

# GRAD SCHOOL 101

MONDAY 27 JULY 2020

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NUCLEAR ENGINEERING PHD STUDENT @ UCB

[www.pollev.com/kaliek018](http://www.pollev.com/kaliek018)

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# ABOUT ME

- B.S. in Nuclear Engineering at UTK – May 2019
- Ph.D. in Nuclear Engineering at UC Berkeley – Eventually
- UTK SWE involvement
  - Outreach chair in FY17
  - Pres-Elect in FY18
  - President & SWE Future Leader in FY19
- My experiences are pretty limited, and I do not claim to be an expert in any way!





# OUTLINE

- Basics of graduate programs
- Common misconception of grad programs
- What you can do at each stage of your academic career to prepare
- How to search for grad schools
- How to put a grad application together
- Tricks & tips

# WHAT IS GRAD SCHOOL?

AND WHAT DOES IT  
MEAN TO BE A GRAD  
STUDENT

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# WHAT IS GRAD SCHOOL?

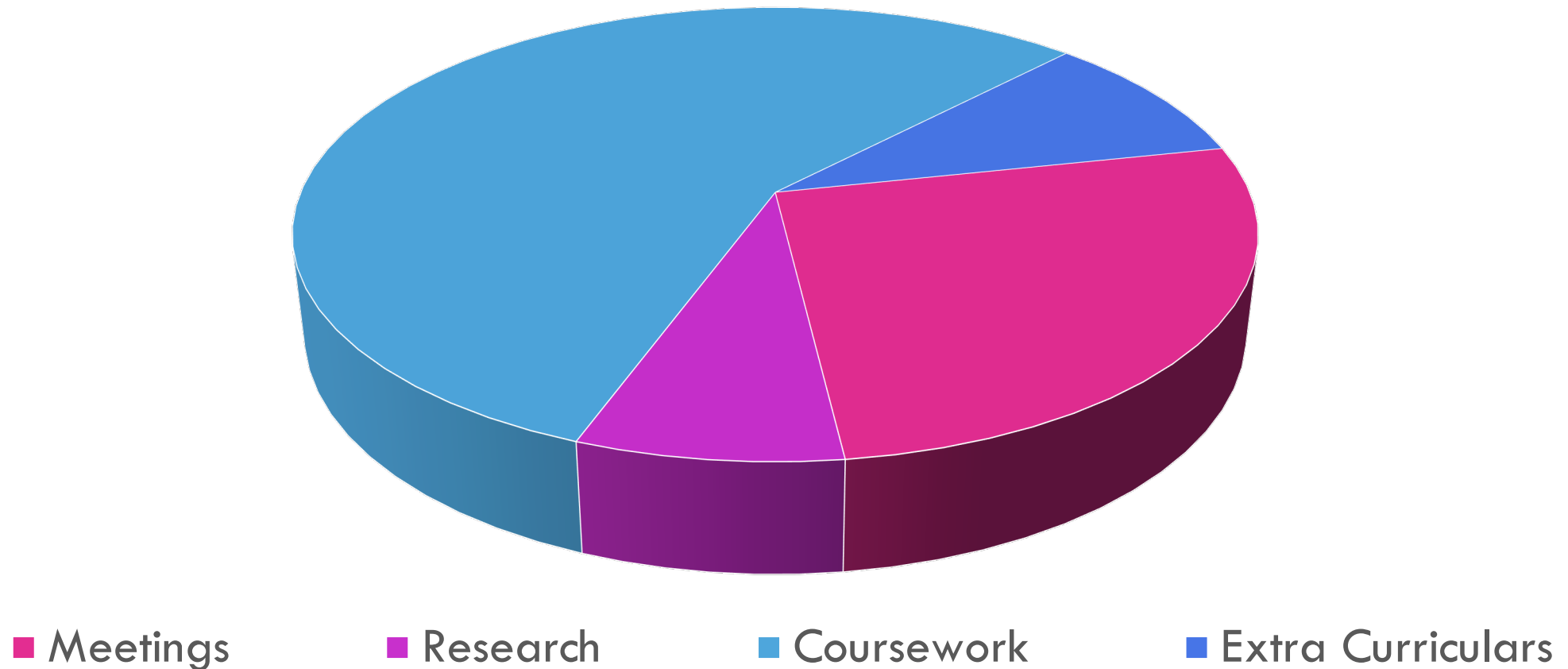
- Master's Degrees
  - Master of Engineering (MEng)
  - Master of Science (M.S.)
  - Master of Business Administration (MBA)
- **Doctorate Degree (Ph.D.)**

