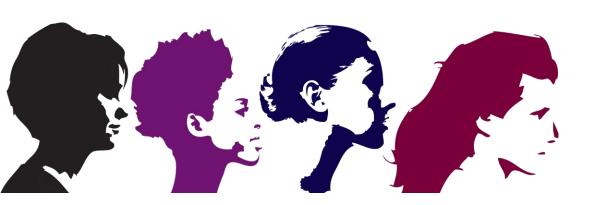# Developing The Grant Proposal: Effective and Funded

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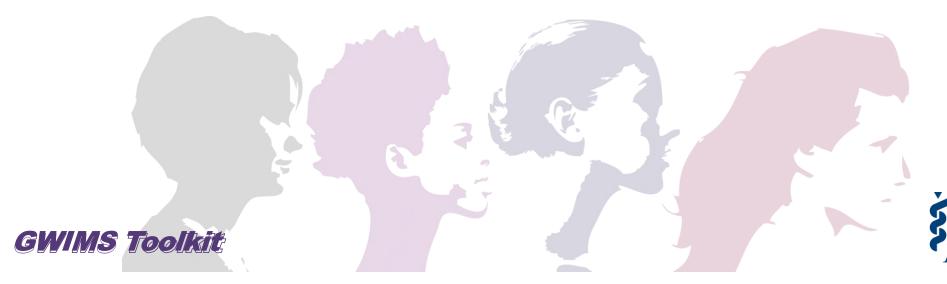
GWIMS Toolkit

Updated June 1, 2023

This toolkit is an updated version of the toolkit "Crafting a Fundable Grant", authored by:

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Part I
Learning Objectives

- **Objective 1**: Determine the purpose of developing a grant proposal

- **Objective 2**: Identify different grant funding agencies/sources

- **Objective 3**: Grant Process Overview

- **Objective 4**: Guidance for developing the typical grant proposal

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Objective 1: Determine the purpose of developing a grant proposal

- The purpose of developing a grant proposal depends on the need(s)/project, i.e.
  there is to be an alignment between the need(s)/proposed project with the purpose
  of the funding opportunity:
  - **Examples**:
    - Performance of research to answer a basic science/clinical science/health equity question
    - Development of educational resources, i.e. biomedical or medical curriculum/curricula
    - Development of biomedical and/or medical workforces, i.e. pipeline/academic pathway(s) development

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Objective 1: Determine the purpose of developing a grant proposal (continued)

- **The purpose of developing a grant proposal depends on the need(s)/project, i.e. there is to be an alignment between the need(s)/proposed project with the purpose of the funding opportunity:**

    - **Examples of typical uses of funds:**

        - Stipends and/or salaries

        - Purchasing of supplies and/or equipment

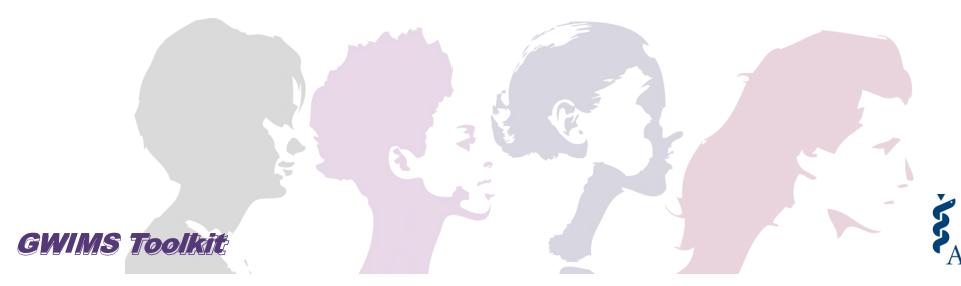   - Pursuit of professional/career development opportunities

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Objective 2: Funding Agencies/Sources

- **Intradepartmental**
  - Seed money/recruiting package
    - **Example**: Departmental Research competitions. Consider discussions with departmental chairpersons.

