Grant Writing Webinar Series for Institutions Building Research and Research Training Capacity

Webinar 2 - Determining Whether a Funding Opportunity is Right for You

September 26, 2022
About Today’s Webinar

This webinar is being recorded. It will be posted online for future access. If you registered to attend, you will receive an email notification when the recording is available.

The recording of Webinar 1 is posted on our website.

You can enter questions in the Q&A Box. We will answer as many as we can throughout the webinar.

You will also have the opportunity to ask questions in an open Office Hour. Details will be shared at the meeting’s end.
Acknowledgements

Thank you to the following teams that helped make this webinar series possible!

• The NIGMS Information Resources Management Branch
• The NIGMS Web Team
• The NIGMS Administrative, Travel and Service Center
• The NIGMS Communications and Public Liaison Branch
• The NIGMS Division of Extramural Activities

Thank you to all of today’s speakers & volunteers!

Thank you for attending or viewing this event.
This series is not a detailed review of specific NIGMS or NIH funding opportunities.

The goal of the entire series is to share strategies for how to navigate the NIH funding process, considerations for determining research and grant writing readiness, and thoughts on effective writing strategies.

This information is appropriate for investigators and sponsored programs or research development professionals.

This information does not supersede official NIH instructions in funding opportunity announcements, the SF424 or the Grants Policy Statement.
Today’s Topics & Speakers

1. Finding Relevant ICs, Study Sections and Program Officers
2. Helpful Considerations When Choosing Which Funding Opportunity to Apply to
3. Highlights of NIGMS MIRA & Training Grants, NIH R15 & R16
4. Writing a Specific Aims Page or Project Description

Speakers:

Behrous Davani, Ph.D.
Branch Chief, NCI Diversity Training Branch

Zhongzhen Nie, Ph.D.
Branch Chief, NIGMS Pharmacological & Physiological Sciences Branch
PART I

Finding Relevant ICs, Study Sections and Program Officers:

Learn the basics of using NIH websites and databases to find potential ICs to consider your work and relevant study sections and program officers.

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NIH Institutes/Centers (ICs) with Funding for Biomedical Research

Each with its own: mission & priorities, budget, funding strategy

No funding authority
Which IC is a Good Fit for Your Application?

- You could start with advice from investigators in your field (mentors, collaborators, etc.), but then consult a Program Officer, as the final word comes from NIH.

- NIH Website: Each IC has its own mission and funding policy
  - [https://www.nih.gov/institutes-nih/list-institutes-centers](https://www.nih.gov/institutes-nih/list-institutes-centers)

- Use NIH RePORTER to identify relevant ICs
  - [https://reporter.nih.gov/](https://reporter.nih.gov/)
Use Matchmaker in RePORTER to Find ICs

Note: This abstract is copied from one of my own NIH grant applications.
Use Matchmaker in RePORTER to Find ICs

Matchmaker is a tool that suggests potential ICs and Program Officers (POs) you could consider following-up with.

NIH will determine which IC and PO will accept an application after submission.
Tools to Find Appropriate Program Officers (POs)

1. Matchmaker in RePORTER

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<tr>
<th>Program Official</th>
<th>IC</th>
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2. Browse IC webpages:

NIGMS Contacts by Research Areas

[https://nigms.nih.gov/about/Pages/contactbyarea.aspx](https://nigms.nih.gov/about/Pages/contactbyarea.aspx)

- Biophysics, Biomedical Technology, and Computational Biosciences
  - Bioinformatics and Computational Biology
  - Biomedical Technology
  - Biophysics

- Genetics and Molecular, Cellular, and Developmental Biology
  - Cell Biology
  - Developmental and Cellular Processes
  - Genetic Mechanisms

- Pharmacology, Physiology, and Biological Chemistry
  - Biochemistry and Bio-related Chemistry
  - Pharmacological and Physiological Sciences
NIH Tools to Find Relevant Study Sections

1. Results from Matchmaker in RePORTER

2. Assisted Referral Tool (ART) by the NIH Center for Scientific Review (CSR)
https://art.csr.nih.gov/ART/selection.jsp

NIH will determine Study Section assignment after application submission.
Helpful Considerations When Choosing Which Funding Opportunity to Apply to:

Recognize the value of funding trends, success rates and sample applications, where available.

