

STUDENT UNDERGRADUATE RESEARCH FELLOWSHIP



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 <u>including</u> International Students



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

^{*3.33} If you are an architecture student after your 5th semester



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

*Exceptions made for graduating Seniors



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



- Do not be afraid of the submit button
- This does not go directly to ADHE
- Please submit all materials prior to your one-on-one meeting



InfoReady Review

HOME -

CALENDAR

Submission sites for grants, scholarships, awards, and other processes



Welcome to the University of Arkansas' InfoReady Review portal. Several categories of processes are managed through this system.

Limited Submissions is where faculty apply for the internal competition when the University has a limit on the number of proposals that can be submitted by the institution.

Internal Funding is where applicants submit proposals for internally funded research grants.

Honors College is where that College accepts applications and manages a variety of grants and scholarships opportunities.

Enrollment Services is where other, more general grant and scholarship opportunities are managed.

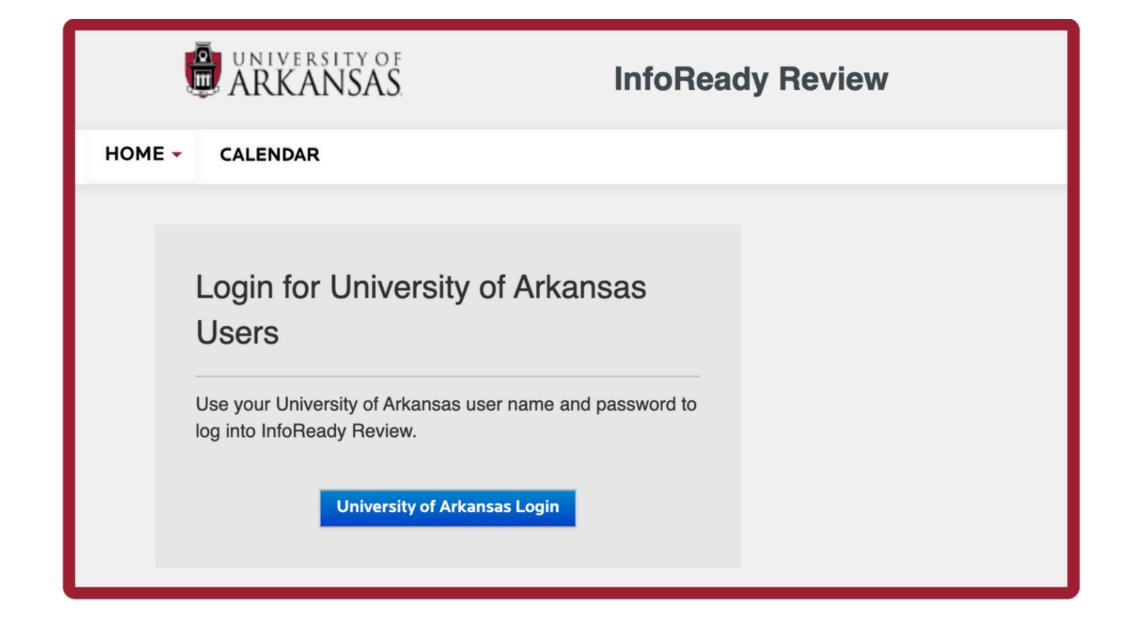
In addition, although not listed directly on these websites, InfoReady is often used to manage other submission and review processes, such as Conflict of Interest disclosure and Outside Employment Approval requests and Visiting Scholars and Delegations petitions.

This application runs best on the latest supported versions of Chrome, Firefox, and Safari browsers.