- **Intramural**
  - Small project awards to facilitate interdepartmental collaboration
  - Research projects in certain areas of expertise: cancer, information technology, education
    - **Example**: Louisiana Clinical & Translational Science Center **www.LACaTS.org**: pilot or developmental projects for junior faculty

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Objective 2: Funding Agencies/Sources (continued)

- **Extramural (Examples)**

  - American Association for the Advancement of Science (**AAAS**)
    Example: **L'Oréal USA For Women in Science**

  - Howard Hughes Medical Institute (**HHMI**)

  - Kellogg Foundation

  - National Institutes of Health (**NIH**) (see next slide for examples/funding mechanisms)

  - National Science Foundation (**NSF**)

    Example: Faculty Early Career Development Program (**CAREER**)

  - Professional Expertise: American Society of Biochemistry & Molecular Biology (**ASBMB**)

  - Robert Wood Johnson Foundation

  - U.S. Department of Education

  - U.S. Department of Defense

  - Veteran's Administration

    Example: VA Career Development Awards

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Objective 2: Funding Agencies/Sources (continued)

Extramural: Example- National Institutes of Health (**NIH**) Funding Mechanisms

1. Research Projects: **R01**, **P01**, etc.

   R01: Independent funding

   P01/PPG: Program project grant (usually at least 3 investigators with related research) which may transition to a SPORE (P50, Specialized program of research excellence) or to a Center grant (P30)

2. Small Business: **R41**, **R42**, **R43**, **R44**

3. Training and Career Development: **F**, **K**, **T**, and Loan Repayment such as:

   K01: Mentored Research Scientist Development Award

   K08: Mentored Clinical Science Research Career Development Award

   K23: Mentored Patient-oriented Research Career Development Award

   K99/R00: Career development to Independence Pathway Award

4. Centers: **U01/U54-** Specialized Center-Cooperative Agreements (**U54**), as defined by the NIH Office of Extramural Research, "support any part of the full range of research and development from very basic to clinical; may involve ancillary supportive activities such as protracted patient care necessary to the primary research or R&D effort. The spectrum of activities comprises a multidisciplinary attack on a specific disease entity or biomedical problem area".

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Objective 2: Funding Agencies/Sources (continued)
Types of funding announcements

Example: NIH Announcements

Funding Opportunity Announcement *(FOA):* is a publicly available document in which a Federal agency makes known its intentions to award Discretionary Awards, usually as a result of competition for funds.

NIH FOA Categories:

- ***Program Announcement (PA):*** a formal statement about a new or ongoing extramural activity or program. It may serve as a reminder of continuing interest in a research area, describe modification in an activity or program, and/or invite applications for grant support.

- ***Request for Applications (RFA):*** a formal statement that solicits grant or cooperative agreement applications in a well-defined scientific area to accomplish specific program objectives. An RFA indicates the estimated amount of funds set aside for the competition, the estimated number of awards to be made, whether cost sharing is required, and the application submission date(s).

- ***Parent Announcements*:** Electronic submission of applications requires that applications must be associated with a specific FOA. Therefore, NIH omnibus parent announcements are provided for applicants to submit investigator-initiated (unsolicited) applications. Responding to such an omnibus or umbrella parent FOA ensures that the correct application package is used and enables NIH to receive the application from Grants.gov.

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Objective 3: NIH Proposal & Grants Process Overview

Get Started

Learn the Basics

Learn how NIH approaches grant funding and how your research fits into our research portfolio. Make sure to explore the different types of grant programs offered at NIH, along with the eligibility requirements.

Plan Your Approach

Find and understand funding opportunities, ensure your research is original, understand your organization's internal procedures, and prepare to write a competitive application.

Apply for Grant Funding

Prepare to Apply

Ensure all registrations are in place, get familiar with requirements, and choose which of the available submission options you will use.

[> 6-8 Weeks Before Submission]

Write Application

Obtain and complete application forms following provided instructions. Find information on developing your budget and formatting attachments.

Submit

Submit your application to NIH. Track and view your application to verify receipt and to confirm that the assembled document correctly reflects your submission.

[Submit early!]

Objective 3: NIH Proposal & Grants Process Overview (continued)

Application Referral & Review

Receipt & Referral

Applications compliant with NIH policies are assigned to an NIH Institute or Center and to a scientific review group for evaluation of scientific and technical merit.

