Overview and Objectives
Obtaining external peer-reviewed grant support is one of the most daunting yet critical determinants to academic and career success. Through select readings and podcasts, writing a draft grant application, and class discussions led by a long-time NIH-funded clinical investigator, this course will provide CEED trainees, clinical fellows, post-doctoral students, and junior faculty without any prior grant writing experience with useful knowledge, insights, and skills in the grant writing process to improve their chances of later funding and subsequent career success.

Course Requirements
1. Completion of required readings, podcasts, and web video prior to each session.
2. Submission of a draft grant application requesting funds from a University-approved pilot program (http://www.ctsi.pitt.edu/planpilot.shtml) (40% of grade)
3. Class attendance and participation (60% of grade).
4. Schedule a 30-minute meeting with course director to discuss your draft grant proposal and future career plans in their office

Textbook

Key Web Resources
Links to continually updated information new investigators need to know about the overall and institute-specific NIH application process all in one place.

The Office of Extramural Research (OER) presents conversations with NIH staff members designed to provide investigators at all career stages with easy-to-understand insights on a wide variety of grant topics.

Tips and Advice for NIH Grant Proposal Submissions - http://nihgrants.blogspot.com/
Information, tips, tricks, and useful links to help navigate the NIH grant proposal process.

4Researchers.org - http://www.4researchers.org/
A searchable collection of short videos containing practical advice from clinical investigators.

NIH Extramural Nexus. http://nexus.od.nih.gov/all/category/blog/
Highly recommend you subscribe to “Open Mike” from Dr. Michael Lauer, Deputy Director for Extramural Research, to stay on top of the latest developments in NIH grant policy.

**Academic Integrity**
Students in this course will be expected to comply with the University of Pittsburgh’s Policy on Academic Integrity (http://www.provost.pitt.edu/info/ai1.html). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity.

**Disabilities**
If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both Dr. Rollman and the Disability Resources and Services (http://www.studentaffairs.pitt.edu/drsservices) no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union.

**Course Grading Scale**
This course will be graded on a pass/fail scale. To pass the class, students will need to attend ≥75% of classes and submit a satisfactory fourth and final draft Specific Aims for review, 1 week after the date of the final class.

**Incomplete grades**
Students who are unable to complete the course for any reason must contact Dr. Rollman as soon as possible to discuss grades and remediation [course reasons (“I” incomplete), extenuating personal reasons (“G” incomplete), withdrawal (“W”)]. Students will have one calendar year from the start of the course to complete the course requirements, otherwise an “I” or “G” grade will remain on their transcript.
Session 1: *Introduction to Grant Writing*

**Learning Objectives:**
1. Articulate the importance of obtaining peer-reviewed grant support to one’s career.
2. Explain the “10,000 Rule”.
3. Describe the types of career-development awards available to new and young investigators.
4. Critically evaluate a request for applications (RFA).

**Topics:**
1. Course overview.
2. What grants are and why they are important.
3. Where to apply for grants.
4. Grants types for new and junior investigators.

**Competencies**

Methodology: Identify potential funding sources for research projects.

**Required reading before the session:**
Eisenberg textbook; Chapter 11, Grants

**Required listening/viewing before the session:**
“10,000 Hour Rule” *YouTube* - [http://www.youtube.com/watch?v=Kq2n1Jlx5P0](http://www.youtube.com/watch?v=Kq2n1Jlx5P0)
5,000 Hours of Effort *4researchers.org* - [http://www.4researchers.org/articles/2397](http://www.4researchers.org/articles/2397)
Malcolm Gladwell’s 10 Rules for Success -[https://www.youtube.com/watch?v=iNiJEsb1PMw](https://www.youtube.com/watch?v=iNiJEsb1PMw)
NIH Grant Application Basics: [http://grants.nih.gov/grants/grant_basics.htm](http://grants.nih.gov/grants/grant_basics.htm)
“NIH Early Career Funding” *4researchers.org* - [http://www.4researchers.org/articles/6862](http://www.4researchers.org/articles/6862)
“Grant Writing for New Investigators” - *All About Grants* podcast [http://grants.nih.gov/podcasts/All_About_Grants/episodes/Grant_Writing_April_2010.mp3](http://grants.nih.gov/podcasts/All_About_Grants/episodes/Grant_Writing_April_2010.mp3)

