

Introduction to Career Development Awards and ESI/NI Grants in Biomedical Informatics



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Outline

- Brief introduction to NLM's Extramural Program
- Career Development Awards
- ESI/NI Research Grants in Biomedical Informatics
- Overview of the NIH/NLM grant processes
- Questions and Answers

This presentation is available online at

<http://www.nlm.nih.gov/ep/biomedinformaticswebinar.html> as a downloadable, printable document. This online version of the presentation includes all of the links presented in the webinar and additional materials to help you prepare grant applications for NLM.

National Library of Medicine (NLM)

The National Library of Medicine (NLM) is part of the National Institutes of Health (NIH) which is organized into 27 Institutes & Centers (IC) each with different missions and priorities, budgets, and ways of deciding which grants to fund

- The NLM began with a small collection in 1836 – celebrating 175 years this year.
- The world's largest medical library with over 17 million items.
- World leader in providing trusted health information to consumers and healthcare professionals. Every day, via the Internet NLM delivers trillions of bytes of health data crucial to the lives of millions of people around the world.
- Conducts and funds research in fundamental and applied research in biomedical informatics and bioinformatics to improve the quality and efficiency of health care.

NLM Extramural Grant Program

- Research Grants
- Resource Grants
- Training Grants

- Career Development Awards
- Small Business Research and Development Grants

NLM Career Development Awards

NLM Career Development Support

- NLM offers early career development awards to help informatics researchers make transition to a successful independent research career
- NLM support research career development in clinical/public health informatics, bioinformatics, translational informatics, and consumer health informatics.
- If you recently earned a doctoral degree and are beginning your career as a junior researcher or faculty member, you may qualify for one or more types of research support.
- Choose the award type that matches your area of interest.

NLM Career Development Award

- [NLM Independent Career Development Award for Biomedical Informatics \(K22\) \(PAR-10-195\)](#)
- Career transition support for biomedical informatics researchers to establish their initial independent research programs.
- [NIH Pathway to Independence Award \(K99/R00\)\(PA-11-197\)](#)
- Career transition assistance for biomedical informatics researchers moving from mentored research to their first independent research program.

*Preference will be given to applicants who received their informatics training at one of NLM's university-based training programs in Biomedical Informatics.

Understand Award Specifics

- Am I eligible?
- What Do Career Development Awards Pay For?
- What is the Funding Duration?
- What Minimum Effort Requirements Apply?
- Are K Awards Renewable?

Am I eligible?

- [NIH Pathway to Independence Award \(K99/R00\)](#): To qualify, you must have a clinical or research doctoral degree with no more than five years of postdoctoral research training at the time of application, and have plans to apply for an assistant professorship at an academic institution.
- You do not have to be a U.S. citizen or permanent resident. However, you should have a visa

that allows you to remain in this country long enough to: 1) move to an independent research career during the K99 phase, and 2) be productive on the research project for the duration of the R00 phase.

- [NLM Independent Career Development Award for Biomedical Informatics \(K22\)](#): You must have completed 2 or more years of mentored postdoctoral research or have been in an independent position for less than 2 years

What Do Career Development Awards Pay For?

- Maximum salary: \$50,000 for K99; \$85,000 for K22
- Maximum research expenses: \$20,000 for K99; \$50,000 for K22.
- Total cost: \$249,000 for R00. This amount includes salary, fringe benefits, research support allowance and applicable indirect costs.

What is the Funding Duration?

- K22: up to 3 years
- K99/R00: 1-2 years for K99 phase; up to 3 years for R00 phase

What Minimum Effort Requirements Apply?

- K22/K99 award recipients must commit a total of 75% of their full-time, 12 month professional effort to the funded project (i.e., a full-time 9 person months).
- Recipients of the R00 phase awards may devote effort to other research projects and may reduce effort on the R00 award if they receive additional independent research support. A reduction of time devoted to a project by 25% or more from the level in an approved application will require NLM prior approval

Are K Awards Renewable?