[Month 1 After Submission]

Peer Review

Applications undergo a rigorous two-stage review. The first level is carried out primarily by non-federal scientists, while the second is performed by Advisory Councils or Boards.

[Months 2-8 After Submission]

Pre-Award & Award Process

Pre-Award & Award Process

Applicants who have scored well submit "just-in-time" information. Final administrative reviews are conducted and Notice of Award documents are sent to successful applicants.

[Months 7-10 After Submission]

Post-Award Monitoring & Reporting

NIH monitors grants carefully. Active monitoring includes reports and correspondence from the grantee, audit reports, site visits, and other information.

[Duration of Award]

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Objective 4: Advice to develop the typical grant proposal

1) Develop a strong knowledge of the literature regarding your proposed project/purpose of the grant proposal:

Reasons:

- to identify gaps in knowledge and rationale for the proposal

- to ensure the originality and to prevent plagiarism

- to heighten feasibility of the proposed original idea

- to provide evidential support of the original idea(s)

- to develop the literature review in order to derive the introduction and background materials for the grant proposal

- to support your purpose for funding, thereby encouraging understanding of the overall project

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Objective 4: Advice to develop the typical grant proposal (continued)

2) Seek professional development training, to function inclusively, using inclusive terminology/language/phrases. It is extremely important to make oneself aware of potentially offensive language or phrases, regardless of whether their use is widely accepted.

Examples:

- Instead of the use of "*minority populations*", use "*populations/marginalized populations who have been historically discriminated against/excluded*"

- Instead of the use of "*low-hanging fruit*", an offensive phase due to its association with the Billie Holiday song, "Strange Fruit" about the lynching of African-Americans, use "the easiest obtained" or "the easiest accomplished".

- Instead of the use of "*handicap*", use "*persons with disabilities*"

- AAMC IDEAS Learning Series- channels experts and resources from within the AAMC and across academic medicine into webinars designed to assist with finding ways to act on relevant initiatives, including methods of inclusive writing.

IDEAS Learning Series
Inclusion, Diversity, Equity, and Anti-racism

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https://www.grantwritingmadeeasy.com/2021/06/28/using-inclusive-language-in-grants/
https://www.ama-assn.org/system/files/ama-aamc-equity-guide.pdf

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Objective 4: Advice to develop the typical grant proposal (continued)

3) Preparation of the NIH Biosketch

- A biographical sketch that documents an individual's qualifications and experience for a specific role on the proposed project.

- NIH requires submission of a biosketch for each proposed senior/key personnel and other significant contributors on a grant application.

- Other granting agencies may use the NIH Biosketch or have their own biographical sketch format.

- Check the funding agency's requirements and follow instructions closely!

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Sample NIH Biosketch (Format changes every few years, confirm prior to use)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME:

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE:

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY

A. Personal Statement

B. Positions, Scientific Appointments, and Honors
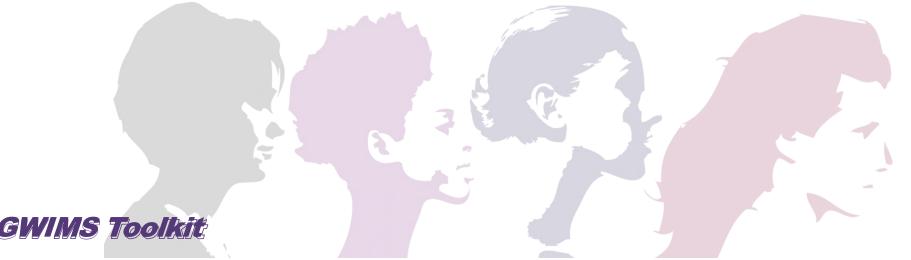
C. Contributions to Science

Objective 4: Advice to develop the typical grant proposal (continued)

4) Additional details:

- Thoroughly understand the Funding Opportunity Announcement (**FOA**) and plan the alignment of the proposed project with the FOA
    - Significance and Importance
    - Creativity/Ingenuity
- Determine if the grant proposal will require additional approval(s) from:
    - Institutional Animal Care & Use Committee (**IACUC**): Animal care
    - Institutional Review Board (**IRB**): Human subjects
- Give yourself enough time to develop and to write the application

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Objective 4: Advice to develop the typical grant proposal (continued)

5) Developing a working timeline:

Identify important dates: Grant Proposal Submission Timeline(s):

- Prepare a draft 4-6 weeks prior to internal/institutional deadline, allowing sufficient time for review with edits.

