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STUDENT UNDERGRADUATE RESEARCH FELLOWSHIP

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SURF Residency Requirements:

- U.S. Citizens, resident aliens, or nationals

Honors College Research Grant (HCRG) and Office of Undergraduate Research Grant (OURG) Residency Requirements:

- Anyone including international students

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GPA required at time of application to be eligible:

	SURF	HCRG	OURG
GPA	3.25	3.5*	3.5
Credits	30	30	30
Honors Credits		6	

*required GPA may be different for some WCOB and FJAD students, check with your Honors Program or Dr. Jennie Popp

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Number of credit hours required each semester for each type of grant:

	SURF	HCRG	OURG
Spring	12	12*	12*
Summer	6	6*	6*
Fall	12	12*	12*

*Exceptions made for graduating Seniors

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SURF Registration

Registration can be found on our website at awards.uark.edu/surf

Register Here

This allows us to keep you updated with important information and changes

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Student Undergraduate Research Fellowship (SURF) - Fall 2023

PDF

> Dates

> Details

> Description

Personal Details

* indicates required

*Applicant First Name:

*Applicant Last Name:

*Are you an international student?: Select

*Are you an honors student?: Select

If yes, how many honors credit hours have you completed prior to this semester?:

*Student ID Number:

*Home City for Student:

*Home State for Student:

Upload Files

***SURF Cover Page** * indicates required

Upload the completed SURF Cover Page. This was emailed to you as part of the SURF Submission Packet that you received when you registered to submit a SURF application at awards.uark.edu.

Please refer to the sample application materials you received upon registering. Make sure that your totals for each category match the sample for your funding period.

Please use the file that corresponds to your funding period. The stipend amounts have been pre-filled and should not be changed.

The file is set up to allow an Adobe Digital Signature from your research mentor. You do not need to procure the "Authorizing Institutional Official" signature; this step will be completed for you after submission. Please upload your cover page as a pdf.

***File Input:** Choose File No file chosen

***SURF Student Stipend Agreement**

Upload the completed SURF Student Stipend Agreement. This was emailed to you as part of the SURF Submission Packet that you received when you registered to submit a SURF application at awards.uark.edu.

The file is set up to allow an Adobe Digital Signature from you and your research mentor. Please upload your stipend agreement as a pdf.

***File Input:** Choose File No file chosen

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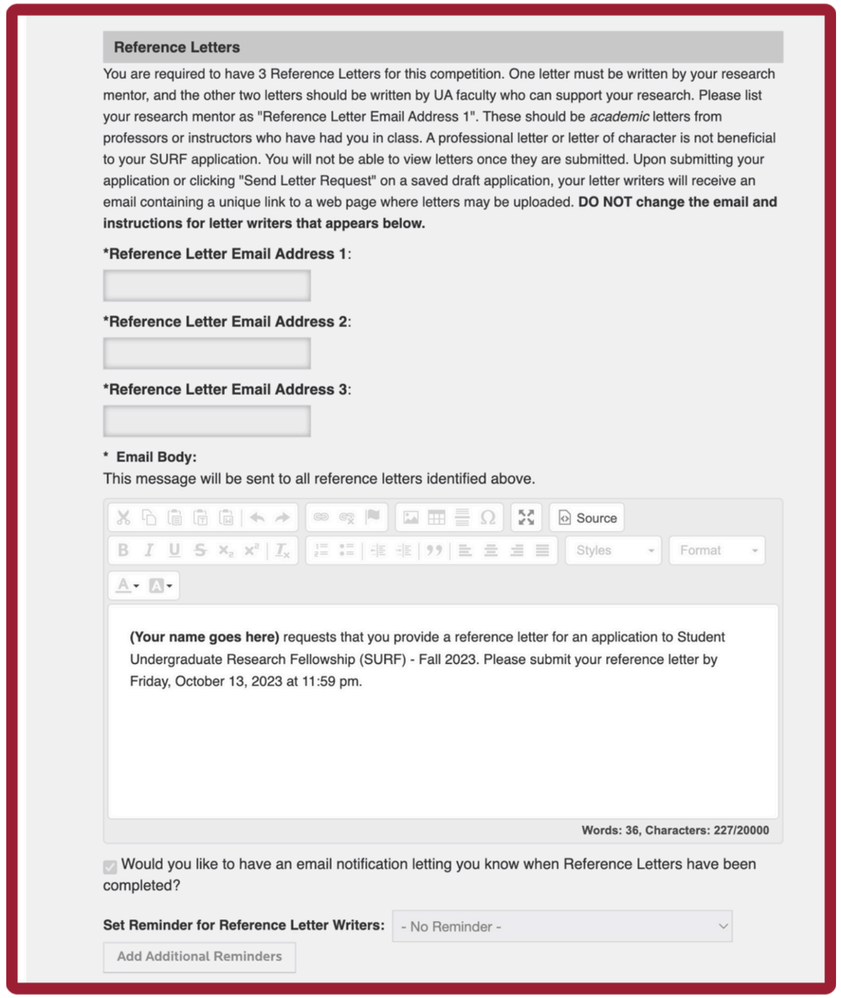
Mentor →