# PHD PROGRAM STRUCTURE

Year 1	Year 2	Year 3	Year 4	Year 5+
<ul style="list-style-type: none"><li>- Mostly coursework</li><li>- Screening exams</li></ul>	<ul style="list-style-type: none"><li>- Finish up coursework</li><li>- Start focusing on research</li></ul>	<ul style="list-style-type: none"><li>- Focus on research</li><li>- Qualifying exam</li></ul>	<ul style="list-style-type: none"><li>- More research!</li></ul>	<ul style="list-style-type: none"><li>- Finish up research</li><li>- Write dissertation</li><li>- Defend!</li></ul>

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## PHD STUDENT TIME BREAKDOWN (YEAR 1)





## SHOULD I WAIT A FEW YEARS?

### ■ **Pros:**

- More experience
- Save up money
- Getting a 'break'

### ■ **Cons:**

- Forget info from undergrad classes
- Hard to go back to school once you experience the real world (and money)

# TRUE OR FALSE

COMMON MYTHS  
AND  
MISCONCEPTIONS  
ABOUT GRAD  
SCHOOL

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WHAT CAN I  
DO TO PREPARE  
RIGHT NOW?

AM I 'ON TRACK'?

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# FRESHMAN YEAR

- Start looking for work experience opportunities
  - Ideally research related
    - Undergrad research assistant at your university
    - Summer internship at national laboratory (e.g. ORNL)
    - REU at institutions you're interested in for grad school
  - It's okay if it's an industry internship!
    - Good to explore and see what different things are like
    - Having 'real world' experience can be sold as a plus!



# SOPHOMORE YEAR

- Keep gaining experience and exploring your interests!
  - Don't be afraid to do a co-op
- Once you are in your discipline specific classes, pay attention to the courses and content you like!
- Start making impressions on your professors
  - Will need letters of recommendation later



# JUNIOR YEAR

- Start thinking about the GRE!
  - Standardized test – ALL (STEM and non-STEM) prospective grad students must take
  - There are free training opportunities – especially for women and URM in STEM
- Take the GRE for the first time
  - Ideally, the only time
- Think about which tech electives you take - see if there are any relevant to what you'd like to study in grad school



# SUMMER BETWEEN JUNIOR AND SENIOR YEAR

- Research which schools you want to apply to
- Start preparing your application materials
  - Statement of purpose
  - Personal statement
- Prepare for and/or take the GRE





# SENIOR YEAR

- Fall
  - Applications open!
  - Get your application together
  - Last chance to take the GRE
- Spring
  - Wait around to hear back + have plenty of existential crises
  - School visits
  - Interviews

# SENIOR YEAR – MY TIMELINE

Item	Date
Look into grad preview programs	7/1/2018
Email ONESTOP about GRE Fee Reduction Waiver	7/1/2018
Sign up to take GRE 1	7/10/2018
Have research area picked out	7/15/2018
Email grad admissions about GRE score	7/15/2018
Have list of research advisors and their areas	7/22/2018
Find 4-5 interesting professors at each school	7/22/2018
Start reaching out to professors I am interested in	7/29/2018
Look up reasearch publications for 4-5 interesting professors at each school	7/29/2018
Start writing statement of purpose (SOP)	8/1/2018
Find 2-3 groups with interesting publication and write 1 sentence or two about each group	8/10/2018
Have my first draft of SOP done	8/15/2018
Take GRE (1)	8/18/2018

Talk to your professors about what you want to do in graduate school. Get advice about programs you should look at.	8/22/2018
Take SOP to writing center	8/22/2018
First app opens	9/1/2018
Ask for letters of reccommendation	9/1/2018
Have prof and prof look at SOP	9/1/2018
Take GRE (2)?	9/8/2018
Open every application you plan to submit and at the very least fill in the recommenders section so they get emails sent to them.	9/15/2018
Get someone to edit your SOP for basic errors.	9/15/2018
Take SOP to writing center again	9/20/2018
Tailor SOP for each place I am applying	9/25/2018
Take GRE (3)?	9/29/2018
Remind your recommenders that they said they would write recs, give them a list of the places you are applying to so they make sure to get all of them.	10/1/2018
First app closes	11/15/2018
narrow down to 7 programs	

HOW DO I  
CHOOSE A  
GRAD  
SCHOOL?