- Plan for review by Co-Principal Investigators/Investigators/Collaborators, other colleagues/personnel

- Plan for review by colleagues external to the institution for impartial feedback

- Approvals/Administrative Signatures (Proposal(s) w/Budget(s))

  - Department Chairperson

  - Institutional Signatures (Institutional Officer Signature i.e. Vice-Chancellor of Academic Affairs; Chancellor)

  - Final submission to the funding agency

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Part II:
How to Develop Components of the NIH Grant Proposal
(General format using R01 and R25 details will be used as examples throughout unless otherwise noted)

R01:

A. Project Summary/Abstract

B. Specific Aims Page

C. Research Strategy

    1. Significance, Innovation, Impact

    2. Approach

R25:

A. Project Summary/Abstract

B. Research Plan

C. Overview

D. Specific Aims

E. Research Plan

    1. Significance

    2. Innovation

    3. Approach

Other Sections/Forms (R25 or R01):

Budget and Justification

Assurances

Figures/Images

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Where to Start?

R01:
Investigator-initiated (PA) vs. RFA applications

Investigator-initiated uses a standard PA (Program Announcement) and the application focuses on your specific area of interest. Determine the NIH institute(s) that is the best alignment with your proposal by investigating current research portfolios in relevant institutes.

RFA (Request for Applications) solicits applications within a specific scientific area to address a focused objective of an institute. The application should be tailored to the goals of the RFA and thereby specifically and clearly address the objective(s)/research area in the announcement.

Hint: _Once you have developed a specific aims page, it is suggested that you contact the relevant (email) Program Officers (POs) within an institute, to schedule an appointment to discuss your Aims and to gauge their interest level in your proposal. The POs are an excellent source of information and are usually always willing to help._
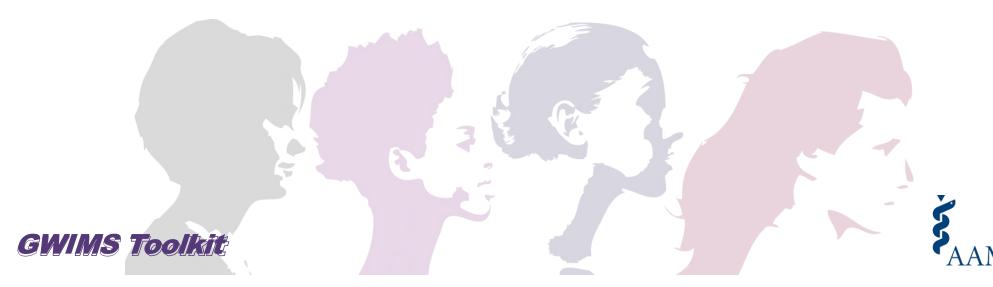
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Where to Start?

R25:

RFA-driven; training grants:
Areas of scientific/research interests may be identified by specific institutes, thereby providing guidelines for the project/educational experience. Typically, these funding mechanisms serve to increase populations of scientists/researchers/physician-scientists from historically-discriminated/excluded, and underserved backgrounds.

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Before Developing Specific Sections

Consider and remember the following:

- The overall review process is a subjective practice with the brevity of time and reviewers are reading multiple proposals at a time, therefore, articulate ideas clearly and succinctly so that they can evaluate proposals appropriately; avoid wordiness.

- When developing your proposal, pay close attention to the tone/manner/quality of your writing.

- Develop your proposal to empower the reviewer(s)' abilities to envision and to understand your goals and forethought, which are under review.

- Professionalism and simplicity in your writing must be demonstrated, especially since you will **NOT** be present to explain your ideas, etc., i.e. leave little to no room for misinterpretation/misunderstanding.