Reference →

Reference →

Fill in your name →



Reference Letters

You are required to have 3 Reference Letters for this competition. One letter must be written by your research mentor, and the other two letters should be written by UA faculty who can support your research. Please list your research mentor as "Reference Letter Email Address 1". These should be *academic* letters from professors or instructors who have had you in class. A professional letter or letter of character is not beneficial to your SURF application. You will not be able to view letters once they are submitted. Upon submitting your application or clicking "Send Letter Request" on a saved draft application, your letter writers will receive an email containing a unique link to a web page where letters may be uploaded. **DO NOT change the email and instructions for letter writers that appears below.**

***Reference Letter Email Address 1**:

***Reference Letter Email Address 2**:

***Reference Letter Email Address 3**:

*** Email Body:**

This message will be sent to all reference letters identified above.

Source | Styles | Format

(Your name goes here) requests that you provide a reference letter for an application to Student Undergraduate Research Fellowship (SURF) - Fall 2023. Please submit your reference letter by Friday, October 13, 2023 at 11:59 pm.

Words: 36, Characters: 227/20000

Would you like to have an email notification letting you know when Reference Letters have been completed?

Set Reminder for Reference Letter Writers: - No Reminder -

Add Additional Reminders

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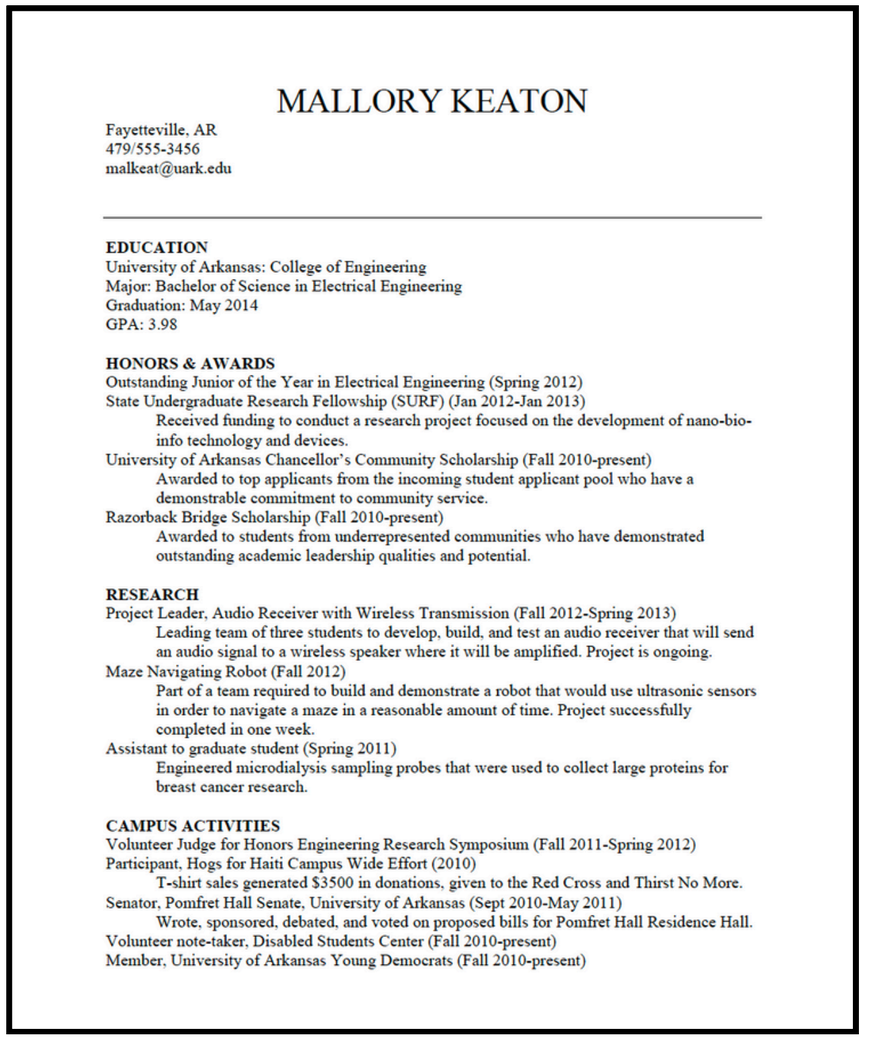
Academic Resume

- Education then research as the top two categories
- Only two pages



MALLORY KEATON

Fayetteville, AR
479/555-3456
malkeat@uark.edu

EDUCATION
University of Arkansas: College of Engineering