THERE ARE SO MANY  
OPTIONS AND I HAVE  
NO IDEA WHAT I AM  
DOING WITH MY LIFE  
AND I AM SO  
OVERWHELMED



# CHOOSING A SCHOOL

- Research group
- Departmental community
- Research project
- Research advisor/PI
- Location
- University



# CHOOSING A SCHOOL

- Research group
- Departmental community
- Research project
- **Research advisor/PI**
- **Location**
- University





# CHOOSING A SCHOOL

- Look at rankings list (good starting point)
- Research professors at the different schools
- Ask a trusted advisor at your undergrad
- Ask other students in your field
- Ask alumni who have gone on to grad school

# CHOOSING A SCHOOL

A	B	C	D	E	F	G	H	I	J	K	L	M	N
School	App Open	App Deadline	Fee	Waiver?	Location	City Pop	1 br Apatment in city center	Loc Rank	Gender %	WW %	Nuke Rank	Overall Rank	My Rank
University of Michigan	9/1/2018	12/15/2018		<a href="#">FreeApp</a>	Ann Arbor, MI	120782	1390.91	4	19.2	7	1	4	1
MIT	9/15/2018	11/15/2018	75	<a href="#">YES</a>	Cambridge, MA	110651	1319.31	1	24.2	4	2	1	1
Texas A&M		12/1/2018	50		College Station, TX	112141	901.67	2	19.5	3	3	12	1
University of Wisconsin		1/1/2019	75	<a href="#">YES</a>	Madison, WI	252551	1175	1	20.0	2	5	20	1
UC Berkeley		12/17/2018			Berkeley, CA	121240	2291.67	1	30.1	1	5	3	2
NCSU		1/15/2019	75		Raleigh, NC	458880	1174.27	3	16.7	8	4	24	3
Georgia Tech		2/1/2018	75		Atlanta, GA	472522	1502.77	1	4.0	9	9	8	3
University of Washington					Seattle, WA	704352	1966.11					26	4
VCU			70		Richmond, VA	223170	1147.44	1				132	4
Tennessee					Knoxville, TN	186239	890	5	15.3	6	8	56	5
Ohio State				<a href="#">FreeApp</a>	Columbus, OH	860090	1176.75					29	5
UF					Gainesville, FL	131591	900					43	5
University of Utah					Salt Lake City, UT	193744	1152.14					58	5
University of New Mexico					Albuquerque, NM	559277	838.24					83	5
University of Missouri					Columbia, MO	120612	833.33					88	5

# GRAD APP COMPONENTS

AND HOW TO  
MASTER THEM



# WHAT ARE PROFESSORS LOOKING FOR?

- GPA
- Education (university)
- GRE
- Experience
- Reference letters

# Crafting

Statement  
of Purpose

Personal  
Statement

Resume

GRE  
Scores

Letters of  
Rec

Transcripts

GPA

App Fee

So much  
time



Acceptance?

# Crafting

Statement  
of Purpose

Personal  
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GRE  
Scores \$

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Rec

Transcripts \$

GPA

App Fee \$

So much  
time



Acceptance?

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Statement  
of Purpose

Personal  
Statement

Resume

Letters of  
Rec



GRE  
Scores

GPA



# GRE SCORES AND GPA (MY OPINIONS)

- Note a lot of schools aren't requiring GRE this year – take advantage of this!
- More and more studies agree the GRE isn't an accurate representation of knowledge
  - Discriminatory practice – generally people with more privilege will be able to afford tutors, etc.
  - It's not a measure of how smart you are, it is a measure of your ability to take the GRE
- GRE often used by professors when dealing with an unknown GPA system (e.g. foreign students)
- Generally, only the GRE math score matters
- GPA also not an absolute metric in my opinion
  - They say often say 3.3-3.5 minimum, but DO NOT BE DISCOURAGED IF YOU ARE BELOW THIS
  - GRE can be a saving grace for a low GPA