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Where Can I Find NIGMS Funding Trends

NIGMS Feedback Loop Blog at: https://loop.nigms.nih.gov/tag/feedback-loop/
Search for: “funding trend,” “MIRA,” “R15,” etc.
Where Can I Find the Success Rate for Each IC?


RePORT › NIH Data Book

- NIH Budget History
- Research Grants
- Small Business Research (SBIR / STTR)
- Success and Funding Rates
- NIH Peer Review

![Graph showing Research Project Grants: Competing Applications, Awards, and Success Rates](image-url)
Where Can I Find Sample Applications

- Scientists in your field: PhD advisor, postdoc mentor, collaborators, other funded PIs
- NIH websites. Search “sample grant applications” from IC pages
  - NIAID – R01, R03, R21, R15, R21/R33, K08, K01, F31, G11, U01
  - NCI, Division of Cancer Control and Population Sciences – R01, R03, R21, R37
  - NHGRI – R01, R21, R03
  - NIA – K99/R00
  - NIA – SBIR/STTR
  - NIDCD – R01

Sample applications are NOT representative of the forms and instructions you should follow, as these change with time.

Sample applications are IC-specific and do not necessarily apply to all ICs or all funding opportunities.

Sample applications do not represent ALL types or formats of successful NIH applications. Mimicking them does not ensure success.
Contacting a Program Officer (PO)

- Contact relevant POs listed on FOAs, IC websites, or in NIH RePORTER Matchmaker
  - Most POs prefer to be contacted by email rather than a “cold call”
  - It is okay to email again if you do not hear back initially
- Share your **Specific Aims/brief project description** in advance
  - Helps PO assess “mission-relevance” and fit with FOA
- Initiate contact early in the application process
- You may end up contacting several POs (contact one person at a time) before deciding where to submit
PART III

Highlights of NIGMS MIRA, NIH AREA & SuRE and NIGMS Training Grants:

Learn the basic elements of these funding opportunities.

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The NIGMS MIRA Program (R35)

• Maximizing Investigators’ Research Award

• The NIGMS MIRA Program is intended to provide support for research within the NIGMS mission in the laboratory of investigators at Domestic/US institutions

• Within the scope of the MIRA, investigators will have the freedom to explore new avenues of inquiry that arise during the course of their research, as long as they remain within the mission of NIGMS

• Key application information
  o 6-page research strategy
  o no Specific Aims Page in the application

• There are two FOAs
  o Early-Stage Investigators
  o Established and New Investigators
NIGMS Early Stage Investigator (ESI) MIRA

- **PAR-20-117**

- NIH defines ESI as PIs that have completed their terminal research degree or end of post-graduate clinical training, whichever date is later, within the past 10 years and who have not previously competed successfully as PD/PI for a substantial NIH independent research award.

- ESI MIRA and ESI R01-equivalent applications with meritorious scores will be prioritized for funding.

- No preliminary data required/expected.

- Budget request: $250K/year for 5 years.

- Concurrent submission of an R01 application allowed.

- See the NIGMS MIRA webpage for details, including FAQs.

NIGMS MIRA webpage - [https://www.nigms.nih.gov/Research/mechanisms/MIRA/Pages/default.aspx](https://www.nigms.nih.gov/Research/mechanisms/MIRA/Pages/default.aspx)
NIGMS Established & New Investigator MIRA

• **PAR-22-180**

• NIH defines New Investigators (NI) as those who have not previously competed successfully for substantial, independent funding from NIH

• Established Investigators (EI) are currently funded with at least one NIGMS single-PI R01-equivalent award

• Budgets for NIs will generally be $250K/year. EI budgets vary more.