Major: Bachelor of Science in Electrical Engineering
Graduation: May 2014
GPA: 3.98

HONORS & AWARDS
Outstanding Junior of the Year in Electrical Engineering (Spring 2012)
State Undergraduate Research Fellowship (SURF) (Jan 2012-Jan 2013)
Received funding to conduct a research project focused on the development of nano-bio-info technology and devices.
University of Arkansas Chancellor's Community Scholarship (Fall 2010-present)
Awarded to top applicants from the incoming student applicant pool who have a demonstrable commitment to community service.
Razorback Bridge Scholarship (Fall 2010-present)
Awarded to students from underrepresented communities who have demonstrated outstanding academic leadership qualities and potential.

RESEARCH
Project Leader, Audio Receiver with Wireless Transmission (Fall 2012-Spring 2013)
Leading team of three students to develop, build, and test an audio receiver that will send an audio signal to a wireless speaker where it will be amplified. Project is ongoing.
Maze Navigating Robot (Fall 2012)
Part of a team required to build and demonstrate a robot that would use ultrasonic sensors in order to navigate a maze in a reasonable amount of time. Project successfully completed in one week.
Assistant to graduate student (Spring 2011)
Engineered microdialysis sampling probes that were used to collect large proteins for breast cancer research.

CAMPUS ACTIVITIES
Volunteer Judge for Honors Engineering Research Symposium (Fall 2011-Spring 2012)
Participant, Hogs for Haiti Campus Wide Effort (2010)
T-shirt sales generated $3500 in donations, given to the Red Cross and Thirst No More.
Senator, Pomfret Hall Senate, University of Arkansas (Sept 2010-May 2011)
Wrote, sponsored, debated, and voted on proposed bills for Pomfret Hall Residence Hall.
Volunteer note-taker, Disabled Students Center (Fall 2010-present)
Member, University of Arkansas Young Democrats (Fall 2010-present)

