A Novel Approach to Writing Effective Proposals – Creating conversations with reviewers, patterns they expect to see…

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Who am I?

BS and PhD in Biochemistry – lipid biochemist

2 year postdoc at NIH in neurobiology

10 yrs at Georgetown (Pharmacology) – cellular neurobiology

4 yrs at Medical College of Ohio – Pharmacology and Medical Student Affairs – closed lab

12 yrs at Mayo Clinic – Graduate Student Affairs, Diversity, Masters in Clinical Research, systematic scientific training vs. mentoring, started evolution into social scientist

3.5 yrs at NIH – Graduate Partnerships Program – student affairs

12 yrs at Northwestern – Faculty coach, PhD student training, big social science research team studying how scientists develop, creating/testing coaching to complement mentoring

Currently PI on NIGMS MIRA, IMSD, 2 NRMN subcontracts

When you think about the environments that have ‘shaped you’, particularly as a scientist, which ones have been most important?

- Your undergraduate college/university
- Your graduate school
- Your MD or PhD program
- An individual lab
- A scientific organization/society

Were any of your environments particularly welcoming?

By contrast, were there any that were not inviting, or where you felt like you were being watched or judged and had to prove yourself?

How did you learn ‘how to act’ in research settings?

Communities of Practice

C of P (Lave & Wenger): groups who share a passion or goal for something they do, and learn how to do it better as they interact regularly

- Shared interest (domain)
- Competence – techniques, beliefs, talking and carrying oneself like a scientist
- Interaction and learning from each other
- Shared practices unique to each group – methods, tools, shared history, ways of doing things

Membership

- Legitimacy or marginalization of newcomers determined by perceived competence with practices
- Different rules may apply to different “types” of group members
- Practices draw on & reflect the power structures of group, as well as wider society, including those based in race, ethnicity, class, and gender

Examples & Implications of C of P for Scientists

Examples of C of P's in science

- Biomedical science as a whole or an individual discipline
- PhD programs and lab groups

Challenges for newcomers

- Practices & rules often invisible (work habits, social expectations)
- Not consistent between labs
- Seldom malicious or even conscious – but unconscious bias and untested assumptions can be played out
- If newcomers perceived as 'different', greater chance of marginalization
- Think lab rotations and first year or 2 in a lab…

Strategies to lessen marginalization

- Openness to what new members bring – match talent to project
- Provide key insider knowledge and guidance (mentoring/coaching)
- Important role of undergrad/postbac/PhD intervention programs

Growing up, if you had family meals, what did you talk about?

What was the economic situation of your family growing up?

Were you the first to go to college in your family?

When you started to think about going to college, what were your family expectations? How did you get advice about how to choose a college, and what was that advice?

When you entered graduate school, was it an easy or difficult transition from college? Did you feel like you fit in right away or did you feel like you did not know how to act?

How would the students you mentor or advise answer these questions?

Cultural Capital

Social Reproduction – Pierre Bourdieu

Acquired consciously or unconsciously based on experiences growing up

Ways of knowing and acting that allows others to recognize ‘you are one of us’

The way a dominant group continues its dominance

Habitus – how you display and ‘spend’ your cultural capital

C of P and cultural capital strongly intersecting

If your path has not been as full of research-related cultural capital, look for mentors to help you break it down and design it – IDP can be good tool

Starting Tenets

1. Writing research and fellowship proposals is not time away from science, it is integral to doing good science
2. Grant writing is a complex skill that is best learned through conscious application of high level leaching and learning principles
3. With few exceptions, high quality writing will not cover up weak or inadequately developed science

Why ‘Novel’ Approach to Grant Writing?

GREAT question…

1. Brings attention to broader element of “making a bid for recognition” as a legitimate member of an elite community
2. Comes from perspective of learning and teaching – grant writing as a complex, culminating skill to be taught and learned – can’t rely purely on mentors
3. Writing to rhetorical patterns
4. Emphasizes peer group process from early writing, ideally led/facilitated by experienced faculty ‘coach’
5. Primary emphasis on oral, not written, feedback in real-time response to pieces of writing
6. Complements and collaborates with mentors and colleagues

Grant writing as a complex, culminating skill

Think about how much has to be mastered first…

Proposals require complex integration of existing knowledge, research questions and design, and unique form of writing

In the past has seldom been approached as a concrete skill to be purposefully taught – aside from workshops

Largely left to mentors and self-learning

Informal mentoring as a process is very idiosyncratic with high degree of variability in skills taught

Often tacit (explicit?) belief among some scientists that being able to figure it out by yourself is one of the determinants of whether or not you ‘belong’ in the Community – makes no sense!