• A PD/PI may not have a MIRA application and another research grant application (e.g., R01, R15, R21) within NIGMS’ mission pending review at the same time, with some exceptions

• See the NIGMS MIRA webpage for details, including FAQs

NIGMS MIRA webpage - [https://www.nigms.nih.gov/Research/mechanisms/MIRA/Pages/default.aspx](https://www.nigms.nih.gov/Research/mechanisms/MIRA/Pages/default.aspx)
Research Enhancement Award (R15)

- Supports small-scale research projects at educational institutions that provide baccalaureate or advanced degrees for a significant number of the Nation’s research scientists but have not been major recipients of NIH support.
  - Domestic/US institutions only
  - The institution or components cannot have received support from the NIH totaling more than $6M/year in 4 of the last 7 fiscal years (except C06, S10, and Gs)
  - PI may not be PI of an active NIH research grant at time of award
- $300K Direct Costs across 3 years
- The R15 activity code supports two programs: AREA & REAP
  - Academic Research Enhancement Award (AREA) for Undergraduate-Focused Institutions
  - Research Enhancement Award Program (REAP) for Health Professional Schools and Graduate Schools. **NIGMS does not participate in REAP.**

[https://grants.nih.gov/grants/funding/r15.htm](https://grants.nih.gov/grants/funding/r15.htm)
Support for Research Excellence (SuRE; R16)

- Replacement of the SCORE program
- To develop and sustain research excellence of faculty at institutions that receive limited NIH research support and serve students from groups underrepresented in biomedical research.
  - Domestic/US institutions only
  - <$6M/year total NIH Research Project Grant (RPG) funding in the past 2 years
  - ≥25% Pell-supported undergrads
  - Or the health professional school was founded to educate students from underrepresented groups
- Research strategy must have a Student Involvement Plan

https://www.nigms.nih.gov/about/overview/Pages/SuRE.aspx
SuRE and SuRE First (R16)

SuRE First Award - PAR-21-173

• Full-time tenure-track (equivalent) or tenured faculty, that has not been PI on any externally-funded, peer-reviewed research grant.

• $125K direct costs/year, up to 4 years

SuRE – PAR-21-169

• Institutions with <20 active SuRE, SC1, SC3 awards

• Full-time tenure-track (equivalent) or tenured faculty, that is not a PI on an active NIH RPG (unless in the last year of SCORE/SuRE/SuRE-First)

• $100K direct costs/year, up to 4 years
NIGMS Training Programs to Promote Diversity

- NIGMS supports several cross-disciplinary undergraduate and predoctoral institutional training programs to promote diversity in the biomedical research enterprise through the National Research Service Award (NRSA) program (“T” activity codes)
- For Domestic/US institutions
- These awards are made to the institution to **support cohorts of trainees for 1-3 years each** with research training & research experiences career development & support a portion of tuition/fees and stipends
- Some of these programs have only one application due date per year
- Awards are typically for five years, after which applicants may be able to seek renewal
## Overview of NIGMS Institutional Training Grants

<table>
<thead>
<tr>
<th>Program</th>
<th>Career stage</th>
<th>Focus</th>
<th>Activity code</th>
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<tbody>
<tr>
<td>Bridges to the Baccalaureate</td>
<td>Community College to Early Bachelor’s</td>
<td>Broad disciplines</td>
<td>T34</td>
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<td>Diverse trainee cohort</td>
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<td>U-RISE &amp; MARC</td>
<td>Sophomore or Junior to Senior</td>
<td>Broad disciplines</td>
<td>T34</td>
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<td>Diverse trainee cohort</td>
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<tr>
<td>PREP</td>
<td>Postbaccalaureate</td>
<td>Broad disciplines</td>
<td>R25</td>
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<td>Diverse trainee cohort</td>
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<tr>
<td>Bridges to the Doctorate</td>
<td>Masters Degree to Early Doctorate (PhD)</td>
<td>Broad disciplines</td>
<td>T32</td>
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<td>Diverse trainee cohort</td>
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<tr>
<td>G-RISE &amp; IMSD</td>
<td>Early Doctorate (PhD)</td>
<td>Broad disciplines</td>
<td>T32</td>
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<td>Diverse trainee cohort</td>
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<tr>
<td>Basic Biomedical Predoctoral</td>
<td>Early Doctorate (PhD)</td>
<td>12 broad areas of basic biomedical sciences</td>
<td>T32</td>
</tr>
<tr>
<td>Medical Science Training Program</td>
<td>Clinical Doctorate-PhD dual degree program (e.g. MD, DO, DVM, DDS, PharmD-PhD)</td>
<td></td>
<td>T32</td>
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[https://www.nigms.nih.gov/training/Pages/Home.aspx](https://www.nigms.nih.gov/training/Pages/Home.aspx)
PART IV

Writing Specific Aims/Project Descriptions:

Become familiar with potential ways to organize a Specific Aims Page or Project Description.