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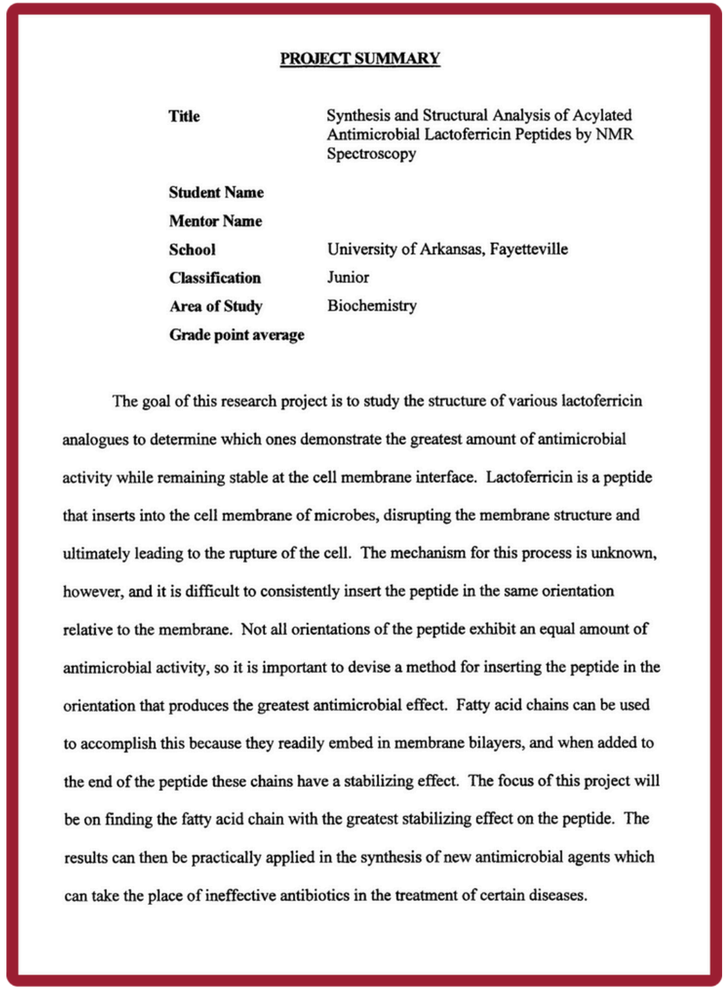
Project Summary

- Think of this as a scholarly abstract
- Can be either single- or double-spaced
- Be sure to include: project title, student name, mentor name, school, classification, area of study, and GPA



PROJECT SUMMARY

Title	Synthesis and Structural Analysis of Acylated Antimicrobial Lactoferricin Peptides by NMR Spectroscopy
Student Name	
Mentor Name	
School	University of Arkansas, Fayetteville
Classification	Junior
Area of Study	Biochemistry
Grade point average	

The goal of this research project is to study the structure of various lactoferricin analogues to determine which ones demonstrate the greatest amount of antimicrobial activity while remaining stable at the cell membrane interface. Lactoferricin is a peptide that inserts into the cell membrane of microbes, disrupting the membrane structure and ultimately leading to the rupture of the cell. The mechanism for this process is unknown, however, and it is difficult to consistently insert the peptide in the same orientation relative to the membrane. Not all orientations of the peptide exhibit an equal amount of antimicrobial activity, so it is important to devise a method for inserting the peptide in the orientation that produces the greatest antimicrobial effect. Fatty acid chains can be used to accomplish this because they readily embed in membrane bilayers, and when added to the end of the peptide these chains have a stabilizing effect. The focus of this project will be on finding the fatty acid chain with the greatest stabilizing effect on the peptide. The results can then be practically applied in the synthesis of new antimicrobial agents which can take the place of ineffective antibiotics in the treatment of certain diseases.