What do you have to achieve in a proposal?

Demonstrate the research you are proposing is important, feasible, a logical next step, and hopefully innovative/novel

Show that you really understand the field, both the broad topic and the precise niche you are in – including best techniques

Show that you are actually working in the field

Demonstrate your prior research accomplishments are excellent and appropriate for your career stage

Write in a way that is crystal clear with every word serving a purpose – and for multiple types of reviewers

Convince the reviewers that you are a legitimate member of the elite NIH-funded research community

It all starts by understanding review processes and knowing your reviewers

In science we write for reviewers. To be a successful writer you have to start from an understanding of:

- What reviewers are used to seeing
- What they want to see
- The criteria they are using to judge what they read
- Their likely approaches to their task
- Knowing and writing to these shows you are legitimate

Your task is to turn the reviewer into your advocate:

- Make the work of the reviewer as simple as possible
- Convince them your work is VERY important
- Convince them you know what your are doing and you can conduct the research you propose

Writing for different types of reviewers

The expert, someone who knows as much, or more, about the topic as you do

The sophisticated non-expert

The skilled scientist who knows almost nothing about your specific topic

The technical expert – e.g. biostatistician or epidemiologist

A non-scientist who may still have a lot of input into review decisions and outcomes

KNOW YOUR REVIEWERS!!! You are writing for THEM.

NIH Information and Videos on Grant Review

Previous session went over the review process in depth – on NUCATS website if you missed it

Videos worth spending 20 minutes viewing!!

http://public.csr.nih.gov/aboutcsr/contactcsr/pages/contactorvisitcsrpages/nih-grant-review-process-youtube-videos.aspx

Guidelines for Reviewers

http://public.csr.nih.gov/ReviewerResources/GeneralReviewGuidelines/Pages/default.aspx

Know the review criteria

Overall Impact – the score that matters

Core Review Criteria for Research Proposals

- Significance – may be global or within a field
- Investigator(s)
- Innovation
- Approach
- Environment

You are actually writing to review criteria

Review criteria very different for F and K awards

Significance

Significance. Does the project address an important problem or a critical barrier to progress in the field? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?

Investigator(s)

Investigator(s). Are the PD/PIs, collaborators, and other researchers well suited to the project? If Early Stage Investigators or New Investigators, do they have appropriate experience and training? If established, have they demonstrated an ongoing record of accomplishments that have advanced their field(s)? If the project is collaborative or multi-PD/PI, do the investigators have complementary and integrated expertise; are their leadership approach, governance and organizational structure appropriate for the project?

Innovation

Innovation. Does the application challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions? Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense? Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?

Approach

Approach. Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project? Are potential problems, alternative strategies, and benchmarks for success presented? If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed? If the project involves clinical research, are the plans for 1) protection of human subjects from research risks, and 2) inclusion of minorities and members of both sexes/genders, as well as the inclusion of children, justified in terms of the scientific goals and research strategy proposed?

Environment

Environment. Will the scientific environment in which the work will be done contribute to the probability of success? Are the institutional support, equipment and other physical resources available to the investigators adequate for the project proposed? Will the project benefit from unique features of the scientific environment, subject populations, or collaborative arrangements?

Review criteria for K08

Overall Impact/Merit – the score that matters

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

ALL sections of the application must be strong – any one that is weak is very likely to drag down the rest

K08 Scored Review Criteria

Candidate (Biosketch and Prior Research)

Does the candidate have the potential to develop as an independent and productive researcher?

Are the candidate's prior training and research experience appropriate for this award?

Is the candidate's academic, clinical (if relevant), and research record of high quality?

Is there evidence of the candidate's commitment to meeting the program objectives to become an independent investigator?

Do the letters of reference address the above review criteria, and do they provide evidence that the candidate has a high potential for becoming an independent investigator?