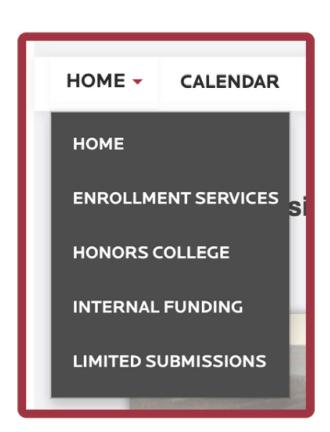


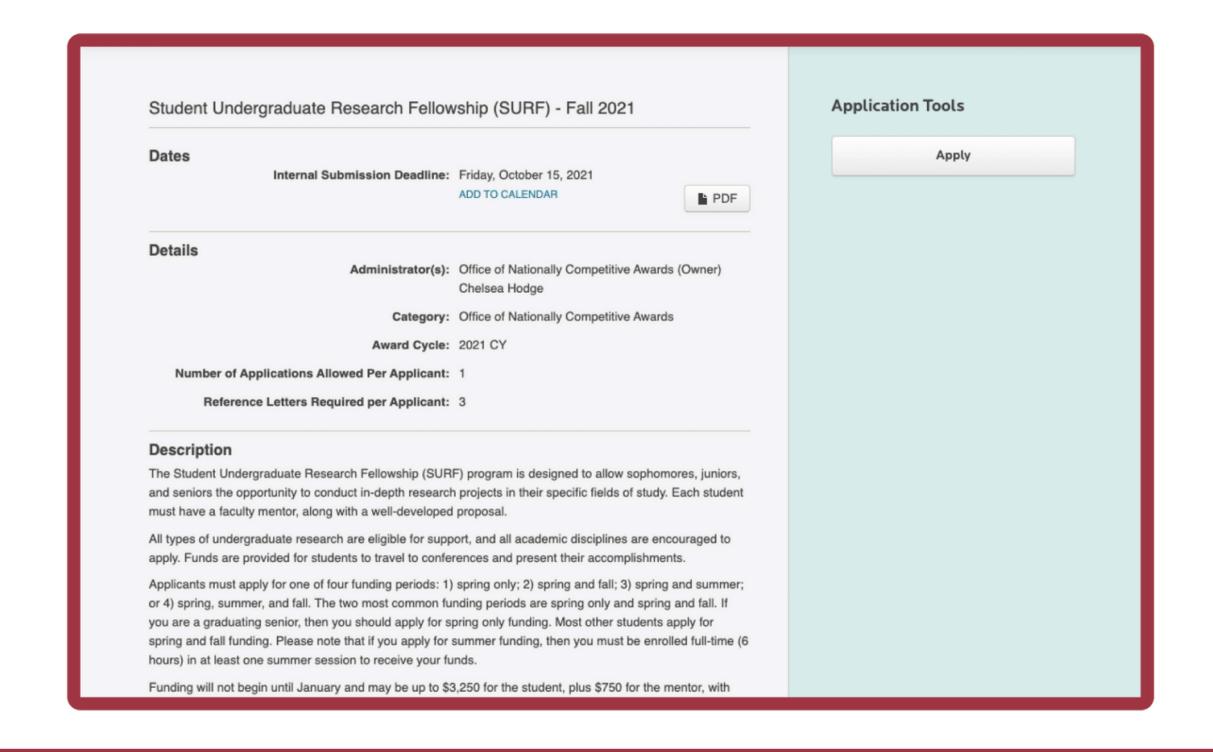
uark.infoready4.com

Make certain you are using your personal UARK login information











Dates	
Details	
Description	
Personal Details ~	
	* indicates require
*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:	
*Student ID Number:	

* 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 prefilled 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

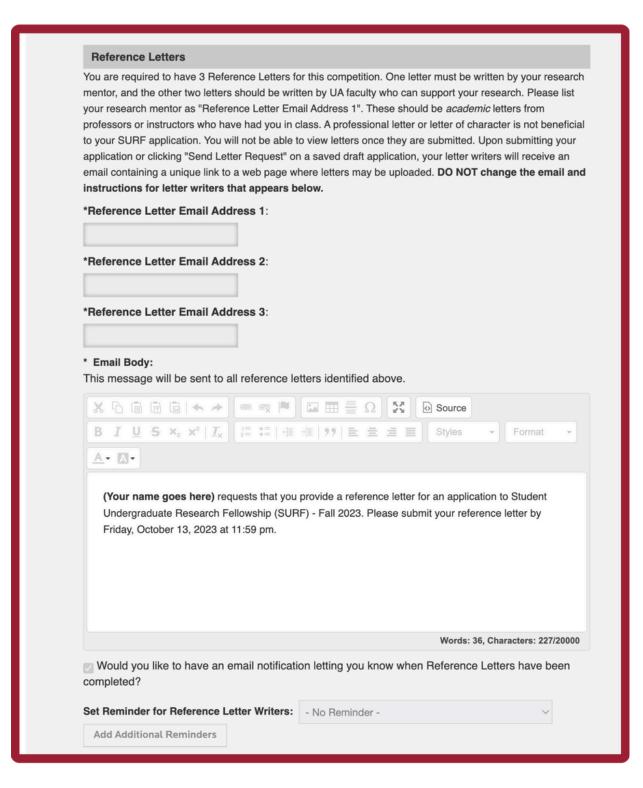


Mentor ----

Reference ----

Reference —

Fill in your name ——





- This is an ADHE form
- Can be physically or digitally signed
- Eligible African American students may apply for the Mahlon Martin Fellowship

