

DOS Research Toolkit Lecture
***Grant Writing and
Funding Opportunities
for Lab Residents***

Dr. Karen Ho
Dr. Shelbie Kirkendoll

May 9, 2024

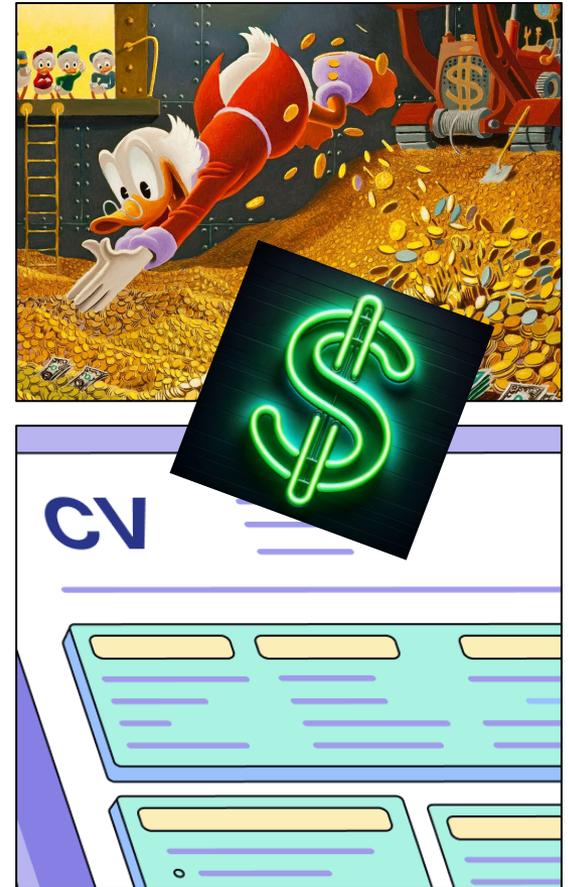
Disclosures

Shelbie:

- The ACS Firearm Clinical Scholar Fellowship is funded by the American College of Surgeons (ACS), the American Association for the Surgery of Trauma (AAST), the Eastern Association for the Surgery of Trauma (EAST), the Western Trauma Association (WTA), and the Pediatric Trauma Society (PTS).
- I receive funding through an NIH LRP grant

Why apply for research grants as a resident?

- You want to do research full-time during residency
- Research itself is costly
 - Supplies, animal models, core facility use, software, travel, study participant compensation, statistical support, database access, etc. etc.
- You plan to be a funded researcher in the future
- You want to build your CV as an academician



What kinds of research grants can residents apply for?

- NIH: T32 or R38 (institutional training grant), F32 (individual fellowship award), LRP (loan repayment plan)
- Foundations and non-profits: ACS, AAS, SUS... and
- “Intramural”: Steven Strittmatter



Check out this [website](#) for others!

Things to know ahead of time



- What is the deadline?
 - Ask for LOR at least 1 month ahead of time
 - Attach your updated CV to your LOR request
 - Draft the LOR yourself!
 - Give yourself time to write the grant, get feedback, and revise!
- What is the funding start date?
- What's the budget and are there budget restrictions?
- What is the “internal” deadline?

What is the Office of Sponsored Research (OSR)?

- This is Northwestern's authorized organizational representative
 - Central pre-award and post-award research administration unit
- Accountable to NU and external sponsors for compliance, review, negotiation, approval, and authorization of all sponsored research activity

All extramural research grant proposals need to be approved by OSR!



- “Extramural” = grants or awards that are sponsored outside of Northwestern University
- Proposals need to be routed entered, assembled, and routed to OSR through CERES by DOS Research Administration
- Notify DOS Research Administration of your intention to apply for a grant **6 weeks** before the deadline
- **DOS “internal” deadline: complete grant application 10 business days before the deadline**

Components of a typical grant application

- Applicant biosketch or CV
- Mentor letter and training plan
- Description of research environment
- Research plan
- Budget
- Other letters of recommendation
- Cover letter and/or personal narrative





DOS Research Administration and OSR can also...

Help ensure you are registered in the **eRA Commons!!** (for NIH grants...T32, R38, F32, etc.)