# RESUME

- 1 page (**professors are busy and have a lot of resumes to look through**)
- Organized and tailored
  - Research experiences
  - Publications (it's okay if you don't have any)
  - Technical skills
  - Relevant class projects
- Online presence (e.g. LinkedIn, ORCID, Github, and/or personal website)
- **Ask for feedback and help**
  - SWE
    - Ask your SWEeties mentor
    - Go to the workshop in the spring
    - Professional resume reviewer when you upload profile to job site (e.g. for conference)
  - Professional Practice
  - Center for Career Development

## Education

### The University of Tennessee

*Bachelor of Science in Honors Nuclear Engineering*

GPA: [REDACTED] / 4.00

Knoxville, TN

August 2014-May 2019

## Experience

### Argonne National Laboratory

*Intern*

Chicago, IL

May 2018-August 2018

- Developed code in Fortran to update SAS4A/SASSYS-1 input preprocessor to allow free format input.
- Extended unit testing capabilities of SAS4A/SASSYS-1.

### University of Tennessee

*Nuclear Engineering Undergraduate Research Assistant*

Knoxville, TN

January 2017-Present

- Evaluate transition from an open to closed nuclear fuel cycle using Cyclus fuel cycle analysis code.
- Assemble input files of various fuel cycles written in XML.

*Nuclear Engineering Undergraduate Teaching Assistant*

August 2018-Present

- Develop weekly review sessions for Thermal Science course.
- Provide tutoring services for students enrolled in Thermal Science.

*Materials Science Undergraduate Research Assistant*

May 2015-May 2016

- Synthesized a sample for study using conventional solid-state synthesis.
- Conducted an *in-situ* high temperature x-ray diffraction (XRD) study and analyzed XRD patterns.

### Dominion Energy

*Nuclear Safety Analysis Intern*

Richmond, VA

May 2017-August 2017

- Analyzed Time to Core Boil (TTCB) for various RCS conditions in GOTHIC thermal-hydraulic code causing TTCB to at least double in some cases.
- Communicated with Surry personnel to get input on how to present TTCB analysis in a way that would be most easily used by plant operators.

*Spent Nuclear Fuel Intern*

August 2016-December 2016

- Created a database of Millstone Power Station spent fuel which allows engineers to extract data for dry storage more efficiently causing a reduction of engineering work time of at least 50%.
- Evaluated source range lengths for earlier cask loading of non-fuel core components.

*Nuclear Core Design Intern*

January 2016-May 2016

- Reported burnup, isotopic, and monthly core follow data and ensured plant was operating as expected.
- Investigated secondary source assemblies and determined that they would need to be replaced earlier than previously thought.

## Activities

### UTK Society of Women Engineers (SWE)

*President*

Knoxville, TN

April 2018-Present

- Interface with company representatives to develop partnerships for the 2018-2019 academic year.
- Organize UTK chapter attendance at SWE annual conference, WE18. Recruited 27 members to attend and obtained sponsorship to defray attendee cost.
- Manage team of 7 officers and 9 chairs.

### UTK American Nuclear Society (ANS)

*Secretary*

Knoxville, TN

May 2017-May 2018

- Recruited volunteers to help with local section's outreach event at local children's museum for Nuclear Science Week.
- Developed a points system to track the number of events that members attend and reward highly involved members with a scholarship to those with the most points at the end of the academic year.

## Skills

Familiar with Windows and LINUX OS

Some Programming Experience in Visual Basic, Python, XML, and Fortran

Comfortable with the following software:

Microsoft Office • OriginPro • CrystalDiffact • MATLAB • CMPR

Tip: use LaTeX to make your resume. Overleaf makes it super easy, and has a ton of templates!