Telling YOUR story…

You are providing the reviewer DATA about you – the path by which you got to where you are and your accomplishments

Get beyond a listing to the logic and contributions – ideally showing increasing independence and creativity

Each step should have purposeful plan

Solving difficult technical problems important to bring out

Whenever possible give evidence of how others have recognized or especially built from your work – impact

If you have had any bumps or delays, explain them, don't make a reader guess – life happens! – how you adapted

Can be difficult to write about you – balance between giving data and bragging/name dropping/over-blown

K08 Scored Review Criteria

Career Development Plan/Career Goals and Objectives

What is the likelihood that the plan will contribute substantially to the scientific development of the candidate and lead to scientific independence?

Are the candidate's prior training and research experience appropriate for this award?

Are the content, scope, phasing, and duration of the career development plan appropriate when considered in the context of prior training/research experience and the stated training and research objectives for achieving research independence?

Are there adequate plans for monitoring and evaluating the candidate’s research and career development progress?

Why should we invest in 5 years of your life?

Start with the destination – the really important research program you will be leading AFTER the K

The skills you have now and the new ones you need to add – MUST be real and meaningful, not just more experience

Makes clear how the research during the K will lead to an R01 submitted ideally year 4 – may have some branches

Good to have smaller research grant submissions too – build evidence you can lead a team before the $1.5 million ‘ask’

Each of the mentors contributes to your change

OK to begin collaborations too – diversification

K08 Scored Review Criteria

Research Plan

Are the proposed research question, design, and methodology of significant scientific and technical merit?

Is the research plan relevant to the candidate's research career objectives?

Is the research plan appropriate to the candidate's stage of research development and as a vehicle for developing the research skills described in the career development plan?

K08 Scored Review Criteria

Mentor(s), Co-Mentor(s), Consultant(s), Collaborator(s)

Are the mentor's research qualifications in the area of the proposed research appropriate?

Do(es) the mentor(s) adequately address the candidate's potential and his/her strengths and areas needing improvement? Is there adequate description of the quality and extent of the mentor's proposed role in providing guidance and advice to the candidate?

Is the mentor's description of the elements of the research career development activities, including formal course work adequate?

Is there evidence of the mentor's, consultant's and/or collaborator's previous experience in fostering the development of independent investigators?

Is there evidence of the mentor's current research productivity and peer-reviewed support?

Is active/pending support for the proposed research project appropriate and adequate?

Are there adequate plans for monitoring and evaluating the career development awardee's progress toward independence?

Your mentoring cloud…

Can vary a lot between applications

Be cautious if you have worked with someone a long time

Essential that your research differentiates you from them

Fine to use the full range from primary mentor to collaborators – don't be afraid to be equal with some

Becoming more common and encouraged to have some (and spend some time) away from primary training site

K08 Scored Review Criteria

Environment & Institutional Commitment to the Candidate

Is there clear commitment of the sponsoring institution to ensure that the required minimum of the candidate's effort will be devoted directly to the research described in the application, with the remaining percent effort being devoted to an appropriate balance of research, teaching, administrative, and clinical responsibilities?

Is the institutional commitment to the career development of the candidate appropriately strong?

Are the research facilities, resources and training opportunities, including faculty capable of productive collaboration with the candidate, adequate and appropriate?

Is the environment for scientific and professional development of the candidate of high quality?

Is there assurance that the institution intends the candidate to be an integral part of its research program as an independent investigator? (NOTE – different for K99/R00 and some K01s)

Institutional Commitment

For K08, K23 or K01 staying at the same site, has to be clear they are committed to your irrespective of the K!

The more specific and detailed the better - $$, space, access to research resources, cores, etc.

K Award Sections and Page Limits

Specific Aims – 1 page

- Differences of opinion on whether to include career development aims as well as research aims but research should predominate

First 3 items of Candidate Information and Research Strategy – 12 pages – Candidates Background, Career Goals and Objectives, Career Development Training Activities During the Award Period

Training in Responsible Conduct of Research – 1 page

Statements by Mentor, Co-Mentor, Consultants, Contributors – 6 pages

Description of Institutional Environment – 1 page

Institutional Commitment to Candidate's Research Career Development – 4 pages

Biographical Sketch – 4 pages

The overall writing style must ‘tell a story’

Think of it as guiding or controlling the thinking of the reviewer – cognitive control

This includes consciously considering what a reviewer might be thinking and writing to it

- Particularly critical if there is controversy in the field and/or what you are proposing might challenge current thinking!

