



UNIVERSITY OF
ARKANSAS™

Grant Writing and Candidacy Examinations

2024

Contents

- Purpose of Candidacy Examinations
- Scheduling
- Topics and Abstracts
- Written Proposal Contents
- Oral Exam

Know the Catalog

- <https://cell.uark.edu/program-description.php>
- You are responsible for knowing the policies and procedures
- Don't take the word of anyone, read and know the policies

Candidacy Examination Formats

- Written and Oral Required by Graduate School
- Program requires completion by end of 29th month in the program
 - Start Fall 2020 must complete before end of Fall 2022
 - Exceptions/delays?

Candidacy Examination Formats (cont'd)

- Written
 - Equivalent of a national/federal post-doctoral fellowship proposal
- Oral
 - Defense of proposal and answer questions from Graduate Advisory Committee

Scheduling

- Form your committees!!
 - Near end of first year
 - Four CEMB faculty- at least two departments
 - Graduate Advisory Committee and Graduate Dissertation Committee
 - Forms available at Graduate school website
 - <https://graduate-and-international.uark.edu/graduate/current-students/forms.php>
- Forms must be signed by CEMB Director
 - **Not by your Department Chair/Head**

First Committee Meeting

- End of first year or beginning of second year
- Discuss
 - coursework
 - Schedule for your candidacy examinations

Example time frame

- September of second year
 - Committee meeting
- Fall of second year
 - Reading research articles
- Spring of second year
 - Writing abstracts
 - Three Abstracts to committee
 - Committee picks the topic
 - Begin writing proposal
- Summer of second year
 - Proposal delivered to committee
 - Oral defense

Picking Topics

- Journal Table of Contents
 - Within last year
 - Important Journals in your field
- Find article that is of interest to you
 - Read article
 - Think about their research finding
- What should the next experiment(s) be?

Abstract

- What is the current problem
- What are the next experiments
- One paragraph at most
- Hope no one publishes before you defend

Appropriate subjects

- Can NOT be on your dissertation research
 - There may be exceptions
- Can
 - Be in the same organism/species
 - Use the same techniques you are already using

Example Abstract

- Recent studies have provided a database (GEISHA) of the microRNAs (miRNAs) expressed in the chicken embryo. These findings have given a starting point for investigating early embryonic miRNA function and expression profiling. We will attempt to gain an understanding of the biological role of miRNAs expressed during embryogenesis by way of antisense 2' OM-ORN-mediated depletion and loss-of-function phenotype analysis *in vivo*. MiRNAs are non-coding RNAs that play a role in the regulation of gene expression, particularly during different developmental stages. MiRNAs regulate gene expression at the post-transcriptional level and have been found to be important for cell proliferation and differentiation in early developmental stages. We will examine a few selected miRNAs from the 135 miRNAs mapped for expression in the first 5 days of embryogenesis. Results from these experiments will add to the growing knowledge on the presence and function of miRNAs in avian embryogenesis.

Format for the Written Portion

- Post-doctoral fellowships
 - NIFA-USDA
 - NIH
 - NSF
 - March of Dimes
 - Heart Foundation

Scope of the Proposal

- One or two specific aims
- One to two years effort
- One or two people

Contents of a basic proposal

1. Summary
2. Background and significance
3. Previous work (not always)
4. Implementation
 - a) Specific Aims
 - b) Pitfalls and Alternatives
 - c) Expected Results
 - d) Timeline
5. Literature Cited
6. Budget
7. Personnel
8. Facilities and Equipment

Summary and opening

- Importance of the opening
 - Hook your reader
 - Focus them immediately
 - Win or lose in the first few sentences
- Tell them exactly what you are going to do in the first one to two sentences
 - “We will analyze how the ESR1 and BRCA1 proteins interact with p53 and MADD1 to dysregulate the cell cycle in neuronal glial cells in the formation of neurofibromatosis.”
- Then you should back up and give the explanation.

Summary and Opening: Example

- This project will determine how an ascites susceptibility region we identified on chromosome Z affects production traits and how genes in this chromosomal region interact with gene networks and pathways to result in ascites. Ascites results from pulmonary hypertension in fast growing broilers with losses world-wide estimated at over \$100M/yr. Current control is by feed restriction which reduces potential. Marker-Assisted-Selection using the chromosome Z region reduced ascites in a hypobaric challenge from 66% to 32%. The region contains several genes implicated in cardiac disease or development. We do not know what affect selection for resistance will have on critical production traits for the broiler industry. Our hypothesis is that this region can be used to increase ascites incidence, but the cost may be in one or more production traits. Specific objectives are: 1) Assess effects of this region production traits; 2) test the same markers in commercial broiler breeder parent stocks; 3) look for other regions that are of smaller effect; 4) look for copy number variations that contribute to ascites phenotype; 5) use RNAseq on hypertrophic vs normal hearts to identify pathway components.
- Potential impact: This would be the first validated marker for selection for ascites resistance and the overall cost for selection for resistance will be known. Identification of additional regions of lesser effect will allow lines to be developed that “stack” resistance in the broilers produced by selected crosses. Objectives 3 through 5 will be critical for identification and development of these additional loci for resistance.

Literature Review: Background and Significance

- What should you include?
 - What would you need to explain to a scientist working in cell and molecular biology?
- What should you not include?
 - Generally known by scientists in the same or related fields.

