



COLLEGE OF PHARMACY

XAVIER UNIVERSITY *of* LOUISIANA

# Pre-Conference Workshop

Professional Development for Improved  
Research Funding

*10<sup>th</sup> Anniversary*  
**HEALTH DISPARITIES CONFERENCE**  
March 16-17, 2017 | New Orleans, Louisiana



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# Accreditation

**UAN: 0024-000-17-001-L04-P**

Participation in this activity earns **3.0** contact hours. To receive credit, participants must complete an evaluation form at the end of this session.

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## DISCLOSURE STATEMENT

Speakers for this session have nothing to disclose. Any updates in disclosure will be made from the podium.

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GRANT WRITING

**Marjorie P. Piechowski, PhD**

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# Strategies for Effective Grant Proposal Development

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Dr. Marjorie Piechowski  
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# Beginning thoughts...

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- Grant writing is a learned skill
  - Most of us did not learn to write grants in graduate school or medical school
  - Practice and patience make a difference in being successful: overall success rate ~ 5-20%
  - Successful grant writers revise and reapply
- Competition is fierce in all fields but ...
- Funding opportunities are plentiful
- Even a small grant can make a huge and permanent impact on your career, your students, your institution and the public.

# Why Should You Write Grants?

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- Augment, expand current research
- Develop new research directions
- Enhance academic reputation
- Assess career growth and accomplishments
  - Internal = tenure, promotion
  - External = comparison with peers in the field
- Expand collaboration and publication potential
- Provide role model for students
- Directly support students
- Increase institutional visibility, ranking
- Make a difference:
  - Improve health and quality of life; save lives
  - Add to scientific knowledge and practice



# What makes a successful grant?

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# What is a well-prepared PI?

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- A successful investigator will be well-positioned in:
  - a. The investigator's field and the relevant literature
  - b. Understanding potential/actual competitors for funding
  - c. The investigator's major funding source(s)
  - d. Appropriate experience and training to do the research
- Successful proposals will be well-positioned with respect to:
  - a. The investigator's own research agenda and goals
  - b. The strategic plan and priorities of the potential funder
  - c. The strategic plan and priorities of the investigator's institution
  - d. The relevant scholarly/scientific discipline and literature

# What creative ideas can grants support?

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- Grants can support
  - Research
  - Curriculum development
  - Faculty training/development/enhancement
  - Undergraduate and graduate students
  - Equipment—research or student labs
  - Travel--individual and group
    - Research, curriculum, faculty development
  - Construction, renovation, infrastructure
  - Conferences/workshops
  - Community outreach
  - Collaborative/consortia projects with schools, industry, other institutions of higher education, local government, non-profit organizations, hospitals

# Types of Proposals

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- Pre-proposal
  - Up to 5 pages (varies by agency)
  - reviewed
  - invited to submit
- Concept/White Paper
  - 2-4 pages, highlights
- Letter of Intent/Inquiry
  - May be a proposal for some foundations
  - May be required
  - May be reviewed
- Full proposal
  - 3-50 pages, can go to several hundred pages
  - Forms and budget
  - Attachments
  - Specific format
- Unsolicited Proposal
- Contract
- Solicited Proposal
- Subcontract
- Collaborative proposal

# Where is the available funding?

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- ❑ Federal government = 90%
  - Research agencies
  - Mission agencies
  - Competitive grants
  - Committed grants: formula/block/entitlements
- ❑ State government (federal flow-through or state funds)
- ❑ Local, regional, international governments
- ❑ Foundations and non-profit organizations: corporate, private, family, community, mission-focused (health or disease, academic discipline, population group, etc.)
- ❑ Business and industry (clinical trials, endowed chairs, etc.)
- ❑ Individuals
- ❑ Internal (College, School/Department/Center/Institute)

# Available Funding: What You Need to Know About Your Sponsor

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- Does your potential sponsor care about your project?
- Does your potential sponsor have a program that fits your project?
- Is your sponsor large enough to support a long-term project?
- Are your needs for project support in line with currently funded projects?
- In line with the sponsor's history of support?
- In line with your career status and current needs?