Don’t forget to write toward different levels of reviewers

MUST employ rigorous technical writing standards

- Paragraphs really do need meaningful topic sentences
- Each sentence must be logically connected
- The last sentence of a paragraph must sum it up and/or make clear to the reader where they are headed in the NEXT paragraph – see videos on sentences and paragraphs

http://www.northwestern.edu/climb/

Grant Sections – what to accomplish in each

Specific Aims – 1 page

- One page synopsis of the proposed research
- Starts from setting the context – a funnel with steep sides
- What is the problem or need?
- Why is it important/significant?
- What is known – from other's work to your own?
- What new information do you hope to uncover?
- What is specific question(s) are you asking and/or the hypothesis you are testing?

Bulleted list of Specific aims – what you plan to do – usually with a sentence or two of detail

Impact Statement

Crystal clear to the reader why what you are proposing is important and what you will do

Make or break for reviewer enthusiasm!

Research Strategy – 3 Sections

Significance = importance

- Previously “Background and Significance”
- Much less emphasis on Background but builds the context behind the question and proposed research
- Establishes the logic path to what you propose to do – easy to forget to make logic clear – you know it and fill in blanks
- Convinces the reviewer you know the field and what is important to pursue vs. less important
- Expands what is provided briefly in Aims page
- Preliminary Data might come in here or mentioned here to be expanded in Approach
- Likely 1-2 pages of 12 page R01
- Work MUST be significant even if not highly innovative!

Research Strategy – Innovation

Innovation = novelty

- New section – new emphasis about

Either not included or lower contribution to F and K awards

The logic may be innovative or the methodological approach – may bring new observation in one field to another

New technologies open up possibilities for innovation

In theory, innovation should give permission for higher risk science but still not always ok with reviewers

Innovative work still must be logical and being reasonably feasible!

Sometimes hard to separate from Significance

Research Strategy – Approach

This is the section where you say exactly what you plan to do to achieve each Aim and test each hypothesis – organized by each Specific Aim

You can have a section on methods that apply to the entire project but more common recently in each Aim – but not repeated

Aims should relate to each other but not be dependent on a specific outcome for a previous aim

Scores on Approach most closely align with Impact score for R proposals!!

Rigor and Transparency

- **Scientific Premise:** The key data introduced by the applicant to justify the project.

"The applicant should supply a sufficient evaluation of the strengths and weaknesses of the data or other justification used to support the application, and should describe how the proposed research will address any weaknesses or gaps."

- Addressed in review of **Significance** criterion for R grants and **Research Plan** in K

Rigor and Transparency

- **Scientific Rigor:** The strict application of the scientific method to ensure robust and unbiased experimental design, methodology, analysis, interpretation and reporting of results.

"Whereas scientific premise pertains to supporting data, scientific rigor pertains to the proposed research (statistical procedures, data analysis, precision, subject inclusions and exclusion criteria, etc.). Different research fields may have different standards or best practices for scientific rigor."

- Addressed in review of **Approach** criterion for R grants and **Research Plan** in K

Rigor and Transparency

- **Consideration of Relevant Biological Variables:** critical factors affecting health or disease in vertebrate animals or human subjects
  - The NIH Policy applies broadly to all relevant biological variables, for example sex, age, source, weight, and genetic strain.
- Consideration of sex as a biological variable required with human or animal studies
- Strong justification required for using only single sex
- Cost and no known sex differences insufficient
- Other important biological variables may be considered

What about NSF grants?

A very different beast but logical framework very similar

- Criteria are Intellectual Merit and Broader Impacts
- The goal to tell a logical, compelling, accurate story is still the same
- At the end of the day you have to convince the reader what you are proposing is more important to do than 90% of the proposals they are reading
- Recent feedback from NSF Program Officer that logic flow is the same as we teach for NIH grants

Back to teaching and learning…Online Tools for Grant Writing

Developed by communications expert who worked with us for 18 months – Karl Keller

Animated PowerPoint presentations with audio – each 15 minutes or less

Vivid display of the patterns that reviewers see and expect to see in grant judged as high quality and fundable