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Synthesis and Structural Analysis of Acylated Antimicrobial Lactoferricin Peptides by Nuclear Magnetic Resonance Spectroscopy

Introduction

The resistance of microbes to antibiotic treatment has become one of the most significant problems facing scientists in recent years, and has led to an increased need to develop alternative methods of combating microbes. Scientists have found that certain proteins possess antimicrobial properties that would be useful in the development of such alternative treatments. One such protein is lactoferrin, an iron-binding protein found in the milk of cows and humans (Cavestro 2002). Analysis of lactoferrin has revealed that its antimicrobial properties come from a 25-amino acid sequence within the protein. The antimicrobial activity of the 25-residue peptide, called lactoferricin, has been further determined to stem from a six residue (or hexapeptide) sequence containing two amphipathic tryptophan (Trp) and three positively-charged arginine (Arg) residues (Schibli 1999).

The protein is thought to act on the microbe by embedding in and disrupting its cell membrane. Microbial cell membranes are composed of a negatively-charged phospholipid bilayer. This negative charge attracts the positively-charged arginine residues in the hexapeptide, and once the membrane and the peptide are in close proximity, the structure of the tryptophan allows it to embed within the bilayer at the surface of the membrane. These added tryptophans disrupt the bilayer and cause the membrane to rupture, killing the cell. The exact mechanism for this process is unknown. The problem with this method is that the tryptophan does not always embed in the membrane properly. If the tryptophan does not embed with the correct orientation, its ability to disrupt the membrane bilayer is affected. To solve this problem, a fatty acid chain can be added to the end of the hexapeptide. This chain readily inserts into the membrane, stabilizing the rest of the hexapeptide and causing the tryptophan to embed in the proper orientation.

This project will explore the effectiveness of various fatty acid chains at stabilizing the orientation of the tryptophan within the membrane. The hexapeptide will be synthesized using four fatty acid chains of varying lengths: six (hexanoic acid), eight (octanoic acid), ten (decanoic acid), and twelve (dodecanoic acid) carbons. If the experiment is successful in identifying a fatty acid chain that stabilizes the tryptophan within the membrane, then the results can be used to better understand the mechanism by which the tryptophan causes the membrane to rupture. A proper understanding of this mechanism could lead to the development of new antimicrobial peptides that operate using a similar mechanism. The creation of such peptides would provide a practical alternative for fighting microbes that have developed resistance to traditional antibiotics.

Experimental Methods

Fmoc addition to 1-MeTrp: In order to allow for unhindered synthesis of the hexapeptide, an Fmoc group will be added to one of the Trp residues to prevent unwanted side reactions for occurring during peptide synthesis. The Fmoc group will be added by dissolving Fmoc-protected succinamide and 1-methyl-L-Trp in dimethoxyethane solvent. The product will be extracted by filtration, then dried on a rotovap machine, washed with methyl-*t*-butyl ether, and dried on a vacuum line. The product will then be dissolved in ethyl acetate and allowed to crystallize. The crystalline product will be pure Fmoc-1-methyl-Trp, which will be protected well enough to be used in the hexapeptide synthesis.

Research Proposal

What is one thing successful proposals have in common?

Successful applicants typically cite at least five peer-reviewed, outside sources in their research proposals

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SURF Research Proposal - Content

- Address the feasibility of the project (i.e., is the project reasonable for you to pursue with the available facilities?)
- Answer the question: Is the project of sufficient difficulty to challenge you?
- Answer the question: Will the project teach you skills that are transferable to other research endeavors/scholarly activities?
- When introducing your topic, assume you are writing to a generalist in your field
- Answer the question: Is the proposed research/scholarly activity of value to your field of study? How? and Why?
- Address other criteria you deem appropriate
- Do your homework. It is important to show you know something about your field & project. (Don't forget to cite that homework.)