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A. Project Summary/Abstract (R01 & R25)

Overall: Project Summary/Abstract (relevant to all NIH grant mechanisms)

1. Brief background of the project; aligns the mindset for the understanding of the overall project
2. Specific aims/objectives or hypotheses
3. Significance of the proposed research; relevance to public health
4. Unique features and innovation of the project
5. Overview of the methodology

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A. Project Summary/Abstract (continued)

Overall: Project Summary/Abstract (relevant to all NIH grant mechanisms)

6. Expected results with described impact on other research areas
7. Includes significance & innovation of the research, and relevance to public health
8. Typically, no longer than 30 lines of text; be succinct!
9. Remember to format using required font and margin specifications
10. Contains **NO** proprietary confidential information

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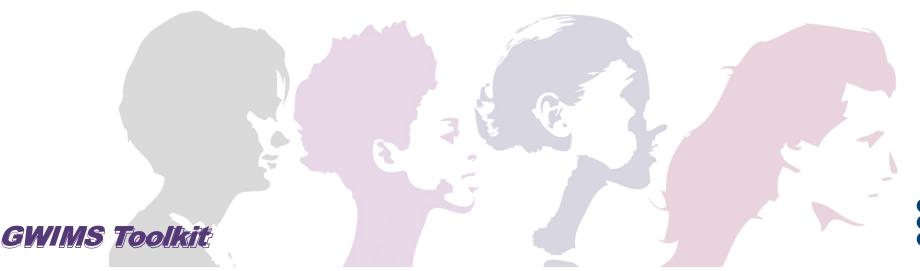# Following Slides identify grant components that are specific to the following:

A. The Overall Proposal, regardless of type
B. The RO1
C. The R25

*NOTE: The slide title will identify which grant component is specific to which grant format.

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B. Specific Aims Page-R01

Ensure the following regarding your proposal:

a) Novel or investigates a new area, thereby answering questions/expands knowledge/understanding, or challenges current concepts.

b) The specific aims page must be a clear articulation of the proposed work because it may be the only page that is read by study section members who are not assigned to review your application.

c) Because reviewers' expertise may be broad, and range outside of your immediate area of research, a broad, comprehensive articulation of the proposed work will be helpful.

d) Provide background, briefly and concisely, to highlight the gap in knowledge that your study will narrow, followed by a clearly stated hypothesis (use **bold** printed for easy identification to the reviewers).

e) State each aim (use **bold** or *italics* to highlight each aim "title") followed by a few sentences explaining how each aim addresses the hypothesis and how it will be studied.

f) Include a few closing sentences stating: 1) how your study will/potentially impact the field, body of knowledge, patient care, etc.; 2) is novel or innovative; 3) how your collaborative group is uniquely poised to complete successfully the proposed study.

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C. Research Strategy-R01

1. Significance, Innovation, & Impact

a) This section should include three subsections: 1) significance; 2) innovation; and 3) impact of the proposed study. Identify clearly the titles of the subsections, ensuring that the reviewers do not have to search for them.

b) Articulate clearly the content of your study, as to prevent reviewers from misinterpretation/misunderstanding of your proposal.

c) Significance: Use this section to present background directly relevant to supporting your hypothesis to illustrate the **significance** of your proposal. This is **NOT** an extensive review of the literature.

d) Innovation: Demonstrate how the hypothesis, methods, or approaches are novel or state-of-the-art.

e) Impact: Express to the reviewers how successful completion of your proposed studies will affect the field, patient care, etc.

f) Preliminary data/figures can be included in this section and/or in the Approach section supporting your hypothesis.