- K awards are not renewable
- NLM expects K awardees to move on to independent research support, such as an R01

Applying for a K99/R00 Award

- Include in your application a career development plan, research plan with a description of the project you will pursue in the R00 phase, and at least three letters of reference.
- During the initial mentored (K99) phase, you must secure a tenure-track, full-time assistant professor position at an academic institution.
- To qualify for the independent investigator (R00) phase, your department chair will need to submit a letter demonstrating the institution's commitment to you by providing protected research time, space, facilities, and support needed to conduct the proposed research.

Applying for a K22 Award

- This grant program supports only the independent career transition phase.
- Must have completed 2 years or more of mentored postdoctoral research, or have been in an independent position for less than 2 years
- Provide "protected time" for newly independent investigators to develop and receive support for their initial research programs
- The award applies to researchers who are pursuing research in clinical informatics, public health informatics, bioinformatics or translational informatics

Writing a Career Development Award Application - 1

- Before jumping in to write your application, carefully read the relevant funding opportunity announcement and follow the instructions in the [SF 424 Application Guide](#), including guidelines for page limits.
- Your application will be peer reviewed by an NLM study section

Writing a Career Development Award Application - 2

Review Criteria

- Candidate
- Career Development Plan/Career Goals & Objectives
- Research Plan
- Consultants(s), Collaborator(s), Mentor(s)
- Environment and Institutional Commitment to the Candidate

Writing a Career Development Award Application - 3

Address Peer Review Criteria

- Peer reviewers will assess your potential based on your CV, research and career plans, and reference letters. Make sure your CV highlights your past successes, and your research and career plans illustrate your commitment and potential for future contributions.
- Your reference letters should come from people who are familiar with your qualifications, training, and research interests.
- Reviewers will evaluate the institution where the proposed research will be conducted. They'll consider whether your institution has suitable facilities and is committed to your development as an investigator.
- For mentored positions, reviewers will assess your mentor's career and research supervision record, and whether his or her work and experience are relevant to your proposed Research Plan.
- Read the relevant funding opportunity announcement (FOA) for

specific peer review criteria.

Writing a Career Development Award Application - 4

Align your career development plan to your professional goals.

- To get the best score, you need to show reviewers that you can establish a research career.
- Your career development plan is as important as your Research Plan. Be sure to:
 - Justify your need for a K award and explain how it will be a vital step toward your ultimate career goal.
 - Specify training and courses that you will participate in, how often you'll meet with mentor (s) and/or collaborator(s), and how all of this will help you reach your objectives.
 - Stress your commitment to a career in biomedical informatics research
 - Read the relevant FOA for other elements you should include in the career development plan.

Writing a Career Development Award Application - 5

Design Your Research Plan Carefully

- Reviewers will look closely at your Research Plan. They will evaluate whether it is appropriate for and tailored to your experience level and if it allows you to develop the skills and knowledge needed for further career advancement.
- Make sure you relate the proposed research to your scientific career goals, and you are able to achieve your objectives in the time you request.

Writing a Career Development Award Application - 6

Document Training on Responsible Conduct of Research

Make sure you've included a plan for instruction in responsible research conduct.

Recent K99/R00 Awards

- Detecting Genome Wide Epistasis with Efficient Bayesian Network Learning (University of Pittsburgh)
- Novel Bioinformatics Tools for Gene Regulatory Network Inference (Washington University)
- Patient Safety through Implementation Science: Clinical Work Culture & IT Design (Vanderbilt University)
- Informatics for zoonotic disease surveillance: combining animal and human data (Arizona State University)
- Statistical & computational tools for reconstruction of gene regulatory networks (University of Rochester)

For more information on recent career development awards, visit

<http://www.nlm.nih.gov/ep/AwardsPublications.html>

NLM ESI/NI Research Grants in Biomedical Informatics

Topics

- New Investigator and Early Stage Investigator
- Research Grant (R01) Programs
- Applying for a R01 Grant
- NLM Grant Process
- NLM Contacts for Questions regarding Career Development Awards and R01 Grants

What is a New Investigator?

