss difficulties with sampling; variations

# APPROACH

## R21

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.
- Include how the data will be collected, **analyzed**, and interpreted as well as any resource sharing plans as appropriate.

## Tips

- Analysis fully planned out if quantitative if possible
- Boxes and arrows

# APPROACH

## R21

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.
- Include how the data will be collected, analyzed, and **interpreted** as well as any resource sharing plans as appropriate.

## Tips

- Interpretation – place in broader context, picture
- How will you measure whether or not you met your specific aims?
- How will you know if you had an impact?

# APPROACH

## R21

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.
- Include how the data will be collected, analyzed, and interpreted as well as any **resource sharing plans** as appropriate.

## Tips

- Resource sharing plan – assumption is that you will share your data and your findings



# APPROACH

## R21

- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.

## Tips

- Be realistic about problems, don't hide problems
- Make a table of problems, impact, solution
- Table of benchmarks with confidence intervals (reduce recidivism x%)
- Use effect sizes, impact factors

# APPROACH

## R21

- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.

## Tips

- Be clear about TIMELINE
- More specific the better
- Budget justification should be clear
- Legal considerations of any sort
- Health risks must be fully managed

# NIH FORMS

- PHS 398 and SF 424
- Face Page (fp1)
- Summary, relevance, project/performance sites, senior/key personnel, other significant contributors, human embryonic stem cells (fp2)
- Table of contents (fp3)
- Detailed budget (fp4)
- Budget for entire period (fp5)
- Biographical Sketch
- Resources
- Checklist
- Planned Enrollment Report

# NATIONAL SCIENCE FOUNDATION

- A description of the proposed research project, including preliminary supporting data where appropriate, specific objectives, methods and procedures to be used, and expected significance of the results;
- A description of the proposed educational activities, including plans to evaluate their impact on students and other participants;
- A description of how the research and educational activities are integrated with one another; and
- results of prior NSF support, if applicable.

# NSF EVALUATION

- Successful applicants will propose creative, effective, integrated research and education plans, and indicate how they will assess these components.
- While excellence in both education and research is expected, activity of an intensity that leads to an unreasonable workload is not.
- The research and educational activities do not need to be addressed separately if the relationship between the two is such that the presentation of the integrated project is better served by interspersing the two throughout the Project Description.

# NSF PROJECT SUMMARY

- Each proposal must contain a summary of the proposed project not more than one page in length. The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity.
- The overview includes a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired societal outcomes.
- The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

# NSF PROJECT DESCRIPTION

- The Project Description should provide a clear statement of the work to be undertaken and must include:
  - objectives for the period of the proposed work and expected significance
  - relation to longer-term goals of the PI's project
  - relation to the present state of knowledge in the field, to work in progress by the PI under other support and to work in progress elsewhere

# ACTIVITIES

- The Project Description should outline the general plan of work, including the broad design of activities to be undertaken, and, where appropriate, provide a clear description of experimental methods and procedures.
- Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful.
- The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- These issues apply to both the technical aspects of the proposal and the way in which the project may make broader contributions.



# BROADER IMPACTS

- The Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities.
- Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to the project.

# BROADER IMPACTS

- NSF values the advancement of scientific knowledge and activities that contribute to the achievement of societally relevant outcomes.
- Such outcomes include, but are not limited to:
  - full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM)
  - improved STEM education and educator development at any level
  - increased public scientific literacy and public engagement with science and technology
  - improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce
  - increased partnerships between academia, industry, and others
  - improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

# DATA MANAGEMENT AND SHARING

- Plans for data management and sharing of the products of research, including preservation, documentation, and sharing of data, samples, physical collections, curriculum materials and other related research and education products should be described in the Special Information and Supplementary Documentation section of the proposal (see [GPG Chapter II.C.2.j](#) for additional instructions for preparation of this section).