# What is meant by Supporting Data?

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- ❑ Preliminary studies, pilot projects done by PI
- ❑ Peer reviewed publications and presentations by PI
- ❑ Data banks, public records
- ❑ National studies, scientific reports high-level organizations or panels
- ❑ Literature search of similar studies

# What can a literature search do for a grant proposal?

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- ❑ Confirmation that the problem has already been solved or that questions remain unanswered.
- ❑ Ideas (best practices) on research methodology.
- ❑ Instruments that might be useful in data collection.
- ❑ Statistical, analytical or evaluation tools that you can use/adapt.
- ❑ Specific data related to your proposed research.
- ❑ Names of researchers in similar areas (to use as consultants or potential reviewers).
- ❑ Sources of additional information (references from articles you read).
- ❑ Examples of model programs and best practices.

# Getting Started on the Proposal

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The five basic questions for a grant:

- what do you want to do?
- why do you want to do it?
- how do you plan to do it?
- how will you know if you succeed?
- what benefits could accrue if the project is successful?

Every grant proposal answers these questions.

# The Two-Pager

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- Using these five questions, write two pages, one good paragraph for each question, in non-technical language.
- This is your starting point for:
  - Clarifying your thoughts
  - Searching for grant opportunities
  - Communicating with potential collaborators
  - Seeking advice/review from agency officers, mentors, and colleagues

# Another way to start thinking

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Especially for research projects:

- ❑ What is your motivating question, issue, hypothesis, subject?
- ❑ How will you answer or shed light on that question?
- ❑ What is the significance or impact of this project?
- ❑ Why are you the best person to do this work?
- ❑ What have you already done to prepare for this project?

# Standard Proposal Components

| Common Heading        | Who Completes | Answers the Question                               |
|-----------------------|---------------|--|
| Cover Sheet           | OR/PI         | Who are we?  |
| Table of Contents     | PI            | What's in the proposal?                            |
| Abstract              | PI            | What's the big picture?                            |
| Problem Statement     | PI            | Why should we do this now?                         |
| Goals/Aims            | PI            | What are we trying to accomplish?                  |
| Measurable Objectives | PI            | What will be different?                            |
| Procedures            | PI            | What exactly are we going to do and when?          |
| Evaluation            | PI            | How will we know if our idea works?                |
| Dissemination         | PI            | Who else will benefit? How will we share data?     |
| Facilities            | PI            | Do we have the necessary tools/resources/capacity? |
| Personnel             | PI            | Who will do the work? Are they qualified?          |
| Budget & Narrative    | OR/PI         | How much will it cost?                             |
| Biographical Sketch   | PI            | Who are the players?                               |
| References            | PI            | Whose work are you building on?                    |
| Appendices            | PI/OR         | What else do the funders need to make a decision?  |



# Standard NIH Grant Components

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- 6-12 page narrative (research plan)
- Other necessary forms and components
- Research Plan includes sections on:
  - Aims
  - Significance
  - Innovation
  - Approach

# Rigor and Transparency Review

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- In 2016 NIH added rigor and transparency to the overall review criteria
- Four areas of rigor and transparency:
  - Scientific Premise: addressed in Significance Section
  - Scientific Rigor: Addressed in Approach Section
  - Consideration of Sex and Other Biological Variables
  - Authentication of Key Biological and/or Chemical resources
- Scientific premise pertains to the supporting data
- Scientific rigor pertains to the proposed research

# More on Rigor and Transparency

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- Scientific premise:
  - Quality and strength of the prior research used as the basis for the proposed research question or project
  - Different from hypothesis or justification
  - To address scientific premise: discuss strengths and weaknesses of the prior research and how the proposed research will address the weaknesses or gaps

# Scientific Rigor, continued...

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- Scientific rigor:
  - strict application of scientific method to ensure robust and unbiased experimental design, methodology, analysis, interpretation and reporting of results
  - To address scientific rigor: describe experimental controls, plans to reduce bias (blinding, randomization, subject inclusion or exclusion criteria, etc.), power analyses, and statistical methods, as appropriate

# Rigor and Transparency, continued

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- Consideration of Sex and Other Biological Variables
  - Addressed in Approach/Research Plan
  - Critical factors affecting health or disease in vertebrate animals or human subjects
  - Sex, age, weight, underlying health conditions
  - Justification for studying one sex and/or for studying animals, including number of animals

# Rigor and Transparency, continued

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- Authentication of Key Biological and/or Chemical Resources
  - Key resources are those that
    - May differ from laboratory to laboratory or over time
    - May have qualities and/or qualifications that could influence the research data
    - Are integral to the proposed research
    - They may include cell lines, specialty chemicals, antibodies and other biologics



# Rigor and Transparency, continued...

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- Applicants should provide a brief plan, one page or less
- Plan should not include authentication data
- Plan may reflect existing guidelines or standards for authentication of a resource when such standards exist
- Reviewers will discuss plan after scoring; comments will not be scored.