- A Program Director or Principal Investigator (PD/PI) is considered a New Investigator if he/she has not previously competed successfully as PD/PI for a significant NIH independent research award.
- The involvement of New Investigators is considered essential to the vitality of health-related research and has been addressed by several important NIH programs and studies.
- In FY 2007, the NIH adopted a policy designed to reverse the steady decline in the number of New Investigators.
NIH New Investigator Website at
http://grants.nih.gov/grants/new_investigators/resources.htm.

What is an Early Stage Investigator (ESI)?

- An ESI is a New Investigator within ten years of completing their terminal research degree or within ten years of completing their medical residency.
- You can request an extension to the 10 year period. Requests to extend the ESI period can include medical concerns, disability, family care responsibilities, extended periods of clinical training, natural disasters, and active duty military service.
- The majority of New Investigators supported by the NIH are expected to be ESIs.

What is the NIH ESI/NI Policy?

- The NIH strongly encourages New Investigators, particularly ESIs, to apply for R01 grants when seeking first-time funding from the NIH. The ESI/NI review considerations only apply to R01 grants.
- NIH research indicated a smaller proportion of individuals with initial R21 or R03 grant support subsequently apply for and obtain R01-equivalent funding. In addition, the initial success rate for R21 applications often is lower than for R01 applications.
- Applications from ESI/NIs will be given special consideration during peer review and at the time of funding. Peer reviewers will be instructed to focus more on the proposed approach than on the track record, and to expect less preliminary data than would be provided by an established investigator. Their early career stage will be considered at the time of review and

award.

- **NLM Policy** - R01 applications from ESI/NIs, with Impact scores of 40 or better will be considered for funding. 10 points beyond the normal fundable level.

Your eRA Commons Profile is Important!

- All New Investigators should update their eRA Commons profiles to ensure that you are given appropriate consideration on R01 applications. Your ESI/NI status is automatically determined by the information in eRA Commons.
- To create an eRA Commons Profile contact your institution's office of research support or grant administration.

<https://commons.era.nih.gov/commons/>



Figure 1. eRA Commons website.

What are the NLM Biomedical Informatics Research R01 Programs?

- NLM Express Research Grants in Biomedical Informatics and Bioinformatics (R01) (PAR 11-208)
- Research Project Grant (NIH Parent R01) (PA 11-260)

NLM Express Research Grants in Biomedical Informatics (R01) (PAR 11-208)

- This program supports research grants that advance the science of biomedical informatics. Informatics is concerned with the optimal organization, management, dissemination and use of information. Biomedical informatics can be defined as the intersection of computer and information sciences with an application domain such as health care, public health, basic biomedical research, or clinical translational research.
- In most instances, informatics projects of interest to NLM involve the application of computer and information sciences to information problems in a biomedical domain.

<http://www.nlm.nih.gov/ep/GrantResearch.html>

NLM Express Research Grants in Biomedical Informatics (R01) (PAR 11-208)

- The following basic informatics problem areas demonstrate the scope of NLM's research interests:
 - Information & knowledge processing, including understanding, translation or

- summarization of natural language in real-time or near real-time, integration of information from heterogeneous sources
 - Advanced information retrieval, knowledge discovery in databases, discovery mining, and other techniques for in silico discovery and research including approaches for accelerating the linkage of phenomic and genomic information
 - Incorporation of machine intelligence into decision tools and resources for health care providers, scientists and consumers
 - Information visualization and presentation approaches to enhance decisions, learning or understanding
 - Innovative approaches for ensuring privacy and security of clinical and biomedical research data.
- Examples of application domains include, but are not limited to:
 - Health Care, Public Health, Health Services Research, and Disaster Information Management;
 - Basic Biological, Social and Behavioral Research;
 - Multi-level computational models of biological and clinical processes;
 - Translational Research that supports (1) uses of data in electronic health records to support biomedical research and (2) translation of biomedical research outcomes through application to problems in clinical care
 - Information Sciences; simulation, user customization, virtual environments or innovative information techniques.
- NLM places a high priority on innovation in the research it supports. While informatics research often involves software development and tool-building, a well-defined research problem and rigorous research design based on preliminary studies are essential elements of any application to NLM's research grant program. Projects to extend capabilities of an existing software tool are only considered fundable if the new capability is highly innovative in its approach.