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The Specific Aims Page: A Master Plan for the Research Application

• A vital part of many NIH research grant applications
  ○ Reminder: NIGMS MIRA applications do not have a Specific Aims page

• Often the basis of the first impression the reviewers will have

• Should capture an essence of your entire application

Disclaimer: This presentation includes examples and tips that do not apply to every successful Specific Aims page or grant application. There are multiple effective formats, all of which are not shown here. Attempting to use any of these formats does not ensure success.
Specific Aims - PHS 398 Research Plan Form

Specific Aims Page Content

• State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will have on the research field(s) involved.

• List succinctly the specific objectives of the research proposed (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology).

### One of Many Effective Structures for Specific Aims Page or Project Description

- **Introductory paragraph**
  - Introduction/background/known knowledge

- **Rationale paragraph**
  - Gap in Knowledge
  - Long-term Goals
  - Objective
  - Central Hypothesis

- **Specific aims paragraph**
  - Specific Aims

- **Overall impact paragraph** (Pay-off paragraph)
  - Expected Outcomes
<table>
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<tr>
<th>Possible Components</th>
<th>Issues Briefly Addressed</th>
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<tbody>
<tr>
<td>Introductory Paragraph</td>
<td>• Educates reviewer by summarizing important knowledge</td>
</tr>
</tbody>
</table>
| Significant problem, solving problem aligned with mission of sponsor | • Identifies knowledge gap or critical need  
• Identifies problem created by need that you plan to solve |
| Rationale Paragraph: What, Why, Who | • Overall project goal addresses identified knowledge gap  
• Presents central hypothesis or statement of need  
• Explains why you are pursuing this project  
• Describes unique qualifications and research environment |
| Present solution to the problem that successfully addresses identified need |  
• Aims logically flow to tell the story of the proposed study  
• Aims consistent with central hypothesis and support overall project goal  
• Aims related, but not dependent on the success of another aim |
| Overall Impact Paragraph | • Statement of innovation, novelty  
• Specific expectations to be fulfilled by project  
• Positive impact of the findings from proposal, specific future steps/next study |

Go from the very big picture...to the very detailed level

Goals (View from 10,000 feet)

Objectives (View from 1,000 feet)

Specific Aims (View from 100 feet)
SPECIFIC AIDS

Colorectal cancer (CRC) screening is effective in preventing or detecting cancer at an early stage. Yet, the patient populations served by community health centers (CHCs) are screened at lower rates than the general population [1-3]. Poor screening rates in CHCs, in turn, contribute to cancer health disparities for minority, low-income, and uninsured patients. In most cases, a patient’s decision to undergo CRC screening is based on the recommendation of a healthcare provider. However, in CHCs, screening rates are lower than in other settings, and the implementation of screening programs can be challenging. Given the substantial increase in patient volume expected when mandatory insurance provisions take effect, an urgent need exists for evidence-based approaches to implement office-system changes that can reduce disparities in CRC screening rates in CHCs and in doing so, reduce disparities in cancer outcomes. The goal of our project is to test the feasibility of an evidence-informed strategy for implementing office-system changes in CHCs that promote CRC screening. The strategy combines an office-systems toolkit (adapted from the National Colorectal Cancer Roundtable [8]) and an outreach specialist to provide training and technical assistance. Our rationale for the project, supported by preliminary data, is that CHCs want to increase screening rates, but need simple, evidence-based tools that—when training and technical assistance are provided—can be implemented and maintained with the time and resources that they have. The strategy we propose is evidence-based and needs to be feasibility tested to determine if the research team has the necessary skills, ability, and access to at least 4 CHCs with 14 clinic sites that are willing to participate (see Letters of Support).

We will test the feasibility of the proposed implementation strategy by pursuing the following specific aims:

Aim 1: Assess the extent of implementation of office-system changes that promote CRC screening, using the CRC toolkit and outreach specialist. Through key informant interviews and provider surveys, and guided by an organizational model of innovation implementation, we will examine the number and type of office-system tools that CHCs implement, perceived ease or difficulty of implementing office-system tools, amount and type of outreach support, and usefulness of outreach support, and organizational factors predictive of implementation.