KALIE KNECHT	
EDUCATION	
University of California, Berkeley	Berkeley, CA
Doctor of Philosophy in Nuclear Engineering GPA: [REDACTED]	August 2019 - Present
• Nuclear Science and Security Consortium Fellow	
University of Tennessee	Knoxville, TN
Bachelor's of Science in Honors Nuclear Engineering GPA: [REDACTED]	August 2014 - May 2019
SKILLS	
Programming Languages:	Python and Fortran
Code Proficiencies:	MCNP, GOTHIC, and Cyclus
Version Control:	git and SVN
Operating Systems:	Windows, macOS, and Linux
Laboratory Skills:	X-ray Diffraction, Radiation Measurements, and Gamma Ray Spectrum Analysis
RESEARCH EXPERIENCE	
Lawrence Berkeley National Laboratory	Berkeley, CA
Graduate Student Researcher	August 2019 - Present
• 3D Compton image reconstruction with scene data fusion using a free-moving gamma-ray detector and auxillary contextual sensor package.	
• Analyzing radiation data from Fukushima Daiichi Nuclear Power Station parking lot.	
Oak Ridge National Laboratory	Oak Ridge, TN
Safeguards & Security Technology Intern	May 2019 - August 2019
• Investigated current international safeguards methods for research reactors.	
• Collected data from HFIR-REDC Pu-238 production process to determine characteristics of normal operation at a research reactor with collocated hot cell facilities.	
Argonne National Laboratory	Lemont, IL
Nuclear Science & Engineering Intern	May 2018 - August 2018
• Developed code in Fortran to update SAS4A/SASSYS-1 input preprocessor to allow free format input.	
• Extended unit testing capabilities of SAS4A/SASSYS-1.	
TEACHING EXPERIENCE	
University of California, Berkeley	Berkeley, CA
Graduate Student Instructor	April 2020 - Present
• Recording laboratory experiments to ensure safe & equitable learning during the COVID-19 pandemic.	
University of Tennessee	Knoxville, TN
Undergraduate Teaching Assistant	August 2018 - May 2019
• Developed weekly review sessions for Thermal Science and Reactor Theory courses.	
• Provided tutoring services for students enrolled in Thermal Science and Reactor Theory.	
LEADERSHIP	
UCB Radwatch	
Graduate Student	August 2019 - Present
• Engaging with the community regarding the risks and hazards of radiation in our environment.	
• Managing Twitter account (@UCBRadWatch).	
• Transitioning website to Wordpress and ensuring website information is current and accurate.	
Fission Products Mentoring Program	
Executive Committee	January 2020-Present
• Founded a mentoring program for Nuclear Engineering undergraduate students.	
• Developed goals and a tracking metric for the first iteration of the program.	
Society of Women Engineers	
GradSWE Community Mentoring Coordinator	October 2019 - Present
• Promoting mentoring program to graduate students during registration period.	
• Coordinated webinars for graduate students to build skills during COVID-19 crisis.	
UCB GradSWE Member	August 2019 - Present
• Led a roundtable discussion on mentoring at a section lunch event.	
• Presented on Mentoring Undergraduates in the Laboratory and Classroom at weSTEM 2020 conference.	

# STATEMENT OF PURPOSE

- Sometimes combined with personal statement
  - Write 1 general one, and tailor to each school you apply to
  - Start working on this as early as you can
    - Modify scholarship application essays
  - 1-3 pages
  - Have everyone read it – tech and nontech
  - Look for examples! Mine is available to you
- Components
    - Academic and research background
    - Career aspirations, long-term goals
    - How will grad program help you meet your career and educational objectives?
    - Research plans – as much as you have formulated
      - Brief intro to thesis research
      - Research hypothesis, design, timeline
      - It is okay if you don't have a research hypothesis yet!
    - Name(s) of professor(s) you want to work for (?)



One of my favorite experiences in the past few years was completing a neutron detection laboratory with a group of students at the VR-1 Research Reactor in Prague. Through the course of this trip, we visited many Czech nuclear sites including Bukov Mine, the Temelín Nuclear Power Station, and the Řež Research Center. We also visited the United Nations complex in Vienna. Here we attended talks by the International Atomic Energy Agency (IAEA) and Comprehensive Nuclear-Test-Ban Treaty Organization. This experience exposed me to a whole new world of jobs that I was previously only aware of in my periphery. Prior to this I thought that most of the jobs associated with nuclear security required policy people – I was not aware of the value I could bring to the table as a technical worker.