What are the NLM Express Research Grant Budget and Duration?

- The NLM Express Research Grant has a limit of \$250,000 per year in direct costs
 - Applicants may request up to 4 years for the project period.
- <http://www.nlm.nih.gov/ep/Deadlines.html>

Research Project Grant (NIH Parent R01) (PA 11-260)

- For investigators whose needs are not met by the NLM Express Research Grant Program, the NIH Parent R01 provides support for rigorous scientific research in biomedical informatics and bioinformatics.
- Investigators applying through the NIH Parent R01 announcement should include a cover letter requesting assignment to NLM.
- Refer to the NLM Express Research Grant information regarding NLM's research grant priorities and scope of interest.

<http://www.nlm.nih.gov/ep/GrantResearchParent.html>

What are the R01 Deadlines?

- Deadlines for New Applications: February 5, June 5 and October 5 each year.
- Deadlines for Revised Applications: March 5, July 5 and November 5 each year
- **Important!!!** Deadlines and procedures can change, always check the NLM website and NIH resources for the most current information.

<http://www.nlm.nih.gov/ep/Deadlines.html>

Grants and Funding: Extramural Programs EP Home | Grant Programs | Awards

Home > Grants and Funding

Grant Deadlines

Grant Deadlines Overview
NLM grant deadlines are the same as those of other NIH Institutes and Centers, unless otherwise noted. Each program has

RFA Deadlines
In addition to investigator-initiated grant programs, NLM also participates in Request for Applications (RFA) announcement deadlines, as provided in each RFA.
[Active RFAs with NLM participation](#)

For More Information
[NLM's grant programs listing](#)
[Grant submission, the review cycle, and all NIH grant deadlines](#)

	Receipt Cycle I	Receipt Cycle II	Re Cy
Research Grants – R01 (Investigator-initiated basic and applied research) <i>new</i>	February 5	June 5	Oct

Figure 2. NLM Grant deadlines web page.

Where do I Find Information About Grants?

- Funding Opportunity Announcements (FOA) posted at
 - NLM Extramural web site (<http://www.nlm.nih.gov/ep/index.html>)
 - the NIH Guide (<http://grants.nih.gov/grants/guide/>)
 - Grants.gov (<http://www.grants.gov/>)
 - Also subscribe to your institution's grant notification service

Where can I find help for writing a grant application?

- NLM and other NIH Institutes and Centers provide a wide range of help for applicants. We will be discussing a few of these resources and provide a much longer list of resources in the downloadable documents that accompany this program.
- Since NIH grant awards are made to eligible institutions and not to individuals, there will be procedures established by your institution regarding preparing and submitting NIH grant applications. Become familiar with these procedures early in your planning period. Also participate in grant writing training at your institution or other organizations.

<http://www.nlm.nih.gov/ep/ForApplicants.html>



Figure 3. NLM's Resources for Applicants webpage.

What Grants has NLM Funded?

- NLM maintains links to information about all funded projects. Knowing what research has been funded in the past can help your planning. You can also contact previous grantees regarding their work.

<http://www.nlm.nih.gov/ep/funded.html>



Figure 4. NLM's Research Awards webpage.

What Grants Does NIH Already Support in My Area?

- NIH RePORTER provides reports, access to data, analyses of NIH Research activities, and access to information about all funded research projects. This tool can uncover funded projects related to your work.

<http://report.nih.gov/index.aspx>



Figure 5. NIH's RePORTER web page.

NIH RePORTER: Reports, Data, and Analyses of NIH Research Activities

You can search RePorter using many strategies ranging from MESH terms to names of Investigators.