# Proposal Presentation Sequence

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- Title page/forms
- Summary/abstract
- Introduction
- Needs, significance
- Hypotheses/ problem statement
- Objectives/Aims
- Methods/Work Plan
- Timeline/schedule
- Evaluation
- Dissemination
- Future funding
- Literature cited
- Budget
- Attachments
  - Biosketch
  - Facilities
  - Other support

# Proposal Development Sequence

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- Need, significance
- Hypotheses/Problem Statement
- Objectives
- Methods/Work plan
- Evaluation/Benchmarks
- Dissemination
- Budget
- Budget Narrative
- Introduction
- Literature cited
- Future funding
- Title/forms page
- Summary/Abstract
- Attachments
  - Biosketch
  - Facilities
  - Other support
  - Data management

# Proposal Components: Abstracts

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- One or two sentences on:
  - Subject: What is the project about?
  - Purpose and significance:
    - What is to be accomplished?
    - Why is this important—to funder, to discipline, to society?
  - Activities: What will be done? With what methods?
  - Target population/location of project
  - Expected outcomes:
    - What results will be produced?
    - How will results advance knowledge/state of art in the discipline or profession?

# Importance of Abstract

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- ❑ Immediately shows topic, approach, relevance
- ❑ Helps determine selection of reviewers
- ❑ Most-read section of proposal, by reviewers, other researchers and the general public
- ❑ May be the only section read by reviewers
- ❑ Entered into permanent electronic database
- ❑ Becomes primary identifier of project
- ❑ Often used by agency as press release, notice to politicians, or other publicity

# Writing the Abstract

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- One paragraph up to one page
- May be limited in space or characters
- Under 20 words per sentence
- Each sentence adds new information
- No introduction or conclusion
- Written last
- Not taken directly from proposal
- Non-technical language
- Third person unless instructed otherwise
- No mention of budget, dates, citations, name of applicant or institution

# Responsibilities and Timelines

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- Partnership between
  - Principal investigator
  - Co-PIs
  - Department staff
  - College administration
  - OR (central research grants office)
  - Compliance Office
  - Other institutional offices
  - Collaborators: persons and institutions

# Realistic timeline

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- Two months
  - Read guidelines carefully
  - Draft proposal narrative against guidelines
- One month
  - Complete all other proposal components
    - Budget, budget narrative, current and pending, biosketch, letters of collaboration/support, etc.
  - Prepare forms
- Two weeks
  - Do final proofreading and editing
  - Submit completed proposal for internal approvals
- One week
  - Do final review; forward to OR for submission
  - Celebrate, relax, sleep, and wait



# Four-Point Checklist

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- Four areas to review before final submission:
  - Proposal and all components
  - Format and agency guidelines
  - Budget numbers and justification
  - Overall proposal package
    - forms, attachments, signatures, required institutional information (e.g., DUNS number, Congressional district)

# Submission Processes

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- Hard copy, mailed or expressed--rarely used now
  - Multiple copies, one signed original
  - Due date, postmark date, open deadline
- Electronic--most commonly used
  - Single copy, electronic signature/validation
  - Hard deadline, time-specific, application window
  - grants.gov for all federal grant agencies but...
  - Agency-specific on-line systems for some:
    - NSF Fastlane
    - DOD
    - EPA
    - DOE
    - ED
    - Private foundations, state and local agencies

# What happens next? Overview of The Agency Review Process

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- ❑ Peer review: the backbone and integrity of the federal grant process and the gold standard in academia
- ❑ Goal: fair, transparent process to judge merits of research and academic work
- ❑ Peer review system usually works well
- ❑ “Peers” may be differently defined by different agencies
- ❑ Not all agencies use peer reviewers
- ❑ Different systems used by different funders

# Peer Review Process

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- ❑ Reviewers usually screened for conflict of interest
- ❑ Reviewers usually not known to applicants
- ❑ Review systems constantly tweaked, improved
- ❑ Crucial for PI to understand agency review system for successful grants
- ❑ 25% of PI grant development time:
  - learn and apply review process/rating criteria
- ❑ Serving as a reviewer is a great learning opportunity for PIs to improve their own grants