	SURF COVERPAGE Check this box to be considered for the Mahlon Martin Fellowship. I certify that Iam African-American.
1.	Name of Student
2.	ID Number: N/A
3.	Eligibility of Student U.S. Citizen Permanent Resident Alien
4.	Name of Faculty Mentor
5.	Name of Applicant's Institution
6.	Permanent Mailing Address and Telephone Number for: Student Mentor
7.	Email address Email address
8.	Title of Project
9.	Academic Department
10.	Degree Sought
11.	SURF Budget (Complete SURF Budget Justification Form & attach to application) Budget Categories Enter amount below
	Student Stipend (cannot exceed \$1,250)
	Mentor Cost (cannot exceed \$750)
	Student Travel Cost (cannot exceed \$750)
	Total SURF Grant applied for by Student & Mentor
	(cannot exceed \$2,750)
	Institutional Match (cannot exceed \$1,250)
	Total SURF Project Costs (cannot exceed \$4,000)
	Total SURF Project Costs (cannot exceed \$4,000) Signatures of authorizing official and mentor denote that these individuals understand the guidelines for this progra and that the institution agrees to provide or obtain half the student's stipend. In addition to existing university functified and state government, nonprofit agencies, private corporations, individual citizens, etc., are sources that can accessed for the match requirement.
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- This is a UARK form
- Every applicant fills this out
- SURF funds <u>you</u> as a researcher, but you may want to use some funds to supplement your research expenses
- Can be physically or digitally signed

SURF Student Stipend Agreement					
I,, understand that a portion of Student Undergraduate					
(print name) Research Fellowship (SURF) funding comes in the	e form of a student stipend. This stipend is				
either \$1,250 (spring only funding) or \$2,500 (sp	ring/summer; spring/summer/fall; spring/fall				
funding), and it is paid directly to me, the studer	nt. The student stipend is meant to supplement				
my income during the research period, and I am	not required to spend any portion of it to				
support my SURF-funded project.					
If I am using my student stipend solely as a living	stipend, I will indicate that I am spending zero				
dollars below. If I have agreed with my mentor t	o use a portion of my student stipend to				
support my research project, the arranged costs	will be listed below:				
Amount to be spent	Description of expenditure				
Both my faculty mentor and I have agreed upon	the use of my student stipend, as is indicated				
below.					
(typed student name)	(typed faculty mentor name)				
(student signature)	(faculty mentor signature)				
(oranonto.Briataro)					
(date)	(date)				



Big Red

Education

University of Arkansas GPA, degree plan, number of hours completed, class standing (sophmore, junior, senior), graduation date

Research Experience

lab experience, presentations, posters, publications of any kind, projects underway

Honors and Awards

scholarships, previous SURF funding, other honors

2

Relevant Experience

leadership experience, volunteerism, community service

Additional Relevant Information

work experience, significant hobbies

Academic Resume

Be sure to Include all of these sections

Only two pages



Project Summary

- Think of this as a scholarly abstract
- Can be either single- or doublespaced
- Be sure to Include: Title, Student name, mentor name, school, classification, Area of study, and GPA

PROJECT SUMMARY

itle Synthesis and Structural Analysis of Acylated Antimicrobial Lactoferricin Peptides by NMR

Spectroscop

Student 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.



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



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.)



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 <u>double-spaced</u>



Timeline

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

2-Dimensional solution NMR in SDS-d25: Samples will also be prepared for 2 dimensional (2D) ¹H NMR in 90% dH₂O/10% D₂O and deuterated SDS (SDS-d25) micelles. To prepare the aqueous samples, each peptide will be dissolved in 90% dH₂O/10% D₂O, the pH will be adjusted to 4.5 using a pH meter, and the sample will be transferred to an NMR tube. For each sample, COESY (Correlated Spectroscopy), NOESY (Nuclear Overhauser Spectroscopy) and TOCSY (Total Correlated Spectroscopy) spectra will be obtained for structural analysis of the peptides.

Research Plan: This project will tentatively follow the schedule listed below.