Classic cultural capital which funded PIs have acquired but often can't articulate what they are doing or why

http://www.northwestern.edu/climb/resources/written-communication/index.html

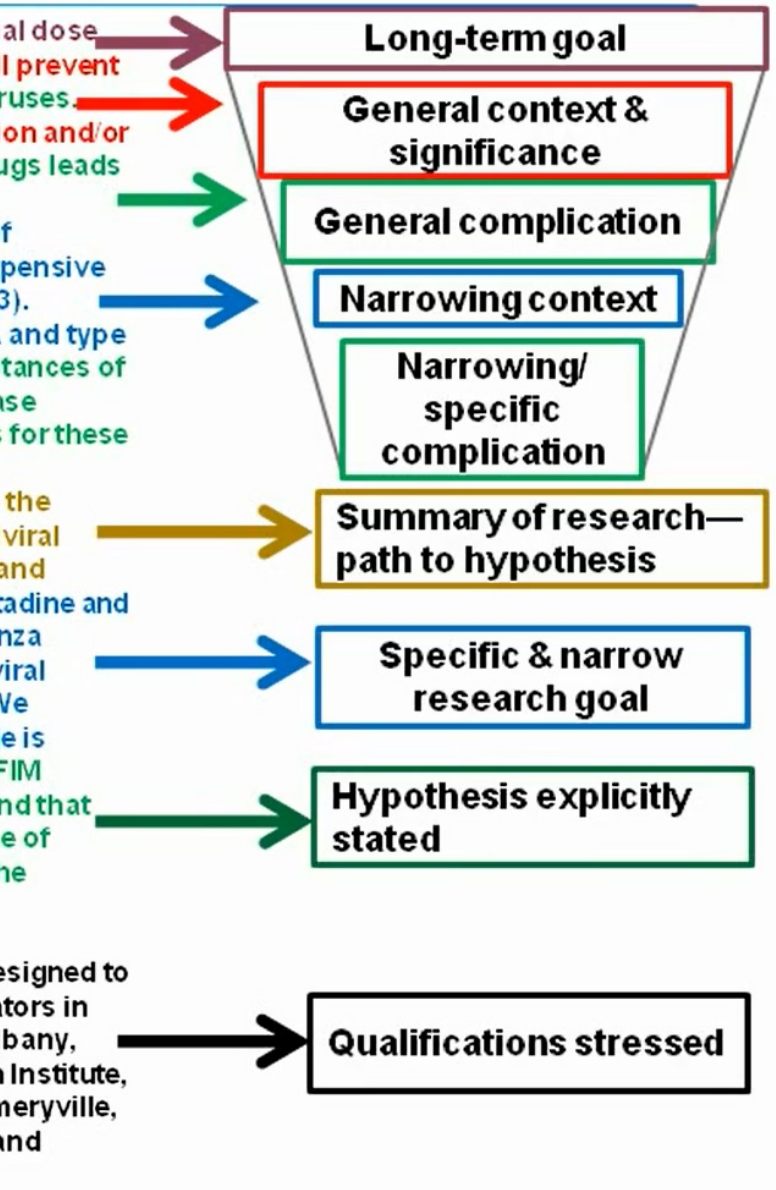
The next paragraph takes up other components, with qualifications addressed after aims

Specific Aims The long term goal of this research project is to identify the optimal dose and schedule of administration of drugs active against influenza viruses that will prevent and/or cure people with influenza without causing the emergence of resistant viruses. The adamantanes and neuraminidase inhibitors have been used for the prevention and/or treatment of influenza. However, they often fail because treatment with these drugs leads to the emergence of resistant viruses in the treated population.