# NIH Scoring System

| Score  | Descriptor   | Additional Guidance on Strengths/Weaknesses         |
|--|--------------|---|
| 1  | Exceptional  | Exceptionally strong with essentially no weaknesses |
| 2  | Outstanding  | Extremely strong with negligible weaknesses         |
| 3  | Excellent    | Very strong with only some minor weaknesses         |
| 4  | Very Good    | Strong but with numerous minor weaknesses           |
| 5  | Good         | Strong but with at least one moderate weakness      |
| 6  | Satisfactory | Some strengths but also some moderate weaknesses    |
| 7  | Fair         | Some strengths but with at least one major weakness |
| 8  | Marginal     | A few strengths and a few major weaknesses          |
| 9  | Poor         | Very few strengths and numerous major weaknesses    |
| <p><b>Minor Weakness:</b> An easily addressable weakness that does not substantially lessen impact<br/> <b>Moderate Weakness:</b> A weakness that limits impact<br/> <b>Major Weakness:</b> A weakness that severely limits impact</p> |              |   |

# NIH Review Process: Overview

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- Review division separate from funding institutes (see next slide)
- Review process managed by permanent NIH staff (SRO) in Center for Scientific Review
- Scientific peer with Ph.D.
  - Usually works with a single review group
  - Does not participate in decision
- Applicant can/should request assignment to review group and to funding institute
  - Can suggest more than one of each
  - If no request, SRO assigns review group based on title, abstract and quick reading of proposal