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SURF Research Proposal - Format

- Write in the first person (ex: “I will perform” instead of “The student researcher will perform”)
- Your works cited section does not count against the 5-page limit for the research proposal
- Discussion of background should account for no more than 25% of the project description
- The timeline should be indicated with a bolded header, and should outline clear and incremental goals for the project’s funding period
- The proposal should be 5-pages double-spaced

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Timeline

- Clear incremental goals
- Monthly or bi-weekly
- Refer to your mentor when setting these goals

Plan and Project Timeline

Month	Goal(s)
January	• Modify 3 channel imaging box for super resolution imaging.
February	• Modify microscope with imaging box – test.
March	• Fluorophore testing to find best dyes for our case.
April	• Single color fixed super resolution imaging (validation).
August	• Multi-color fixed super resolution imaging – testing conditions for cells, media, and tagging.
September	• Experimental multi-color SMLM imaging of fixed A549 cells with selected fluorescent dyes.
October	• Continue experiments, write codes for data analysis, and analyze data.
November	• Finish data analysis, begin writing manuscript and submitting abstracts for conference talks.

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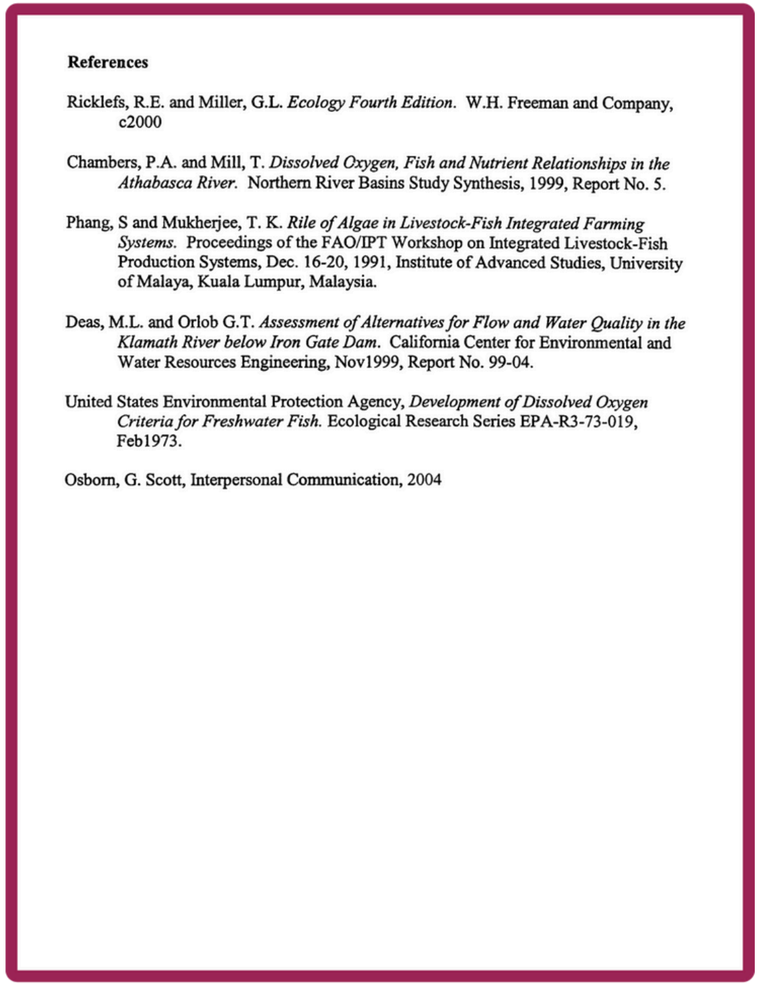
- At least <u>five</u> peer-reviewed sources
- Refer to your mentor for quality sources
- Use the library's resources
- Use your discipline's preferred citation style



References

Ricklefs, R.E. and Miller, G.L. *Ecology Fourth Edition*. W.H. Freeman and Company, c2000

Chambers, P.A. and Mill, T. *Dissolved Oxygen, Fish and Nutrient Relationships in the Athabasca River*. Northern River Basins Study Synthesis, 1999, Report No. 5.

Phang, S and Mukherjee, T. K. *Rile of Algae in Livestock-Fish Integrated Farming Systems*. Proceedings of the FAO/IPT Workshop on Integrated Livestock-Fish Production Systems, Dec. 16-20, 1991, Institute of Advanced Studies, University of Malaya, Kuala Lumpur, Malaysia.