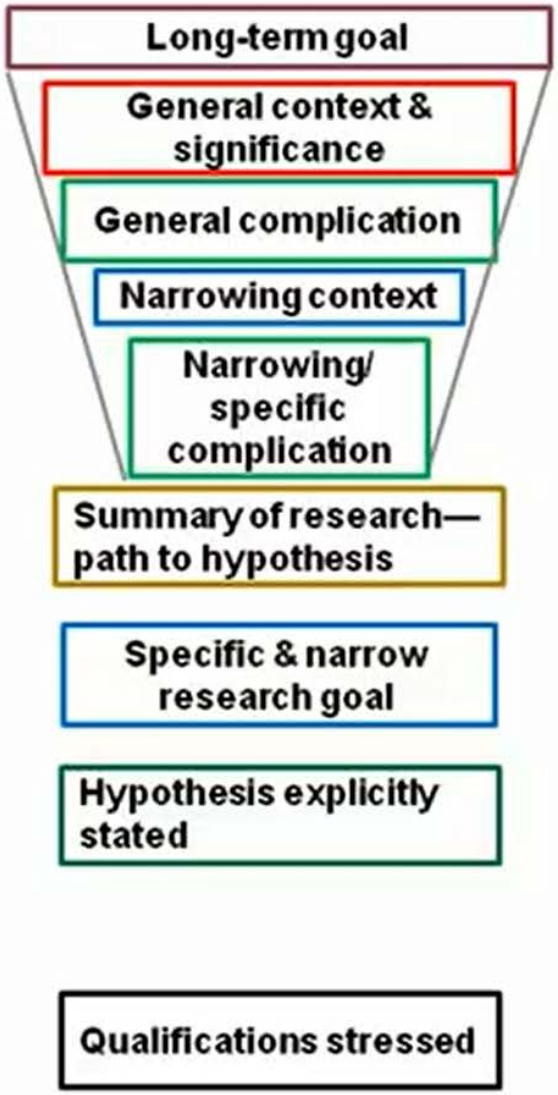
Adamantanes have historically been used in the treatment and prevention of influenza A virus infections (1). Recently, viruses that are resistant to these inexpensive drugs have emerged, rendering them less useful for the therapy of influenza (2, 3). Neuraminidase inhibitors represent a new class of agents for use against type A and type B influenza virus infections (1). While shown to be effective, there have been instances of emergence of resistance or reduced sensitivity during therapy with neuraminidase inhibitors (4-6). This has been seen especially in children where high clearances for these agents in general and oseltamivir in specific are the norm (5).

The hollow fiber infection model (HFIM) system has been used to determine the optimal dose and schedule of administration of antibacterial, antifungal and antiviral compounds for use in the treatment of individuals infected with bacteria, fungi, and viruses (7-16). We propose to use the HFIM system to study the effects of amantadine and the neuraminidase inhibitor, oseltamivir carboxylate, on the replication of influenza viruses and to identify the pharmacodynamically-linked variables for these antiviral drugs, alone and in combination, with respect to inhibition of virus replication. We also propose to identify whether a different pharmacodynamically-linked variable is present for suppression of emergence of resistance. We hypothesize that the HFIM system can be used to provide information on resistance selection in humans and that the HFIM system can be used to determine the dose and administration schedule of antiviral compounds and combinations of antiviral compounds that will inhibit the replication of influenza viruses while preventing the emergence of resistance.

Our research strategy involves a multifaceted, translational collaboration designed to optimize the move from research discovery to clinical application. The collaborators in this activity include a nonprofit research institute (Ordway Research Institute. Albany, NY), a non-profit genomics research institute (Translational Genomics Research Institute, Flagstaff, AZ), and a private biotech company (Adamas Pharmaceuticals, Inc, Emeryville, CA). This strategy has proven successful in other activities including a current and ongoing research project involving the above partners



So, let's look at the two rhetorical patterns, side by side—similar components different sequence



Your challenge is to identify these components for your research, arrange them logically; this template can help

General context & significance	What is "big picture" for research? Why is it important?
Narrowing context	What is known and accepted in your research area?
Your research contribution	Has your previous work contributed? How?
Complication	What is the problem, roadblock, the unknown?
Long-term goal	What final "big result" will research will help achieve?
Specific goal of this research	What is "specific narrow goal" of this research?
Summary of research—path to hypothesis	How does previous research lead to hypothesis?
Hypothesis	What do you believe to be the answer to the complication?
Qualifications stressed	What makes you the right person to undertake this research?

A bid for recognition as legitimate

We are all influenced greatly by what we expect to see/hear in 'people like us' – reviewers no different

Comes from language, style, patterns – when you are established in a field there is tolerance for being unique

Read instructions very carefully

This is why we teach so explicitly writing to the patterns of the community – i.e. funded proposals

Teaching and learning proposal writing

All learning starts with ‘teaching’ new information/patterns/ skills that you could not be expected to know

Practice/apply – no substitute! This is where short workshops fall short – practice is best with something that matters

Feedback from experts – where peer groups alone are limited

Repeat, repeat, repeat, repeat – get the message?