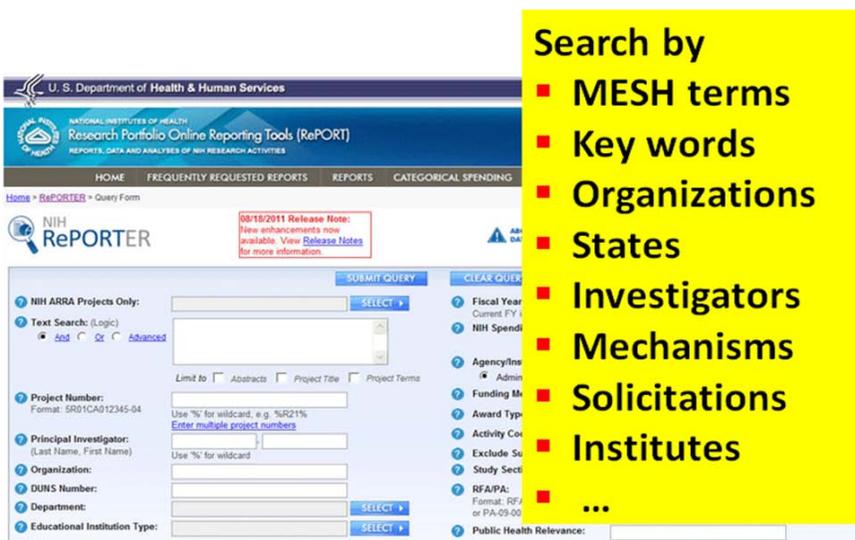


Figure 6. Can search NIH Reporter using multiple terms.

Learn About the NIH Peer Review Process

- When writing an application you need to understand how it will be reviewed and write with your audience, the reviewers, in mind. NIH provides many excellent resources to learn about the review process.

<http://cms.csr.nih.gov/AboutCSR/OverviewofPeerReviewProcess.htm>

The screenshot shows the NIH Center for Scientific Review website. At the top, there is a navigation bar with links for 'home', 'contact csr', and 'staff directory'. A search bar is also present. The main heading is '"The Peer Review Process"'. Below this, there is a diagram titled 'Center for Scientific Review National Institutes of Health' illustrating the process: an 'Applicant' submits a 'Grant Application Kit' to a 'Scientific Review Group' (SRG). The SRG provides a 'Summary Statement' to the 'Funding Institute/Center'. A text box titled 'What Happens to Your Grant Application: A Primer for New Applicants' explains that the application is assigned to a review group and an NIH Institute or Center. A sidebar on the right includes a 'printer friendly' link and a 'Home' menu with options like 'About CSR', 'News and Reports', 'Peer Review Meetings', and 'Resources for Applicants'.

Figure 7. Center for Scientific Review peer review process web page.

View the NIH Peer Review Videos

When writing an application you need to understand how it will be reviewed and write with your audience, the reviewers, in mind. NIH provides many excellent resources to learn about the review process.

<http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm>



CSR has produced a series of videos to give you an inside look at how scientists from across the country review NIH grant applications for scientific and technical merit.

New and established applicants will find insights and understanding that can empower them to improve the applications and increase their chances for receiving a more positive review.

Two video thumbnails are shown side-by-side. The left one is titled 'NIH Peer Review Revealed' and is described as 'Provides a front-row seat to a review peer review meeting.' The right one is titled 'NIH Tips for Applicants' and is described as 'Gives applicants practical advice and insights.' Both thumbnails show a play button and a YouTube logo.

Figure 8. Web page for NIH peer review online videos.

Writing Grants That Get Funded

- Research plan answers 6 essential questions
 - What important problem is being addressed?
 - What do you intend to do to address the problem?
 - What has already been done;
 - Is the work feasible yet novel?
 - How will you do it?
 - Do you have the team and the resources to do it?
- Successful applications typically are
 - Impactful!
 - Well-focused and explicitly written with milestones, metrics, contingencies
 - Not overly ambitious
 - Understandable by a non-expert, intelligent reader
 - Well justified (for people, time, budget)

Sample Life Cycle of a New NLM Grant Application NLM Funding Plan

Here is an illustration of the life cycle of a new NLM grant application. The application is submitted by the Feb 5 deadline through Grants.gov. It is best to submit well in advance of the deadline in case there is any problem with the application. The application will be reviewed by the Biomedical Library & Informatics Committee in June. The BLIRC is NLMs standing study section. An impact or priority score will be available online via NIH Commons in 7 days and the complete Summary Statement is normally available in 4 weeks post BLIRC. A second level of review is conducted by the NLM Board of Regents in Sept or Oct. Final finding decisions are made in October and November. And Finally a Notice of Award can be made in November or December.