2004

October—Prepare 2 batches of Fmoc-1MeTrp and analyze by 1H-NMR Nov—Synthesize LfB 20-25 add the 6 carbon Fatty acid tail Dec—Cleave LfB 20-25-FA6 from resin and treat with TFA-d1

2005

January— Analyze LfB 20-25(1MeTrp)-FA6 by HPLC and mass spectrometry February—

- a. Prepare oriented sample of LfB 20-25-FA6 in DOPC:DOPG (3:1) for solid state ²H NMR
- b. Prepare sample of LfB 20-25-FA6 in deuterated SDS micelles for 2 dimensional solution ¹H NMR and circular dichroism spectroscopy

March—Synthesize LfB 20-25(1MeTrp) and add the 12 carbon fatty acid tail April—

- a. Cleave LfB 20-25-FA12 from resin and treat with TFA-d1
- b. Analyze LfB 20-25(1MeTrp)-FA12 by HPLC and mass spectrometry ptember—
- a. Prepare oriented sample of LfB 20-25-FA6 in DOPC:DOPG (3:1) for solid state ²H NMR
- b. Prepare sample of LfB 20-25-FA12 in deuterated SDS micelles for 2 dimensional solution ¹H NMR and circular dichroism spectroscopy
 October—Work on data analysis

40 weeks, 10 hours a week = 400 hours



- 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



Jay McAllister
Engineering and Honors College
Librarian

jtmcalli@uark.edu 479-575-2480





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

STUDENT PERFORMANCE

PROPOSED RESEARCH PROJECT

APPROPRIATE COURSE SELECTION

Professor Razorback

Name
Department
Institution

Brief statement of research/scholarly interests

List of recent publications that relate to the proposed research

2

List of undergraduate advisees and undergraduate projects directed (limit to the last 5 years)

Other relevant information

Mentor CV

- Only two pages
- These sections are a suggestion



Mentor Letter of Support

- Address all letters to the SURF Selection Committee
- Address student's academic (especially research) abilities and performances
- Outline significance of the student's project
- Indicate student's ability to complete the project
- Comment on student's ability to meet the schedule and to live up to commitments
- Outline the mentor's advisory role, explaining what the mentor has to bring to the project
- Must be on official letterhead and signed
- Letters will be submitted through InfoReady



Additional Reference Letters

- The additional letters of support should come from academic faculty who have taught you or supervised your research. Professional letters or letters of character are not helpful to the SURF application. Letters should not be written by graduate assistants.
- Address all letters to the SURF Selection Committee
- Address student's academic (especially research) abilities and performances
- Relay, whenever possible, specific examples of the student's merit and potential
- Must be on official letterhead and signed
- Letters will be submitted through InfoReady



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



Stipend Funding Periods

<u>Spring</u>

\$2,000 One-Semester

<u>Spring-Summer</u> → \$4,000 Two-Semester

Spring-Fall \$4,000 Two-Semester

<u>Spring</u>-Summer-<u>Fall</u> \$4,000 Two-Semester



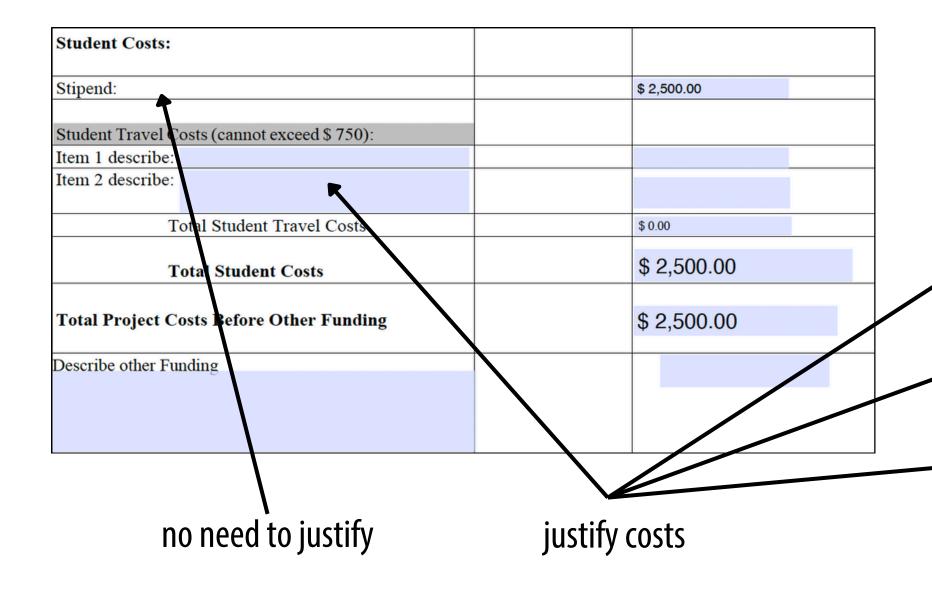
TOTAL:

SURF Spring-Fall Example

Student Stipend	SURF	UA Match	Sub-total	Total	HCRG	OURG
Spring	625	625	1250 (+750)	2000	2000	2000
Fall	625	625	1250 (+750)	2000	2000	2000
Mentor Funds	750		750 (+750)	1500	1500	1500
Student Travel	750		750	750	(HCTG)	