Must start with small bits to learn from to avoid wasted time and ‘inaccurate’ learning

Principles sometimes followed in lab training but seldom in papers and proposals – wasted effort on figuring it out

Providing feedback under expert guidance VERY fast way to practice and learn

Oral feedback as an option vs. written

Both can be very helpful – not either/or

Written feedback strengths

- Written alternatives/explanations to work from
- Can be thoughtful response considering alternative

Witten feedback limitations

- Hard to get detail and focus
- Actually very slow processing in typing – limited details
- “Looks fine to me” – limited critical attention

Oral feedback as an option vs. written

Oral feedback strengths:

- Much more rapid and replicates initial response of the reader – first impressions matter
- Can compare reactions of multiple ‘brains’ very quickly
- Can reveal thinking leading up to reactions – logic path
- Able to think out loud and consider multiple options
- Engages the writer and reader in dialogue – multiple rapid iterations toward revision

Oral feedback limitations:

- Thinking out loud can be interpreted as ‘final’ not fluid
- Not everyone comfortable with spontaneous reactions – prefer to mull over before declaring
- Need way to capture conversation or can slow down

Group/peer feedback vs. single expert

Both have great strengths done right!

- Group is stronger teaching/learning paradigm – observe multiple iterations and logic of expert
- Able to practice on others – much easier than self!
- Rapidly reveals what the ‘expert’ writer forgets to tell reader
- Expert (coach) can ‘teach’ many people at once!
- Can be incredibly time efficient
- Attention and feedback visible – group keeps all on task

DON’T think of it as CRITIQUE – it is all about ‘cognitive display’ – “When I read this paragraph this is what my brain is doing.”

You’re neuroscientists, you get this, right?

Critical elements of peer groups/feedback

Well-intended but still novices – coach buffers/guides

You are not writing for reviewers TOO far outside your field so those outside can't expect it to be understandable by them

Not about critique and strong opinions about what is right way

Ideal if senior faculty can moderate or 'coach' the group

Great insights and even collaborations possible from those close to the field – unique form of networking with others you might never bump into

So what do you do with all of this????

- Do NOT feel bad if you don't know how to write a proposal – how could you?
- Approach it as a skill to master – like pipetting
- Look for ways to understand and learn SKILLS, not just 'do it' over and over – like our videos
- Get feedback on small pieces of early writing, but big enough for someone to get context
- Think seriously of getting oral feedback to capture reactions/thinking of others – record it – you can never write fast enough
- Seriously consider writing in groups with a more experienced person to coach the group – but giving feedback, NOT critiquing
- It actually will take less of their time than typing and broader impact
- Can work virtually once group dynamic established

Faculty Grant Writers Groups – began in 2008

Began developing approach in mid-1990s

Every 4 months – “Whose writing a proposal?”

Everyone comes with paper copy of Specific Aims page, or research questions, hypotheses if just getting started

In real time, read and discuss –I model talking through what my brain is hearing from what I read – others engage too

Each week refine and revise questions, hypotheses, aims, aims page

Move on to Significance, Innovation, other sections of F and K

Especially effective done early during writing

Have added recording of oral interchange – moving more toward using oral processing methods in most feedback

Groups typically meet weekly for 2-4 months

Grant Writers Groups - continued

May go on to Approach but most often these are beyond the expertise of the group, but not always

Still requires input of scientific mentors, and other mentors for K, but focuses that time on the science while we develop writing skills and give fresh eyes to improve writing

Audio recording of discussion BIG improvement - captures thinking and discussion which otherwise often lost

Participants so far…

270+ different people since 2008 – also many repeats

Roughly 30-50% stay the course in each group

- Some realize they need more time, preliminary data, pubs
- Always positive reinforcement – many return to new groups

Faculty mentors refer Fellows and junior faculty to the group

NO instances of mentors reacting negatively

As could be expected, difference of style and content between group and mentors pop up – good teaching tool, careful not to be dogmatic or proscriptive about only one way to write

At least 59 proposals funded to people who have been in groups – many pending and in various stages of resubmission - ~50%

3 perfect 10s on K and R03 proposals

Take-Home Messages

Writing research proposals is an invaluable element of high quality research

Writing research grants is a teachable, learnable skill

- Often not approached as such because of the focus of research training on informal mentoring
- Effective grant writers (i.e. mentors) often can't explain or deconstruct why they write the way they do and why it works

The ability to write and sound like what reviewers expect is a central ingredient of being judged as a legitimate member of the research community – strong social underpinnings

It is extremely difficult to become a skilled writer by yourself – look to colleagues and groups as invaluable resources

More Take-Home Messages

Get feedback early and often on small pieces of writing

Recognize you will get different perspectives from different kinds of readers

See if you can get people to ‘think out loud’ as they read – reveal what they are thinking as they read

Feedback on a full proposal is great but requires a lot of time – be sure to have the right people do it

Don’t let writing proposals hold you back!