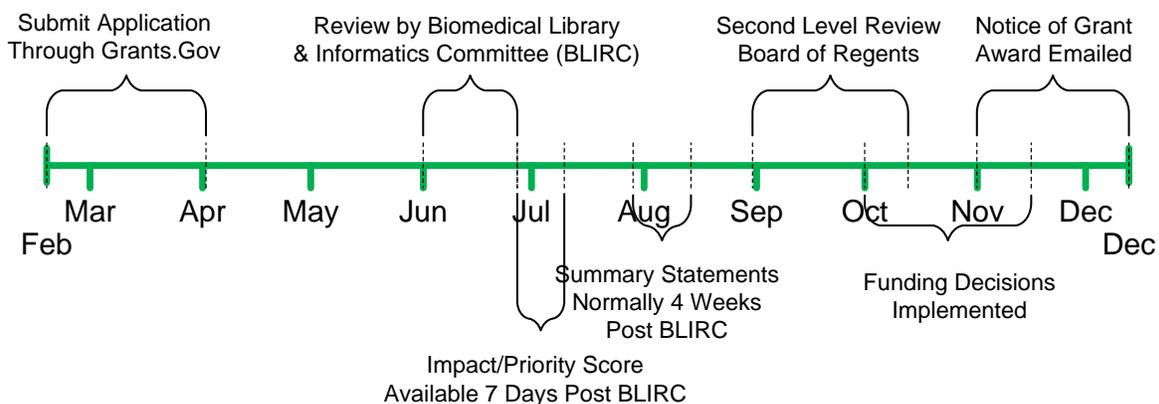


Figure 9. Illustration of the life cycle of an NLM grant application.

NLM Funding Plan

- **Funding Strategy:** NLM supports as many meritorious competing grant applications as possible, across the array of grant programs it offers. General funding guidelines are

established each year based on appropriated funds available. Final award decisions reflect considerations of program relevance, portfolio balance, recommendations of the NLM Board of Regents, and availability of funds. In keeping with NIH policy, budgets for awarded grants may receive programmatic or administrative adjustments. These adjustments take into consideration the overall scientific and technical merit of the grant application as well as the appropriateness of the requested budget. Although NLM's training authority is not part of the Ruth L. Kirschstein National Research Service Award (NRSA) programs, stipends and other details of NLM's training programs are modeled upon NRSA.

- **Fundable Range:** NLM uses the overall Impact Score as the primary basis for award decisions on all grant types, along with innovation and potential impact. For experienced investigators, applications with Impact scores 30 or better are the most likely to be funded. For Early Stage investigators and New investigators seeking their first R01 research grant, applications with Impact scores of 40 or better will be considered for funding. All grant awards are subject to the availability of funds.

Need Help with Your Proposal... Who Ya' Gonna' Call?

- For questions about the scientific and technical aspects of your application contact one of the NLM Program officers.
 - **For Clinical and Public Health Informatics**
Dr. Hua-Chuan Sim, simh@mail.nih.gov
 - **For Bioinformatics and Translational Informatics**
Dr. Jane Ye, yej@mail.nih.gov
 - **For Consumer Health Informatics**
Dr. Alan VanBiervliet, alan.vanbiervliet@nih.gov
- For questions regarding the application review process contact the Scientific Review Officer, Dr. Arthur Petrosian, petrosia@mail.nih.gov, or Dr. Zoe Huang, huangz@mail.nih.gov.
- For help with the financial and business aspects of an application contact the NLM Grants Management Officer, Dwight Mowrey, mowery@mail.nih.gov
- **Additional Resources:** <http://www.nlm.nih.gov/ep/Grants.html>



Figure 10. Picture of the three "scientists" from the movie Ghost Busters.

Good Grants Get Considered,

Outstanding Grants Get Funded



Figure 11. NLM 175th celebration staff picture in front of the National Library of Medicine.

Questions and Answers from the webinar are available at
<http://www.nlm.nih.gov/ep/biomedinformaticswebinar.html>.