**In-class exercise:**
Prior to class, explore the Office of Research for the Health Sciences Database and CTSI websites for pilot and other programs that could support your research ([http://oorhs.pitt.edu/research-funding/funding-opportunities](http://oorhs.pitt.edu/research-funding/funding-opportunities) and [http://www.ctsi.pitt.edu/funding-pilot-foa.html](http://www.ctsi.pitt.edu/funding-pilot-foa.html)). Bring 1-2 funding opportunities you find on these or other websites to class and be prepared to discuss details of the application(s) and why you selected it.
Session 2: Choosing a Research Question

Learning Objectives:
1. Discuss various strategic issues involved with selecting a research question.
2. Describe how new scientific ideas develop.
3. Use the Internet to conduct “due diligence” on the originality of ones ideas.
4. Explain several key issues when deciding among potential funding agencies.

Topics:
1. How to identify ambitious, feasible, and “fundable” project ideas.
2. What is project “due diligence”
3. How to conduct “due diligence” on one’s own ideas for projects

Competencies

Problem Formulation: Propose significant and novel empirical, testable, hypothesis-driven research questions using, where appropriate, different disciplines and community engagement.

Problem Formulation: Conduct comprehensive literature reviews from appropriate sources across disciplines

Methodology: Identify potential funding sources for research projects.

Required reading before the session:
Eisenberg textbook; Chapter 8, Research
Chapter 12, Grantsmanship

Required listening/viewing before the session:
Where good ideas come from - http://www.youtube.com/watch?v=NugRZGDbPFU
Walter Isaacson on the traits of technology’s “Innovators” - https://www.youtube.com/watch?v=qOXhSRWQyyw
Mentorship is the key to success - http://www.4researchers.org/articles/10670
Plan Your Application - https://grants.nih.gov/grants/planning_application.htm
Research Online Reporting Tools (NIH RePorter): http://projectreporter.nih.gov/reporter.cfm
Clinicaltrials.gov: http://clinicaltrials.gov/
Required written assignment.
E-mail one or two ideas for projects that you might pursue pilot funding. Each idea should be 2-3 paragraphs long that: (1) begins with 1-2 sentences describing the background of the problem, (2) includes a testable research hypothesis; and (3) can be completed in under 24-months.

In-class exercise:
In class, instructor will review the ideas submitted in writing by students and demonstrate on-line tools and strategies they can use to conduct “due diligence” on their own ideas.
Session 3: Specific Aims

Learning Objectives:
1. Explain why a well-written Specific Aims section is critical to funding success.
2. Describe the structure and elements of a well-crafted Specific Aims document.
3. Identify common flaws investigators make drafting their Specific Aims section.

Topics:
1. The purpose of the Specific Aims section.
2. Why the Specific Aims section is so critical to funding success.
3. Components of a compelling Specific Aims section.

Competencies

- **Problem Formulation:** Critically review published studies that use various research methodologies and identify possible sources of bias and potential health disparities therein.
- **Written Communication:** Prepare written presentations of research at a variety of stages to a range of audiences, technical and non-technical, and respond to constructive criticism.

Required reading before the session:
Eisenberg textbook; Chapter 9, Writing

Required listening/viewing before the session:
“NIH Tips for Applicants” – https://www.youtube.com/watch?v=IAOGtr0pM6Q&t=14s
“Make it Crystal Clear” - 4researchers.org - http://www.4researchers.org/articles/4580
“Send us a Concept Paper First” 4researchers.org - http://www.4researchers.org/articles/3687
“Common Challenges and Problems in Constructing Specific Aims: Preparing your First NIH Grant” - https://www.youtube.com/watch?v=1Cj_YKrlQzpE
Rigor and Reproducibility in NIH Applications: https://grants.nih.gov/reproducibility/index.htm

In-class exercise:
We will distribute the Specific Aims sections from several NIH grant applications and highlight the structure and elements of a well-crafted draft.