Aim 2: Estimate the costs of CRC toolkit and outreach specialist. To estimate the costs of implementing changes to the CRC toolkit and outreach specialist, we will examine activity logs, we will estimate the cost and resources used during the project, and the benefits of the CRC screening station. This project is innovative in that it attempts to shift the current paradigm for making systems-based changes that promote cancer screening in CHCs from the collaborative approach to one that promises greater feasibility given resource constraints of CHCs. The project will provide an estimate of the net benefit of the new system to the CRC process-pre-implementation to the CRC process-post-implementation.

Aim 3: Conduct a limited test of the office-system changes implemented, using the CRC toolkit and outreach specialist. We will measure changes in documented provider recommendation for screening and documented screening results through chart audits at baseline and post-implementation.

This project is innovative in that it attempts to shift the current paradigm for making systems-based changes that promote cancer screening in CHCs from the collaborative approach to one that promises greater feasibility given resource constraints of CHCs. The outcomes of the project will provide an estimate of the net benefit of the new system to the CRC process-pre-implementation to the CRC process-post-implementation. The project is expected to have a positive impact on the health of minority and underserved populations by helping CHCs improve their CRC screening rates.
Example 1: Goal, Objective & Rationale (R21)

Our **long-term goal** is to improve CRC screening rates in Community Health Centers (CHCs) and in doing so, reduce disparities in cancer outcomes. The **objective** of this R21 application is to test the feasibility of an evidence-informed strategy for implementing office-system changes in CHCs that promote CRC screening. The strategy combines an office-systems toolkit (adapted from the National Colorectal Cancer Roundtable [8]) and an outreach specialist to provide training and technical assistance. Our **rationale** for the project, supported by preliminary data, is that CHCs want to increase screening rates, but need simple, evidence-based tools that—with training and technical assistance—they can implement and maintain with the time and resources that they have. The strategy we propose is evidence-informed and promising [7, 9-16], but is novel in this setting and therefore needs to be feasibility tested in this challenging organizational context prior to larger-scale evaluation. Our research team has the necessary breadth of expertise and experience (see Biographical Sketches), and has access to at least 4 CHCs with 14 clinic sites that are willing to participate (see Letters of Support).

We will test the feasibility of the proposed implementation strategy by pursuing the following specific aims:

https://cancercontrol.cancer.gov/is/funding/sample-grant-applications
Example 1: Overall Impact Paragraph (R21)

This project is **innovative** in that it attempts to shift the current paradigm for making systems-based changes that promote cancer screening in CHCs from the collaborative approach to one that promises greater feasibility given resource constraints of CHCs. Consistent with the purpose of the R21 funding mechanism, the **expected outcomes** of the project will provide a solid basis for a larger-scale trial of the implementation strategy. Results from Aims 1 and 2 will indicate which office-system tools the CHCs were able to implement, how much and what type of support they needed, and how much staff time and resources it took to implement office-system changes using this approach. Aim 3 will generate effect-size estimates to inform the development of a larger scale trial. In addition to **advancing implementation science**, the project is expected to have a **positive impact** on the health of minority and underserved populations by helping CHCs improve their CRC screening rates.

https://cancercontrol.cancer.gov/is/funding/sample-grant-applications
HYPOTHESIS AND SPECIFIC AIMS:
The transcriptional and posttranscriptional regulation of numerous debilitating human immune-mediated diseases, including inflammatory bowel disease (IBD), together affect over 8.5 million people (1 in 31 U.S. residents). In particular, aberrant in vivo FOXp3+ regulatory T (Treg) cell function (1) and chronic intestinal inflammation indicates proinflammatory signals in vitro impair Treg function (2). Our lab was the first to characterize the essential role for the histone methyltransferase (HMT) EZH2 in the epigenetic regulation of Treg cell function. Indeed, EZH2 expression is increased in Treg cells from IBD patients, and EZH2 silencing leads to improved Treg function. These findings suggest that EZH2 silencing strategies may be beneficial in IBD. However, the regulation and biological impact of the FOXp3-EZH2 pathway in IBD is unknown. This knowledge is important given the apparent loss of function of Treg cells in inflammation.