Specific Aims

- How many
 - 1 to 2
 - Should occupy one to two years of work
- Inter-dependence
 - Fatal Flaw
 - If Aim 2 depends on a specific outcome from Aim 1 then, that is a Fatal Flaw

Experimental Design:

- List Specific Aims
- For each Specific Aim provide
 - Hypothesis / Rationale
 - Experimental details
 - Expected results (maybe)
 - Pitfalls and Alternatives

Experimental Design (cont'd)

- How much experimental detail is enough?
 - Only describe protocols that are not routine or that are new
- How much is too much?
 - Don't make yourself look like a rookie

Pitfalls and alternatives

- Recognize your limitations
 - Risky experiments
 - New methods
- What experiments might not work?
- What other methods/approaches could be used?

Budget

- Spreadsheet from RSSP (AES vs NIH/NSF)
 - <https://osp.uark.edu/investigator-s-toolbox.php>
 - Look for Budget Workbook template
 - Excel spreadsheet with several different worksheets
 - Use the one for the appropriate number of years
 - Salaries Yours and Grad student(s)
 - Supplies
 - Travel
 - Equipment
 - Tuition
 - Indirect Costs
- Budget Justification

1-YR Budg	2-YR Budg	3-YR Budg	4-YR Budg	5-YR Budg
-----------	-----------	-----------	-----------	-----------

		AY20				Year 1		Year 2		Cumulative	
		Base Salary	Type	Person-Months	Cost	Sponsor	UA	Sponsor	UA	Sponsor	UA
1	BUDGET - University of Arkansas										
2	Proposed to (Sponsor):										
3	Proposed Start & End Dates:										
4	UA Lead Investigator:										
5	UA Lead Dept/College:										
6											
7	SALARIES & WAGES										
8	PI		9 mo. NonCL		0%	0	0	0	0	0	0
9	PI, summer salary		Sum		0%	0	0	0	0	0	0
10	Co-PI #1		9 mo. NonCL		0%	0	0	0	0	0	0
11	Co-PI #1, summer		Sum		0%	0	0	0	0	0	0
12	Co-PI #2		9 mo. NonCL		0%	0	0	0	0	0	0
13	Co-PI #2, summer		Sum		0%	0	0	0	0	0	0
14	Co-PI #3		9 mo. NonCL		0%	0	0	0	0	0	0
15	Co-PI #3, summer		Sum		0%	0	0	0	0	0	0
16	Co-PI #4		9 mo. NonCL		0%	0	0	0	0	0	0
17	Co-PI #4, summer		Sum		0%	0	0	0	0	0	0
18	[Fill in position as needed]		12 mo. NonCL		0%	0	0	0	0	0	0
19	Postdoctoral Associate		12 mo. NonCL		0%	0	0	0	0	0	0
20	Research Associate (staff)		12 mo. NonCL		0%	0	0	0	0	0	0
21	Research Assistant or Tech		12 mo. NonCL		0%	0	0	0	0	0	0
22	Graduate Assistant (Ph.D.)			mo. @	0%	0	0	0	0	0	0
23	Graduate Assistant (Masters)			mo. @	0%	0	0	0	0	0	0
24	Hourly, non-student(s)			hrs @	0%	0	0	0	0	0	0
25	Hourly, enrolled student			hrs @	0%	0	0	0	0	0	0
26	Total S&W					0	0	0	0	0	0
27	FRINGE BENEFITS				Institutional Rate:						

2024



Personnel

- 1 to 2 page biosketch for you
- Role in project for each participant
 - Participant to be named later

Facilities and Equipment

- What do you have in your current laboratory
- Campus facilities you need to use
 - Animal Care
 - Greenhouses
 - Core laboratories

Getting Help

- Writing Studio
 - <https://success.uark.edu/academic-initiatives/writing-studio.php#writing-guides>
 - Reading for proper English
 - Update 2015:
 - The WS will no longer help students with preparation of their written Candidacy Examination because of concerns about undue influence on the content.
 - If a graduate advisory committee determines that the written exam is in need of English improvement at the defense then a request to use the WS may be made to the CEMB program director who can then make a formal request for an exception to the director of the WS.
 - CEMB students who are concerned about their writing abilities may use the WS in advance of their written exam on other assignments to improve their writing style and English.
- ELAC 50403: Research Writing in the STEM Fields

Getting Help

- Senior graduate students for comment
- Major Professor
 - Only for general comments.

Oral Defense

- Only schedule when you know you will be able to deliver the written a week in advance
- Before starting Orals
 - Committee chair should determine whether written is sufficient.

Oral Defense (cont'd)

- Minimum 3 hours when ALL can be present.
 - You may NOT have your oral defense if all are not participating
 - Committee member(s) or candidate may participate by video or phone

Oral Defense (cont'd)

- Prepare powerpoint to cover the background and specific aims of your proposal
- Expect interruptions and many questions
 - You will likely not finish your powerpoint

Oral Defense

- Questions may be about anything
 - Your committee decides what questions are fair
 - Expect your committee to push you beyond your knowledge base
 - Anything you mention becomes fair game for more questions

Oral Defense (cont'd)

- The committee is pushing you to see when you say “I don’t know”
- Even then, expect them to push you even more, or give you hints to see whether “maybe you do know”
- Be VERY CAREFUL about answering too quickly or not understanding the question.
- If you are going to “guess” then preface with “if I had to guess..”

Outcomes of the Defense

- Your committee must decide whether you passed
- It is not a “majority vote”
- They have the right to ask for a continuation or additional oral defense
- The only outcomes available are:
 - Pass
 - Suspend and continue later
 - Fail

Outcomes of the Defense

- If there are ANY questions about the outcomes of the oral defense then the candidate and the major professor should contact the Program Director.

Remember

- This is an educational experience to test your creative thought, depth of knowledge, and scientific breadth. To judge how you are progressing towards an independent scientist.