Home |



eRA Commons ?

Track your application; manage and report on your federally funded award

Commons Help/Service Desk

866-504-9552 301-402-7469

Hours Monday-Friday, 7am-8pm EST

Recent News

Note: Improved Visual Appearance for Commons: Look for an enhanced visual appearance for Commons over the next few months, as it moves to the new look and feel of other eRA modules. The new look is part of a required technology update that will enhance the security and stability of Commons. The capabilities remain the same. However, there will be changes in the way users navigate to other modules, access action items, export documents, etc. For additional details and images, please visit: [eRA Common: Improved Visual Appearance](#)

Note: Users with Multiple eRA Commons Accounts: Users with multiple eRA Commons accounts should hold off on moving to two-factor authentication until 2024. eRA will then have a solution for users to consolidate their multiple accounts into a single eRA account that contains all their organization affiliations and roles. More importantly, once users complete the consolidation process, they will be able to associate their Login.gov or InCommon Federated account with one eRA account to support all their authentication needs. ([See eRA Commons roles](#)).



General tips to be successful

- Make sure your specific research aims can be accomplished within the proposed time and resources
- Make sure you have adequate preliminary data
- Develop a **feasible timeline** with application drafts
- Be realistic about the time it can take to write and revise the application, incorporate feedback, and get the application to OSR on time

More information on timelines/due dates:

<https://grants.nih.gov/grants/how-to-apply-application-guide/due-dates-and-submission-policies/due-dates.htm>



General tips to be successful

- Pay attention to formatting requirements

See guides below for:

Formatting attachments:

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

Page limits:

<https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/page-limits.htm>

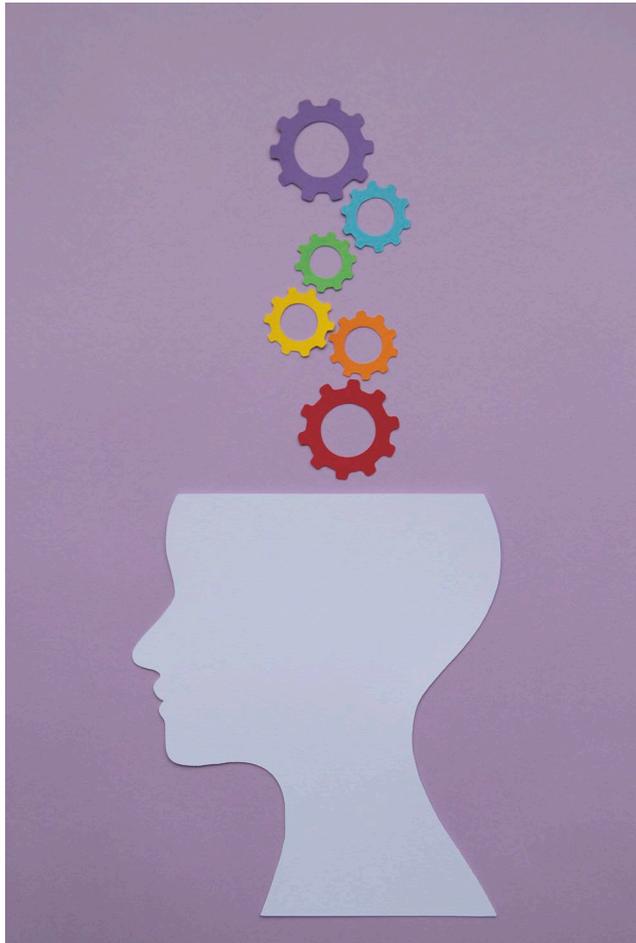
Text field entry:

<https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/rules-for-text-fields.htm>

Creating data tables:

<https://grants.nih.gov/grants/forms-g/data-tables.htm>

What makes a successful grant proposal?



Significance to the field

Investigators

Innovation

Approach

Environment

NIH Biosketch

<https://grants.nih.gov/grants/forms/biosketch.htm>

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

Basic Info



A. Personal Statement



B. Positions, Scientific Appointments, and Honors



C. Contributions to Science

A few notes on formatting...

- Figures, tables, or graphics are not allowed in the biosketch.
- The biosketch may not exceed five pages per person. This five-page limit includes the table at the top of the first page.