Required written assignment:
E-mail instructor a 1-2 page draft Specific Aims section for your pilot project. Describe the background of the problem, two or three specific aims, and include a “testable” primary hypothesis and at least one testable secondary hypothesis. Instructor will return them to you with feedback at our Session 4 class.
Session 4: Significance, Innovation, and Approach

Learning Objectives:
1. Describe the Significance, Innovation, and Approach sections of a grant application.
2. Explain the importance of storytelling to building compelling grant applications.
3. List the key elements of an exciting “fundable” Approach section.

Topics:
1. The purposes and elements of the Significance, Innovation, and Approach sections.
2. Storytelling in grant applications.
3. Approach section do and don’ts.

Competencies
Written Communication: Prepare written presentations of research at a variety of stages to a range of audiences, technical and non-technical, and respond to constructive criticism and questions.

Ethics and Professional Norms: Provide examples of the norms of professional integrity with regard to designing and conducting research including: data collection, sharing, and protection; and reporting of findings.

Required reading before the session:
Students will read the Significance, Innovation, and Approach sections from several proposals that will be distributed prior to class.

Required listening/viewing before the session:
“Including All in Clinical Research” - All About Grants podcast
http://grants.nih.gov/podcasts/All_About_Grants/episodes/Telling_Story_March_2011.mp3

“Write Your Research Plan” - NIAID Website
https://www.niaid.nih.gov/grants-contracts/write-research-plan#A18

“Write Your Application” Scroll-down to “What Peer Reviewers Look For” on NIH Office for Extramural Health Website
https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm#What Peer Reviewers Look For

In-class exercise:
We will review the Significance, Innovation, and Approach sections from several proposals distributed prior to class.

Instructor will return your writing assignment to you with feedback. Please bring a revised draft to Session 5 class.
Session 5: Biosketches

A Learning Objectives:
1. Explain the difference between a CV and a Biosketch.
2. List the elements of an NIH Biosketch
3. Draft a basic biosketch personal statement.

Topics:
1. Grant timelines.
2. The 2015 NIH Biosketch.
3. The biosketch personal statement.
4. Letters of support.
5. Feedback on students’ draft Specific Aims document.

Competencies
Written Communication: Prepare written presentations of research at a variety of stages to a range of audiences, technical and non-technical, and respond to constructive criticism and questions.

Multidisciplinary Teamwork: Engage in self-assessment, recognizing and addressing strengths and weaknesses in their research skills.

Management: Demonstrate behaviors needed to be an effective project manager including: oversight of fiscal regulations; recruitment; human resource management; and quality assurance.

Required reading/listening before the session:
The new Biosketch
http://grants.nih.gov/podcasts/All_About_Grants/episodes/Biosketch_March_2015.mp3
Biosketch advice from the NIH blog
http://nihgrants.blogspot.com/search/label/Biosketch%20Personal%20Statement
The Worst Personal Statement Ever - Tips and Advice for NIH Grant Proposal Submissions
http://nihgrants.blogspot.com/2012/06/worst-personal-statement-ever.html
How Collaborative Genius Drives Innovation:
https://www.youtube.com/watch?v=1wRU_STOq_c
“Assembling the Right Team” - All About Grants podcast:
http://grants.nih.gov/podcasts/All_About_Grants/episodes/Personnel_Sept_2011.mp3

In-class exercise:
Together, we will review together several NIH Biosketches that will be distributed in class and the draft Specific Aims students submitted at the end of our last class.

Required written assignment for submission in Session 6:
Create your Biosketch and personal statement using the fillable PHS 398 forms on the NIH website
https://grants.nih.gov/grants/forms/biosketch.htm
Session 6: Budgets and Letters of Support

Learning Objectives:
1. Describe how the NIH funds projects.
2. Explain the basics of grant budgeting.
3. List the 7 elements of a budget justification section.
4. Describe when to include a “letter of support” and the elements of a strong letter.

Topics:
1. Grant budgets, what it is and where the money goes.
2. What spending is allowed by NIH.
3. How to write a strong budget justification.

Competencies
Written Communication: Prepare written presentations of research at a variety of stages to a range of audiences, technical and non-technical, and respond to constructive criticism and questions.

Ethics and Professional Norms: Provide examples of the norms of professional integrity with regard to designing and conducting research including: data collection, data sharing, data protection, and reporting of findings.