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C. Research Strategy-R01

2. Approach

This section details **HOW** you will achieve each Aim. Ensure that your aims are cohesive in addressing the hypothesis, but that the success of one aim does **NOT** depend on the success of another aim.

a) The specific aims should be feasible and achievable within the timeline of the granting period.

b) Use **bold** or *italics* to highlight each of the Aims and the Aim(s)' subsections. These are specific points that the reviewers address, therefore, facilitate the reviewer(s) to identify them!

c) Each **Aim** should be a separate section that contains subsections stating:

   i. Rationale-provide clear, concise reasoning/justification (2-3 sentences)

   ii. Experimental approaches and interpretation of data-explain the experiments that will be performed in each aim with enough detail to allow the reviewers to understand the approach, but do not overwhelm them with providing excessively specific details. Use figures to illustrate visually complicated approaches.

   iii. Statistical analyses and rigor-explain how the data will be analyzed to determine significance and how your approaches will be performed in a precise & accurate manner (i.e. number of experimental replicates, number of samples analyzed, etc., to demonstrate significance of results)

   iv. Potential pitfalls and alternative approaches- identify where/how experiments may not provide exact answers/insight/understanding, and then articulate alternatives that will be used if needed. One does not want the reviewers identifying your potential experimental pitfalls!

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D. Research Plan-R25

OVERVIEW/PROJECT SUMMARY:

1. States the purpose of the project and highlights the application's alignment with the Request for Applications (**RFA**).

2. Highlights the proposed project's importance and its feasibility, with its "cutting-edge" or innovative characteristics

3. Composed of the literature that supports the argument and thereby, the identification of the "gap" in knowledge/purpose of the project. This section provides one of the primary opportunities to develop the reviewer(s) understanding of the proposed project.

4. Highlights how the project will expand the knowledge/workforce.

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D. Research Plan-R25

SPECIFIC AIMS:
Consider how your proposal will expand the development of the medical/biomedical workforce. What is the educational mindset of the project?

a) Using evidence-based literature/data, design your narrative to illustrate the necessity of inclusion of the populations who have been systemically excluded.

b) Articulate how the proposed project will overcome the exclusion and how the expected outcome will improve due to the inclusion of the population, as well as will contribute to overall health equity.

c) In the articulation of an educational mindset/outlook, it important to first explore your own approach regarding instruction and learning.

d) Therefore, as you are exploring the literature and designing the proposed project, consider how you will articulate that mindset, as well design the project to operationalize the approach.

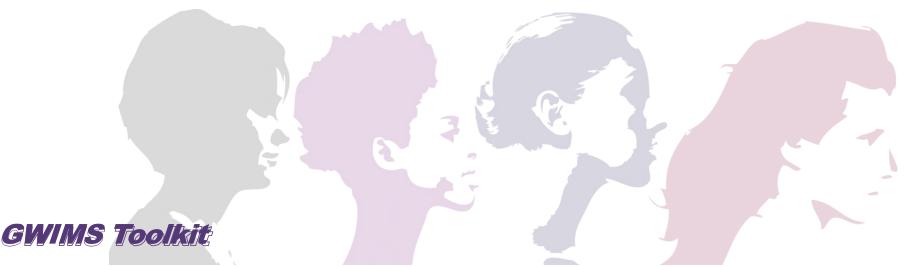   **Example**: Deficient Mindset v Growth Mindset

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D. Research Plan-R25

SPECIFIC AIMS (cont.):
If your proposed project is a training grant, consider the following:

Mentorship: The derivation of this section of educational support is extremely important and must be crafted to include the following training for mentors:

1. Understanding of mentorship and how to educate/train others

2. Inclusivity w/mitigation of discrimination, implicit & explicit bias, and microaggressions (behavioral and decision-making)

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E. Research Plan-R25

SIGNIFICANCE:
A narrative used to:

1. Identify the proposed problem.

2. Articulate the knowledge gap/necessity and the plan to fill the gap/need.

3. Articulate the profound reason for the proposed project and how it will resolve and prevent the reoccurrence of such issues.

4. Thoroughly explain your ideas, etc., inclusive of the importance of this proposed project with how/the ability of its implementation, to solve the proposed problem.

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E. Research Plan-R25

<u>INNOVATION</u>:
A narrative used to:

1. Identify the uniqueness/exceptionality of the ideas using forward-thinking to derive the proposed project.

2. Re-articulate knowledge gap/necessity, inclusive of the novel ideas to solve the problem.

3. Connect the dots for the reviewer and thoroughly explain your ideas, etc., facilitating the envisioning/understanding of the reviewers to appreciate how/the ability of these new ideas will solve the proposed problem.