Personal Statement

- Briefly describe **why you are well-suited** for your role(s) in this project.
- Relevant factors may include:
 - aspects of your training;
 - your previous experimental work on this specific topic or related topics;
 - your technical expertise;
 - your collaborators or scientific environment;
 - and/or your past performance in this or related fields, including ongoing and completed research projects from the past three years that you want to draw attention to
- You may cite **up to four publications or research products** that highlight your experience and qualifications for this project.
- You are allowed to cite interim research products.

Personal Statement

- If you wish to explain factors that affected your past productivity, such as family care responsibilities, illness, disability, or military service
- Indicate whether you have published or created research products under another name.

Personal Statement *Example*

A. Personal Statement

I am a general surgery resident from The Valley Health System in Las Vegas, NV that is currently taking two years off from clinical responsibilities to pursue a postdoctoral research fellowship in firearm injury prevention. My research position as the Firearm Injury Prevention Scholar is a unique collaboration between The American College of Surgeons and Northwestern University. My clinical and research interests include trauma and acute care surgery, quality improvement, and violence and injury prevention. Trauma surgery and firearm injury prevention became my sole interest after caring for victims of unnecessary firearm violence. My research endeavors have grown as I have gained both clinical and methodologic experience during residency and now in my dedicated research years. I pursued this research position to be able to spend dedicated and deliberate time to gain the methodological and mentorship experience so that I can successfully pursue injury prevention research throughout the remainder of my clinical residency years and my future career.

Current training level



Clinical/ Research interests



Plan for postdoc research time



Personal Statement *Example*

Ongoing and recently completed projects that I would like to highlight include:

- a. **Epidemiology of Non-Lethal Firearm Injury**
 - a. **Bridging the Gaps: Individual and Community-Level Risk Factors for Non-Lethal Firearm Injuries in the United States.** This is a multi-center prospective cohort study that evaluates the differences between lethal and non-lethal firearm injury by individual and community level risk factors. My position is as first author, and my role has been data analysis, manuscript drafting, and eventual submission for publication.
 - a. **Firearm Safety/Storage**
 - a. **Context and Motivations for Storage Among Firearm-Owning Surgeons: A Qualitative Study.** This is a qualitative study that involves one-on-one interviews with firearm-owning surgeons to explore their views and experiences as well as motivations and context of individual firearm storage practices. My position is as first author and my role has been to conduct interviews, code transcripts, analyze themes, manuscript drafting and eventual submission for publication.
- Presentations:**
- a. **S. Kirkendoll**, A. Thomas, M. Crandall, R. Royan, A. Jang, A. Ellyin, B. Campbell, A. Reyes, E. Betz, A. Stey *Motivations and Context for Storage Among Firearm-Owning Surgeons: A Qualitative Study.* Oral quick shot presentation, Academic Surgical Congress 2023; Houston, TX, February 9th, 2023.
- a. **Quality Improvement**
 - a. **Quality Improvement Focus Groups.** This is a qualitative study that examines surgeons' barriers and facilitators to performing quality improvement projects. My role is as a secondary author and involves moderating focus groups, analyzing transcripts, creating a master codebook, and eventual manuscript drafting. *Submitted to American Surgical Congress, February 7-9th, 2023, Toronto, Canada.*

Positions, Scientific Appointments, and Honors

List any relevant academic and professional achievements and honors:

- Students, postdoctorates, and junior faculty should include **scholarships, traineeships, fellowships, and development awards**, as applicable.
- Clinicians should include information on any clinical licensures and specialty board certifications that they have achieved.