Multidisciplinary Teamwork: Describe the functions and roles of multiple disciplines with which they interact.

Management: Demonstrate behaviors needed to be an effective project manager including: oversight of fiscal regulations; recruitment; human resource management; and quality assurance.

Required reading and listening before the session:
Eisenberg textbook; Chapter 14, Managing your Team, Time, and Money.
“Why are Budgets Cut” - All About Grants podcast:
http://grants.nih.gov/podcasts/All_About_Grants/episodes/Budget_cuts_June_2011.mp3
“Design First, Budget Later” 4researchers.org - http://www.4researchers.org/articles/3677
Develop your Budget - http://grants.nih.gov/grants/developing_budget.htm

In-class exercise:
We will review and discuss the Budget Justification sections from several recent NIH grants.

Required written assignment:
Submit your Biosketch by the end of class.
Session 7: The NIH Grant Review Process

Learning Objectives:
1. Describe the basics of the NIH peer-review process.
2. Explain what NIH reviewers look for when reviewing grant applications.
3. Identify the components of the Summary Statement.

Topics:
1. What goes on in a study section.
2. What is a Summary Statement and how to interpret it.
3. Reading the tea leaves, or “what are the reviewers trying to tell me”.

Competencies

*Ethics and Professional Norms*: Provide examples of the norms of professional integrity with regard to designing and conducting research including: data collection, data sharing, data protection, and reporting of findings.

*Multidisciplinary Teamwork*: Engage in self-assessment, recognizing and addressing strengths and weaknesses in their research skills.

Required reading before the session:
- Eisenberg textbook; Chapter 13, Peer Review of Grant Applications.

- NIH Peer Review Process Revealed - https://www.youtube.com/watch?v=fBDxI6l4dOA&feature=youtu.be

- NIH Peer Review - https://grants.nih.gov/grants/peer-review.htm#scoring2


Required listening/viewing before the session:
- “The Ins and Outs of a Study Section Meeting”, “Scoring Your Application”, and “Summary Statement Basics” All About Grants podcasts

In-class exercise:
We will review the summary statements from several NIH grants that will be distributed in class.

Required written assignment to complete:
E-mail instructor a revised 1-2 page third draft Specific Aims section for your pilot project that includes the background of the problem, two or three specific aims, a “testable” primary hypothesis and at least one secondary hypothesis.

Instructor will review your submission and “assign” a primary and secondary reviewer to each draft proposal in Session 7. Each student should be prepared to provide a 3-5 minute oral and written critique on their assigned grants during our Session 8 class and submit their written critique to instructor and to the student applicant.
Session 8: Reviews and Wrap-Ups

Learning Objectives:
1. Provide team feedback on a Specific Aims document.
2. Describe some of the rewards and challenges of a clinician-investigator career.

Topics:
1. Mini-grant reviews.
2. Class summary.

Competencies
Problem Formulation: Propose significant and novel empirical, testable, hypothesis-driven research questions using, where appropriate, different disciplines and community engagement.

Written Communication: Prepare critiques of written presentations following the appropriate guidelines (e.g., NIH).

Written Communication: Prepare written presentations of research at a variety of stages to a range of audiences, technical and non-technical, and respond to constructive criticism and questions.

Multidisciplinary Teamwork: Engage in self-assessment, recognizing and addressing strengths and weaknesses in their research skills.

Required reading before the session:
Read your assigned Specific Aims documents.

“Bad Reviews” 4researchers.org - http://www.4researchers.org/articles/2175/919
“Options If Your application Isn’t Funded” – https://www.niaid.nih.gov/grants-contracts/options-if-application-not-funded

Recommended reading:
Eisenberg textbook; Chapter 18, Balancing Research Clinical Activities, and Family Life.
Randy Pausch Lecture on Time Management – YouTube or podcast:
https://www.youtube.com/watch?v=oTugissqQT0 or

In-class exercise:
We will review and critique the Specific Aims sections submitted earlier. Be prepared to provide a 3-5 minute oral critique on your assigned grants.

Required written assignment to complete before the session:
Send instructor a satisfactory revised fourth draft Specific Aims that is responsive to the peer-review critiques discussed in Session 8 (see Course Grading Scale; p. 2).