Student Justification



SURF BUDGET JUSTIFICATION FORM Student and mentor have determined that the following expenditures are needed to adequately fund the project: Enter amount in box below **Mentor Costs:** Summer Salaries and Fringe Benefits (9 Month Faculty Only): Salary - enter amount Applicable Fringe - (insert institutional fringe rate) RATE: Total Salary and Fringe Materials and Supplies: Item 1 describe: Item 2 describe: Item 3 describe: Total Materials and Supplies (books, paper, etc.) \$ 0.00 Travel Costs: Item 1 describe Item 2 describe: m 3 describe: **Total Travel Costs** \$ 0.00 Other Expenses: Item 1 describe Item 2 describe Item 3 describe Total Other Expenses (Printing, copying, etc.) \$ 0.00

Total Mentor Costs Cannot Exceed

\$750 \$ 0.00

Mentor Justification



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. <u>Click here</u> to view our transcript guide. For current grades and
 marks, click <u>here</u>.
- 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.

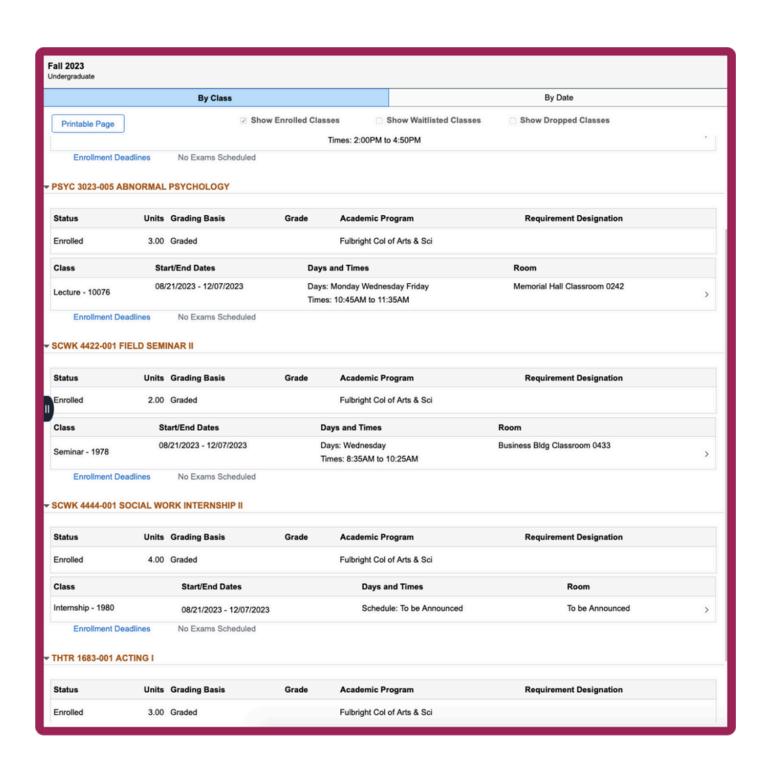
In-Person

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.



Workday Schedule

- Make sure it shows your credit load
- This is to verify that you are enrolled full time this (fall) semester





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
- <u>August 1</u> Summer term project completion
- <u>December 1</u> 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



Office of Undergraduate Research Grant (OURG)

Dr. Suresh Kumar Thallapuranam Amy Epps



Honors College Research Grant (HCRG)

Dr. Jennie Popp



TOTAL:

SURF Spring-Fall Example

Student Stipend	SURF	UA Match	Sub-total	Total	HCRG	OURG
Spring	625	625	1250 (+750)	2000	2000	2000
Fall	625	625	1250 (+750)	2000	2000	2000
Mentor Funds	750		750 (+750)	1500	1500	1500
Student Travel	750		750	750	(HCTG)	



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



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

^{*3.33} If you are an architecture student after your 5th semester



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

*Exceptions made for graduating Seniors



Final Thoughts

- Any major is eligible
- Apply through SURF for all of these awards
- If you are not selected for SURF, you will be automatically considered for the HCRG and OURG



It's ok to click submit

Submit



Post-Award

- Watch for Terms and Conditions from the Office of Sponsored Programs (OSP)
- Watch for worktag via email from OSP
- For use of Travel Stipend (Student and Mentor), contact your departmental Representative <u>prior</u> to your travel





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



Emily Wright
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



SURF Registration

Celebrating Discovery

ONCA Instagram