Example

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2022-Present	Firearm Injury Prevention Clinical Scholar, American College of Surgeons, Chicago, IL
2022-Present	Committee Member, Injury Prevention Committee- AAST, Chicago, IL
2022-Present	Workgroup Member, V3 Stop the Bleed Workgroup Committee, American College of Surgeons, Chicago, IL
2022-Present	Stop the Bleed Instructor, American College of Surgeons, Chicago, IL
2022-Present	Committee Member, Advocacy Committee- Resident and Associate Society of the American College of Surgeons, Chicago, IL
2022-Present	Member, Clark County Medical Society, Las Vegas, NV
2022-Present	Question Bank Author, COMLEX Level II exam, True Learn
2021-2022	Committee Member, Residency Curriculum Committee- The Valley Health System, Las Vegas, NV
2021-2021	Member, Justice Equity Diversity Inclusion Committee, The Valley Health System, Las Vegas, NV
2021-Present	Member, American College of Surgeons- Nevada chapter, Las Vegas, NV
2020-2021	Member, American College of Surgeons- Massachusetts chapter, Boston, MA
2020-2021	Committee Member, Education Curriculum Committee, Baystate Medical Center, Springfield, MA
2020-Present	Member, American College of Surgeons, Chicago, IL

Contributions to Science

- Briefly describe **up to five** of your most significant contributions to science.
- The description of each contribution should be no longer than one half page, including citations.

For each contribution, indicate the following:

1. the historical background that frames the scientific problem;
2. the central finding(s);
3. the influence of the finding(s) on the progress of science or the application of those finding(s) to health or technology;
4. your specific role in the described work.

Example

Background



C. Contributions to Science

1. Early research endeavors: My early research endeavors and professional activities focused on equity in medical education. Residency application for osteopathic and international medical graduates (IMG) has been historically difficult, especially when applying for specialty fields. As an osteopathic applicant, I experienced the challenges of a newly merged allopathic/osteopathic application process in 2020. I noticed that many residency websites and databases had missing data, specifically on whether osteopathic or IMG applicants were considered, if osteopathic board exams were accepted in lieu of allopathic exams, and what (if any) visas were accepted for international applicants. This challenge led me to investigate residency websites and the residency database "FRIEDA" to highlight the gaps in knowledge that applicants face and the opportunities for improvement.

Implication



Finding



Publications:

Kirkendoll SD, Carmody JB, Rhone ET. *Information Quality for Residency Applicants in Fellowship and Residency Electronic Interactive Database (FRIEDA) and Program Websites*. Cureus. 2021 Mar 15;13(3):e13900. Doi: 10.7759/cureus. 13900. PMID: 33880256; PMCID: PMC8046680

Research Environment

Research Environment

Applicants **should clearly state that they have the appropriate resources to conduct the research**, such as adequate equipment and laboratory space.

- Determine what resources and support your organization has and what additional support you'll need.
- Consider whether the available equipment and facilities are adequate and whether the environment is conducive to the research.

Example

Postdoc research
funding

My position is two years in duration and is fully salaried. I am provided funding to complete a master's degree in Health Services and Outcomes Research through NU. My funding is provided by leading U.S. trauma societies in addition to the American College of Surgeons. These societies include the Eastern Association for the Surgery of Trauma (EAST), Western Trauma Association (WTA), the Pediatric Trauma Society (PTS), and the American Association for the Surgery of Trauma (AAST). Part of my funding is dedicated to travel for annual research meetings including the ACS Quality and Safety Conference, AAST annual conference, ACS Clinical Congress, ACS COT annual meeting, ACS Leadership and Advocacy Summit, and one research meeting of my choice.

Northwestern
Resources (DOS)

Northwestern University (NU)

All NU faculty and trainees have access to research databases, administrative support, and hardware and software assistance available directly within the Department. The academic focus of the Department has been to grow and sustain a balanced portfolio of research and maintain our educational excellence. In 2021, the Department was ranked #19 in NIH awarded funding (Blue Ridge Institute for Medical Research). In addition, the Department received \$ 9 million in research awards within the given year. Unique resources provided by Northwestern include additional financial support for research efforts, access to research methodology resources as well as mentorship support. Examples of these resources are listed below:

- 1. Financial support- open access research fund, scholarships to fund academic travel for oral presentations at national meetings.
- 2. Research methodology resources- Geospatial analysts, librarians to help with systematic reviews/meta-analyses, experts in qualitative research, as well as psychometricians.
- 3. Additional mentorship- weekly research meetings between research fellows and academic researchers within the surgery department to review any ongoing research projects.