Deas, M.L. and Orlob G.T. *Assessment of Alternatives for Flow and Water Quality in the Klamath River below Iron Gate Dam*. California Center for Environmental and Water Resources Engineering, Nov1999, Report No. 99-04.

United States Environmental Protection Agency, *Development of Dissolved Oxygen Criteria for Freshwater Fish*. Ecological Research Series EPA-R3-73-019, Feb1973.

Osborn, G. Scott, Interpersonal Communication, 2004

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SURF Evaluation

- Your SURF application will be evaluated by a state-appointed faculty committee.
- Your part of the application constitutes the bulk of the review

--Scores for each criteria are on a 1-9 scale, 1 being the best score and 9 being the worst score--

Definitely Fund — *Possibly Fund* — *Do Not Fund*

1	2	3	4	5	6	7	8	9
Superior	Excellent	Above Average	Good	Average	Fair	Below Average	Minimal	Poor

Scoring Criteria	Points
Student's Academic Success: GPA, Extracurricular Activities, Leadership, etc.	9 - Poor
Qualifications of the Mentor and Research Team (if applicable): Clear plan for support, research history, experience in the field of proposal, contributions to undergraduate research.	9 - Poor
Innovation/Originality: Generates new ideas and/or applies existing ideas in a new context.	9 - Poor
Significance of the Study: Outcomes are clearly proposed and Impact is anticipated. **STEM** – Addresses an area of importance to the discipline and shows potential to advance the science. **Non-STEM** - Expands knowledge of best/creative practices in the field, increases creative output.	9 - Poor
Appropriateness of the methodology: **STEM** - Research design, Sampling approach, Data collection protocol/plan, Data analysis procedure/plan, Protection of human subjects and/or plan for seeking IRB approval. **Non-STEM** – Preliminary Research showing selection and citation of primary and secondary sources, Hermeneutic framework, analytical approach is well defined or creative process and products are well planned/described.	9 - Poor
Merit: **STEM** - Utilizes established scientific principles, Demonstrates how scientific knowledge will be gained, Problem/topic being investigated is of value to the larger scientific community. **Non-STEM** – Uses best practices and innovative approaches in the field, betters the understanding of the human experience, benefits and engages the fields community.	9 - Poor
Other Criteria: Reference Letters, plan for dissemination, appropriate budget, feasibility of completing the project in projected timeframe, cohesiveness and coherency, clarity of writing	9 - Poor
(Add all points together) **Total Points**	

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Four Applicants Per Mentor

- Mentors are allowed a maximum of four SURF applicants
- If you have more than four, then they may apply through SURF for an HCRG or OURG
- If you have more than four student researchers applying for funding, please let us know (awards@uark.edu) which ones should be considered for SURF

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Stipend Funding Periods

Spring	→	$1,250 One-Semester
Spring-Summer	→	$2,500 Two-Semester
Spring-Fall	→	$2,500 Two-Semester
Spring-Summer-Fall	→	$2,500 Two-Semester

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SURF Spring-Fall Example

	SURF	UA Match	Sub-total		Total	HCRG	OURG
Student Stipend							
Spring	625	625	1250		1250	1250	1250
Fall	625	625	1250		1250	1250	1250
Mentor Funds	750		750	(+250)	1000	1000	1000
Student Travel	750		750		750	(HCTG)	
TOTAL:			4000		4250	3500	3500

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registrar.uark.edu

Transcript Request

- The University of Arkansas transcript is a **complete** record of the student's enrollment and academic history at the University of Arkansas, including **all** undergraduate, graduate, and law courses. Partial transcripts based on a student's career (undergraduate, graduate, or law), or transcripts that include only selected coursework, are not available. Click here to view our transcript guide. For current grades and marks, click here.
- All financial obligations to the University of Arkansas must be met before an official transcript can be released.
- Transcripts may not be picked up by a third party unless the student has given written authorization with the request.
- A photo ID is required for transcript pickup.
- There is a cost of $10.00 per official transcript.