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E. Research Plan-R25

APPROACH:
A narrative used to:

1. Articulate the operationalization of the specific aims with the forward-thinking identified in the Innovation; describe step-by-step the proposed experiments to examine the hypothesis relating what will be executed, and the method(s) to be utilized.

2. Describe the expectation of time necessary to execute the proposed work.

3. Describe the assessment and capture with protection of the data.

4. Articulate roles and accountability of all programmatic personnel.

5. Describe analysis of the data w/collection timeline(s) and describe how the use of the data will be utilized to improve the project.

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Other Sections/Forms

BUDGET/JUSTIFICATION:

This section may include:

1. Itemized cost-effective necessities, including personnel/ salaries, participants stipends, supplies, etc. needed to operationalize the proposed project

2. Narrative to articulate/justify the requested funds

*Collaborate with the Departmental Business Manager, to develop this section to ensure compliance with the RFA/PA, as well as the institution's guidelines.

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Other Sections/Forms

ASSURANCES/LETTERS OF SUPPORT of The Project:

1. Request and secure assurances/letters of support (**LOS**) at least 3 to 4 weeks prior to submission deadline of the proposed project.

2. Select colleagues/collaborators who can provide the support, i.e. in-kind work, etc., offered in the assurances/LOS.

3. Provide the colleagues/collaborators/upper administration a summary of the format of the assurance/LOS, as well as the proposed project.

4. Assurance/LOS should be placed on institutional/school letterhead.

5. Biosketches may be required from collaborators playing a key role in the proposed work. Provide enough advanced notice to collect their bio-sketches and ensure their personal statements reflect their roles in the proposed project.

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Other Sections/Forms

<u>FIGURES/IMAGES/TABLES for R25:</u>

1. Follow the directions of the RFA.

2. Proof-read (individually and w/colleagues), to confirm:
   a) Margins
   b) Headers/Footers
   c) Font-type
   d) Font size
   e) Clarity
   f) Labeling
   g) Referencing in the text of the proposed project

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ADDITIONAL TIPS

- Follow the directions of the RFA/PA closely and ensure all required sections and forms are addressed or included.

- Articulation of evidence inclusive of the art of writing credibly must be utilized throughout the proposal.

- Proof-read and spell check.

- Provide colleagues/collaborators an opportunity to review the proposed project. Request that they examine for understanding, and clarity, as well as writing voice-tone.

- Send to impartial colleague/someone with grant review experience to read and provide feedback.

- Prepare final draft and send to collaborators/colleagues at least a month prior to submission deadline to allow time for revisions.

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Resources

- Institutional resources: e.g. Faculty development office, Departmental development, Office of Sponsored Project/Research

- www.grants.gov/

- https://www.niddk.nih.gov/research-funding/process/apply/funding-mechanisms

- https://www.nih.gov/

- https://www.niddk.nih.gov/research-funding/process/apply/funding-mechanisms/u54

- https://grants.nih.gov/grants/policy/nihgps/html5/section_2/2.3.5_types_of_funding_opportunity_announcements__foas_.htm

- https://www.ogrants.org/

- https://www.niaid.nih.gov/grants-contracts/sample-applications

- https://youtu.be/-U72FWz2YCg

- https://grants.nih.gov/grants/grants_process.htm

- https://www.grantwritingmadeeasy.com/2021/06/28/using-inclusive-language-in-grants

- https://www.ama-assn.org/system/files/ama-aamc-equity-guide.pdf

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Resources (continued)

- https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm

- https://www.apa.org/about/apa/equity-diversity-inclusion/language-guidelines.pdf

- https://nrmnet.net/

- https://grants.nih.gov/grants/forms/biosketch.htm

- https://www.niaaa.nih.gov/resources-applicants

- https://your.yale.edu/sites/default/files/files/HowToWriteACompellingAbstractForGrantApplication_July2017.pdf

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6133727/

- https://cloud.email.aamc.org/ideas?utm_source=sfmc&utm_medium=email&utm_campaign=ideas&utm_content=webinar

- https://new.nsf.gov/funding/opportunities

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