# The National Institutes of Health

Office of the Director



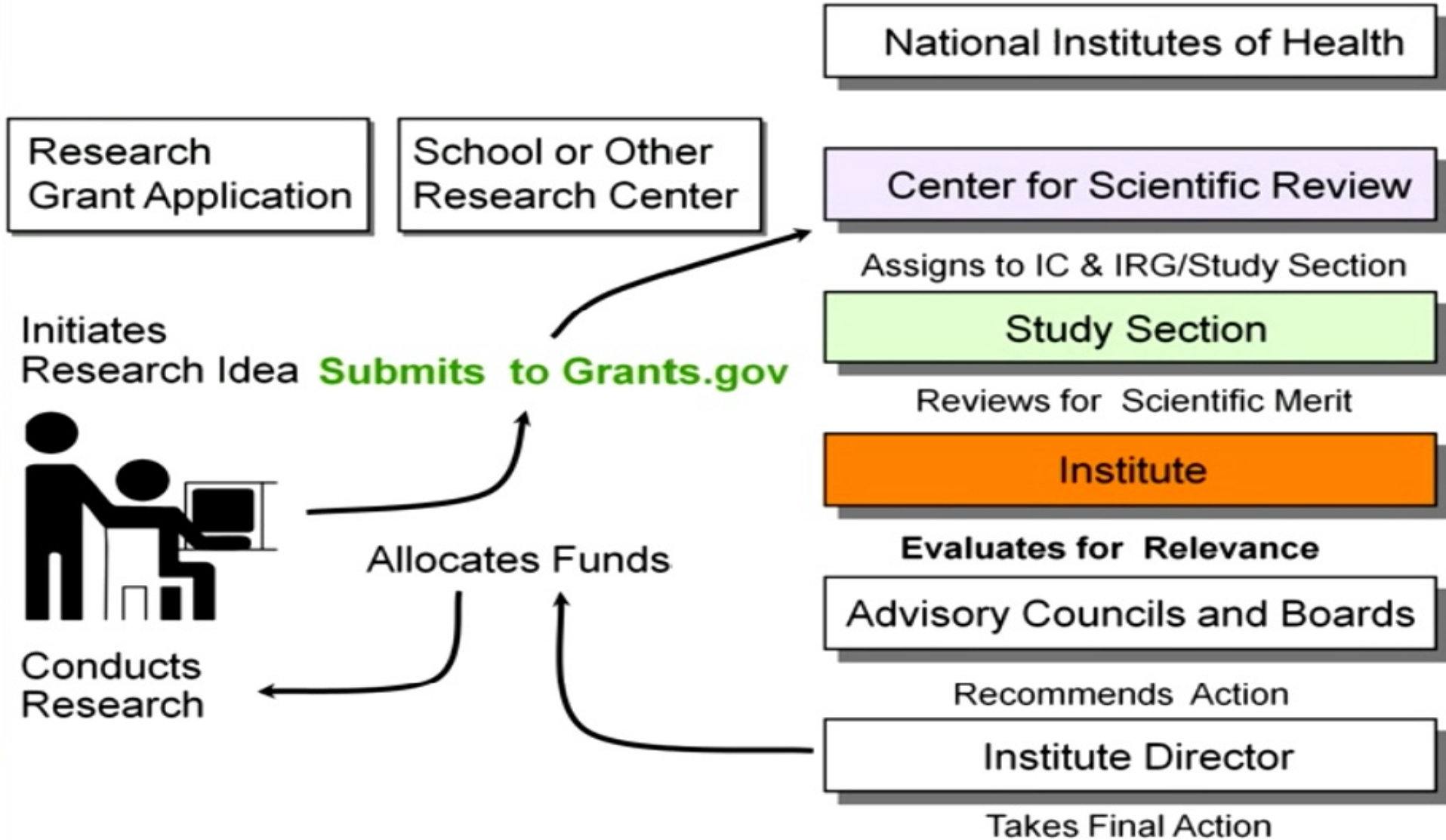
# NIH SRO Role in Review Process

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- ❑ Analyzes content of application for fit with review group expertise
- ❑ Documents and manages conflict of interest in reviewers
- ❑ Recruits initial and ad hoc reviewers
- ❑ Assigns applications to reviewers
- ❑ Communicates with PI for added material if required for review
- ❑ Attends and oversees administrative and regulatory aspects of peer review meetings
- ❑ Prepares summary statements and sends to PI, with reviewers' comments and scores



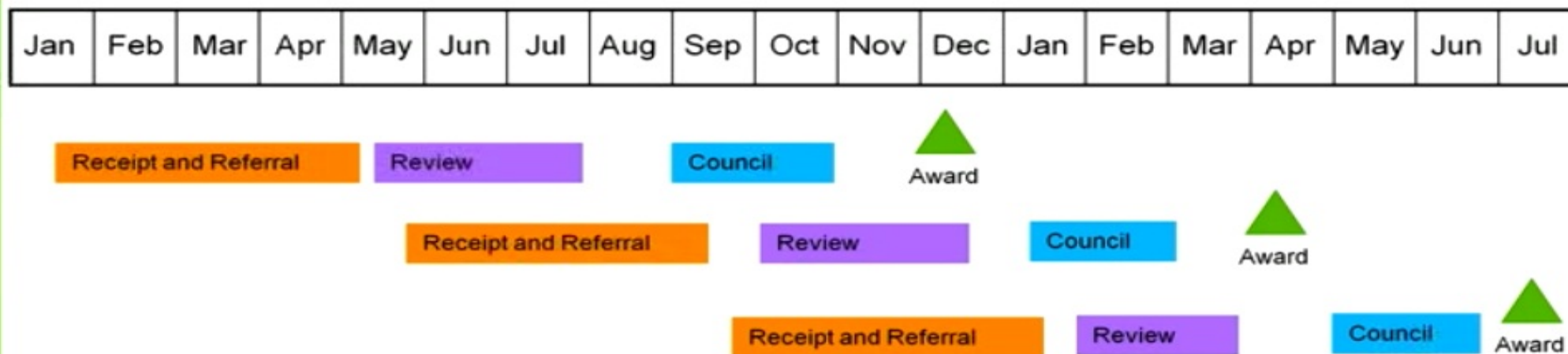
# Review Process for a Research Grant





## Overall Timeframe from Submission to Award

There are three main overlapping cycles per year



<http://grants1.nih.gov/grants/funding/submissionschedule.htm>

# NIH Grant Process: Start to Finish



# What Agencies Seek in Reviewers

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- Knowledge: current expert in the field
- Education: usually doctoral level
- Experience: PI on comparable project
- Diversity in
  - Gender
  - Ethnicity
  - Geographic balance
  - Experience
  - Type of organization
  - Age distribution

# Final Thoughts...

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- ❑ Successful grantsmanship is a life-long process
- ❑ You won't get a grant unless you submit, so jump in and try
- ❑ Most proposals are unsuccessful the first time but...
- ❑ Revising and resubmitting works
- ❑ Becoming a reviewer is an invaluable learning experience
- ❑ Proposal development is an art and a science that can be learned
- ❑ Today is a good start on that development.

# Thanks

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For Questions and Follow-up:

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