Our long-term goal is to dissect epigenetic mechanisms regulating Treg cellular differentiation and function, which may provide novel strategies for the treatment of GI inflammatory diseases; as these discoveries will facilitate the development of novel therapeutics for IBD. Consequently, the objective of this grant is to characterize the role of the epigenetic regulator EZH2 in Treg suppressive function. These investigations are strongly supported by preliminary data demonstrating: 1) EZH2 is required for Treg suppressive function; 2) IL6 signaling leads to phosphorylation of EZH2; 3) lymphocytes isolated from the intestine of IBD patients demonstrate activation of IκBα-induced gene networks and loss of EZH2 HMT function; and 4) conditional knockout of EZH2 in FOXP3+ T cells leads to in vivo immune dysfunction. Based upon these compelling data, we propose the CENTRAL HYPOTHESIS that EZH2 silencing in Treg cells, and the disruption of EZH2 gene networks, contributes to IBD pathology. Our specific aims will test the following hypotheses:

Aim 1: Repression of immunoregulatory gene networks by FOXP3 requires the formation of a complex containing EZH2 and FOXp3-kinase-EZH2, thereby disrupting the expression of proinflammatory genes.

Aim 2: IL6 signaling pathway permits sustained Treg suppressive function in the setting of intestinal inflammation.

Aim 3: The FOXp3-EZH2 signaling pathway permits sustained Treg suppressive function in the setting of active inflammation. This discovery will stimulate development of novel therapeutic strategies for IBD and other inflammatory diseases. Chromatin remodeling of FOXP3 and EZH2 is well studied in the Department of Gastroenterology at Mayo Clinic makes us uniquely qualified to pursue this objective, given the extensive collective experience of histone methyltransferase biology.

You do not have to have 3 aims!
Figure 1: Conceptual framework.

Through the mechanistic experiments designed in the following aims we will **identify** the role for FOXP3 in the recruitment of EZH2 to core target genes required for Treg function (Aim 1). We will **define** the signaling network responsible for phosphorylation of EZH2 and disrupted HMT function (Aim 2). Finally, we will **perform** pre-clinical studies of innovative therapy designed to generate Treg cells resistant to disruptive modifications in the setting of inflammation (Aim 3).
Specific Aims/Project Description: Overall Tips

• Start by setting the context, funnel down to the problem, and solution
• Create a solid hypothesis with a strong scientific premise
• The aims should collectively test the central hypothesis or accomplish the objective
• Use 2-4 realistic aims over 2-to-5-year funding period, with the resources available
• Discuss your Specific Aims with colleagues
• Write, discuss, revise, write (repeat)
• Avoid “over-ambitious” or “incremental” aims
• Conclude with an impact statement or expected outcome
• Use italics, bold, underline to emphasize key points in the Specific Aims page (in moderation) and be consistent throughout the application
• Gain the reviewers’ confidence while convincing them that your proposal is important to support
Common Weaknesses of Specific Aims/Project Description

• Aim/Goal 1: Does A cause B?
  ▪ It can be problematic if a major aim depends on specific outcomes of a prior aim

• Aim/Goal 2: To use models of process A to predict markers of condition B.
  ▪ This aim/goal is descriptive. Suggested revision: To predict markers of condition B using models of process A and determine what role X plays in the progression of B

• Aim 3/Goal: We will measure levels of X in 1000 samples of Y to characterize the pattern of expression of X.
  ▪ Some descriptive findings may be too detailed for a specific aims page or project description
Consider Word Choice

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<th>Strong Verbs</th>
<th>Descriptive</th>
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<td>Implement</td>
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“Chance favors the prepared mind”

Thank you!
Final Webinar of this Series (#3)

Tuesday, November 1, 2022.
2:00-3:15pm Eastern Time (USA)

Writing a Competitive Application

- How to make use of sample applications
- Getting feedback on your application drafts
- Structured writing practices
- The NIH Review process
Open Virtual Office Hour

Monday, October 3, 2022.  1-2pm ET

No RSVP Needed. Up to 30 attendees at the most.

*We will send the link to the email used to log into this webinar.*

If you have additional questions, please reach out!
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