Letters of Recommendation

<https://grants.nih.gov/grants/how-to-apply-application-guide/write-application/reference-letters.htm>

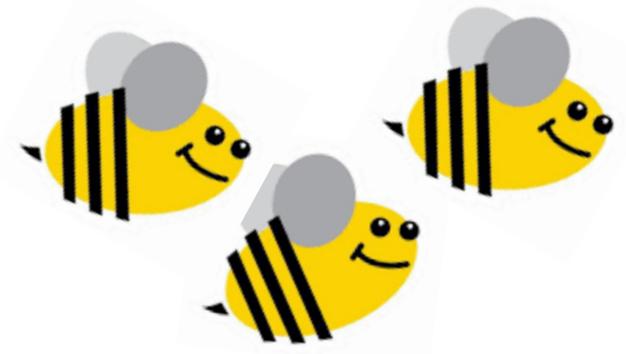
LOR Instructions

Selecting a Referee

- At least three, but no more than five, reference letters are required unless otherwise specified in the funding opportunity.
- Depending on the type of application, reference letters may have to come from individuals not working on the project with you (see specific grants for details)

Tips for writing your own LOR

- Use buzzwords
 - “The best trainee I’ve ever worked with”
 - “This trainee is in the top XX%”
- Don’t be afraid to brag about yourself
 - your letter writer will tone it down as they see fit
- What to talk about:
 - Your strengths
 - Your dedication to research/the field
 - Your ability to succeed



LOR Example

BEFORE

Dear Review Committee Members,

I am writing this letter in enthusiastic support of Shelbie Kirkendoll who is applying for the NIH extramural LRP grant award entitled, *The Scope and Quality of Injury Prevention Work at ACS Verified U.S. Trauma Centers*.

Dr. Kirkendoll is an exceptional candidate for this award and has shown ample dedication to research throughout her medical and surgical residency training thus far. She has first authored two published manuscripts during residency already and purposefully sought out her position as the Firearm Injury Prevention Research Fellow given her dedication to the field of trauma surgery and passion for injury prevention. She is the only firearm injury prevention research fellow in the United States and has unique connections to two robust institutions, Northwestern University and The American College of Surgeons, both of which will provide her with the resources and capabilities she needs to succeed.

AFTER

Dear Review Committee Members,

I am writing this letter in enthusiastic support of Shelbie Kirkendoll who is applying for the NIH extramural LRP grant award titled **Scope and Quality of Injury Prevention Work at ACS Verified U.S. Trauma Centers**.

Dr. Kirkendoll is an exceptional candidate and has shown dedication to research throughout her medical and surgical residency training thus far. She has first authored two published manuscripts during residency already and purposefully sought out her position as the Firearm Injury Prevention Research Fellow given her dedication to the field of trauma surgery and passion for injury prevention.

Research Plan

Research Plan

The research plan describes:

1. The proposed research
2. Its significance
3. How it will be conducted



- Remember, your application has **two audiences**: the majority of reviewers who will probably not be familiar with your techniques or field and a smaller number who will be familiar.
- **All reviewers are important to you** because each reviewer gets one vote.
 - To succeed in peer review, you must win over the assigned reviewers. They act as your advocates in guiding the review panel's discussion of your application.
 - Write and organize your application so the primary reviewer can readily grasp and explain what you are proposing and advocate for your application.

More information on research plan components:

<https://grants.nih.gov/grants/how-to-apply-application-guide/forms-h/general-forms-h.pdf>

Example Outline

- Specific Aims
- Research Strategy
 - Significance
 - Innovation
 - Approach

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Specific Aims



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).

Specific Aims Example

Specific Aims:

This proposal's objective is to determine the impact of the spatial structure and mechanics of *Pseudomonas aeruginosa* biofilm infections, in chronic wounds, on virulence, antibiotic resistance, and immune evasion.

Most chronic bacterial infections are caused by biofilms, aggregated bacteria that are embedded in a matrix of polymer and protein. Unlike well-mixed, liquid cultures, biofilm infections have well-defined spatial structure. This spatial structure is given by the sizes of bacterial aggregates, the relative positions of aggregates, and matrix heterogeneity. Aggregates also have viscoelastic mechanical properties that are conferred by the matrix. Basic principles of material transport indicate that the spatial structure of biofilm infections must impact intercellular signaling, virulence, and antibiotic resistance; comparison of biofilm mechanics with known phagocytic forces indicate that resistance to deformation and breakup likely help biofilms resist immunological clearance. However, there is little to no in-depth, quantitative knowledge regarding the impact of spatial structure and mechanics on disease course. Completion of the work we propose here will open new possibilities for therapeutic strategies that specifically target biofilm structure and/or mechanics.