Request Methods

Transcripts can be requested by the following methods:

Online

The University of Arkansas has authorized Parchment to provide our online transcript ordering system. You can order transcripts using a Visa or MasterCard at any time of the day or week. Parchment will process transcript orders from 8:00 AM to 5:00 PM Monday through Friday. Your credit card will be charged when your order is complete.

- Click here to order an official transcript(s) through the Parchment site.
- Click "Ordering your own credentials or academic records" or "Ordering on behalf of someone else" and the Parchment site will provide instructions for placing your order, including delivery options and fees. You can order as many transcripts as you like in a single session at $10.00 per transcript. Parchment charges a $2.75 processing fee for each recipient (transcript addressee).
- Order updates will be emailed to you. You can also check order status and history online here.
- If you need assistance or have questions about Parchment transcript ordering service, please go here.

In-Person

Bring a photo ID to the Office of the Registrar at 146 Silas H. Hunt Hall or at 1083 East Sain Ave. in Fayetteville. Transcripts can only be released with the written authorization of the student. Identification will be required for transcripts to be picked up in person. Payment must be made by cash or check only.

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Final One-Page Abstract

At the completion of your funding period, you are required to submit a one-page abstract to ADHE.

- May 1 Spring term project completion
- August 1 Summer term project completion
- December 1 Fall term project completion

Present your research

"Fellowship recipients are required to present the findings of his/her research at a state or national conference in his/her discipline or attend a meeting of experts in his/her discipline as directed by his/her mentor."

- ADHE

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Honors College Research Grant (HCRG)

Dr. Jennie Popp

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SURF Spring-Fall Example

	SURF	UA Match	Sub-total		Total	HCRG	OURG
Student Stipend							
Spring	625	625	1250		1250	1250	1250
Fall	625	625	1250		1250	1250	1250
Mentor Funds	750		750	(+250)	1000	1000	1000
Student Travel	750		750		750	(HCTG)	
TOTAL:			4000		4250	3500	3500

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SURF Reporting Requirements

- SURF awardees follow the same internal reporting guidelines that HCRG and OURG awardees follow
- Honors College deliverables
  - Blog and photo (at the end of each semester funded) – be featured on the HNRC blog site honorsstories.uark.edu
  - Final report (can submit same report as required by SURF)
- Instructions will be provided by the Honors College at time of the award

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SURF Collection - Mid-October

SURF Early Review

- Students are encouraged to participate in an early review. Please schedule an appointment with Matthew Halbert if you would like your application reviewed prior to Collection

SURF Collection

- At SURF Collection, any registrants who have not participated in an early review will have their application reviewed by a University of Arkansas faculty or staff member during a Microsoft Teams appointment. These appointments will be available to choose on October 1st.

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Goldwater Scholarship

Applications judged on the basis of outstanding academic performance, as well as a demonstrated potential for and commitment to a career in mathematics, the sciences, and engineering (except applied) career. The University of Arkansas can nominate four current sophomores or juniors. Five if one is a transfer student. **Campus deadline: December 1**

Eligibility:

- Be a U.S. citizen, resident alien, or U.S. national
- Currently enrolled as a sophomore or junior
- Pursue a Bachelor's degree full time in mathematics, science, or engineering (not applied engineering)

Award Amount:

- Up to $7,500 per year for eligible expenses, such as tuition, fees, books, room and board.
- Sophomores may qualify for two years of support; juniors for one year.

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Suzanne McCray
Vice Provost of Enrollment Dean of Admissions and Nationally Competitive Awards

Emily Voight
Senior Associate Director of Nationally Competitive Awards
Fulbright Program Advisor

Matthew Halbert
Assistant Director of Nationally Competitive Awards
SURF Coordinator

Robert Ellis
Assistant Director of Nationally Competitive Awards