Our long-term goal is to find new strategies for remediating biofilm infections by addressing physical properties. Here, our central hypothesis is that spatial structure and mechanics are the major *physical* factors controlling the development of pathogenicity, antibiotic resistance, and immune evasion in biofilm infections. This hypothesis is based on a synthesis of our own and others' published work. The rationale is that completion will identify key physical targets for preventing, disrupting, or ameliorating biofilm infections for an important biofilm-forming opportunistic human pathogen. The work we propose here will also develop experimental techniques and understanding of an important model system that together will constitute a widely-applicable platform for assessing the impact of biofilm structure and mechanics for other infecting organisms.

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Specific Aims Example

What are you going to do?

How are you going to do it?

What do you **hypothesize** the results will be?

AIM 1:

We will test our central hypothesis and attain our objective *via* the following *specific aims*:

1: Determine the spatial structure and mechanics of biofilm infections in wounds. For this, we will use sophisticated imaging to determine, in three dimensions, the size, number, locations, and heterogeneous matrix content of bacterial aggregates in a mouse model of chronic wound infection. We will simultaneously measure the density and distribution of neutrophils around the biofilm aggregates. At present, no good technique for measuring the mechanics of biofilm infections exists. We will develop such a technique using AFM microindentation and abrasion of *ex vivo* biofilms. *Working hypothesis:* The structure and mechanics of *in vivo* biofilm infections in chronic wounds will follow development trajectories arising from the matrix-producing capabilities of the bacteria and pressure from the host immune defense.

After listing specific aims:

The *expected outcome* of this work is a comprehensive understanding of what structures and mechanics develop in biofilm infection of chronic wounds, and the degree to which these structures and mechanics give rise to pathogenicity, antibiotic resistance, and evasion of the immune system. The results will have an important *positive impact* because they lay the groundwork to develop a new class of targeted treatments.

What is the **expected outcome**?

How will it **impact** the field?

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Significance

- **Explain the importance of the problem** or critical barrier to progress that the proposed project addresses.
- Describe the **strengths and weaknesses in the rigor of the prior research** (both published and unpublished) that serves as the key support for the proposed project.
- Explain how the proposed project will **improve scientific knowledge**, technical capability, and/or clinical practice in one or more broad fields.

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Innovation

- Explain **how the application challenges and seeks to shift current research** or clinical practice paradigms.
- Describe any **novel** theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- **Explain any refinements, improvements, or new applications** of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Approach

- Describe the overall **strategy, methodology, and analyses** to be used to accomplish the specific aims of the project.
- Describe plans to address weaknesses in the rigor of the prior research that serves as the key support for the proposed project.
- Include how the data will be **collected, analyzed, and interpreted**
- Discuss **potential problems**, alternative strategies, and benchmarks for success anticipated to achieve the aims.

Example funded R01 with outlined research plan:

www.niaid.nih.gov/sites/default/files/1-R01-AI121500-01A1_Gordon_Application.pdf

Best practices for revising your grant

- Ask for feedback from other people: your mentor, your collaborators, your peers
- Look at successful grant applications
 - NUCATS, NIAID.... DOS Resident Research webpages (coming soon!)
- Take your proposal to a grantwriting workshop to get a “fresh eyes” on it



What happens after I submit?

- NIH: check the “payline” or published success rates for your funding mechanism
- If you are not successful...
 - Take a beat ... and keep a healthy perspective on the big picture
 - The more you write, the better you will become
 - The more grants you read, the better you will write
 - Talk to your mentor about revising and resubmitting
 - **DON'T GIVE UP!**



GO  D
LUCK!

Questions?

Our contact information:

Shelbie Kirkendoll

shelbie.kirkendoll@northwestern.edu

Karen Ho

kho1@nm.org