During my undergraduate career, I have found that I most enjoyed the courses on how radiation interacts with matter and radiation detection. I find everything from the physics of the radiation losing energy to the electronics of detectors to be fascinating. My interest in nuclear detection paired with the appeal of jobs that help make our world more secure has brought me to a decision in what I would like to do for my career. I wish to work in the nuclear security and nonproliferation sphere. Between my love of travel and desire to work in this area, I would be interested in someday working at the IAEA. I have also been exposed to the national laboratory environment and found it appealing, so I can envision myself conducting research on nuclear nonproliferation and security at a national laboratory.

Throughout my undergraduate degree, I have been fortunate to have a variety of internships and research positions. Halfway through my undergraduate career, I took a year away from school to work at Dominion Energy in their nuclear corporate office. Over three rotations, I interned in the core design, spent fuel, and safety analysis applications groups. I also had the opportunity to go to some of Dominion's plants during refueling outages, where I got to tour the plant and see how it operates. While I plan to orient my career toward a more research-based area, I do believe that my experiences interning at Dominion have helped to give me a big-picture overview of the nuclear industry and allowed me to be more comfortable with nuclear engineering.

In the early years of my undergraduate education, I conducted research concerning the use of pyrochlore crystalline structures as nuclear waste forms for the immobilization of High Level Waste. This research position involved experimental laboratory work, so through this position I learned that I enjoy hands-on laboratory work. I also learned about long term storage and the proliferation concerns that run alongside it. I gained research skills such as synthesizing samples, measuring data, and most importantly how to communicate my results. I believe that my experience with undergraduate research has laid a good groundwork for the skills I will need to conduct research on detection in the future.

This past summer I completed an internship at Argonne National Laboratory, where I found that I enjoy working in the national laboratory setting. My task for the summer was to develop code in Fortran to update the input processor SAS4A/SASSYS-1, a deterministic analysis code for fast reactors. I wrote documents describing the design of my software and my plan for testing its functionality. I also learned about version control and how to work with others to develop code. A large part of my internship was extending unit testing capabilities of SAS4A/SASSYS-1, so I became well acquainted with the process of testing new pieces of code. This internship experience will be valuable to me in my graduate studies because it greatly increased my competency with coding, which could serve me well in tasks such as writing scripts to help with data analysis.

Currently, I conduct undergraduate research at The University of Tennessee using the Cyclus fuel cycle simulator to evaluate the transition from an open to a closed nuclear fuel cycle. One of the largest challenges I have faced in my research is extracting data from the databases output by the simulator. To help manage this task, I have used a Python script that allows me to extract relevant parameters from the databases. Part of my research involves looking at mass flows to address proliferation concerns as we transition to an open nuclear fuel cycle. This experience has given me familiarity with the nuclear fuel cycle, which will be very useful to me in my career as I identify areas of proliferation concern.

Because I am interested in nuclear detection and nonproliferation, I have taken a few relevant graduate courses as an undergraduate. One of the courses I have taken is titled Radiation Protection. In this course, I developed a fundamental understanding of the physics and biology behind radiation interactions with matter, including detailed content on indirectly ionizing radiation. This is relevant because an understanding of how radiation interacts with detector medium is crucial to developing new detection methods.

I have also taken a graduate course titled Nuclear Security Science & Analysis. The keystone project of this course was an exercise where our class worked as a group to manage a hypothetical company that builds a nuclear material storage facility and transports material to the new site. We planned measures to keep the nuclear material secure, and at the end of the course we travelled to Y-12 for a tabletop exercise where Y-12 security personnel played as our adversary. The experienced Y-12 personnel were able to breach our nuclear security measures, but the project was a great tool for learning how an actual nuclear material theft scenario would play out. This course is relevant because if I want to develop detectors to help ensure nuclear security, it is important that I understand the capabilities of nuclear threats. This course, along with Radiation Protection, also showed me that I can succeed in graduate level courses.

My academic goal for graduate study is to investigate radiation detection methods for nuclear nonproliferation applications. By researching new detection methods and improving old ones, I hope to be able to address nuclear security problems that the world faces. I enjoy technical work, but I also like to exercise other parts of my brain by looking at the bigger picture – how can we develop security systems that work? What threats can we reasonably expect? What policy do we need to implement to ensure we can live in a world safe from nuclear threats? I envision myself using the physics-based principles of radiation interactions that I enjoy to improve and innovate nuclear detection methods, but also having the opportunity to take a step back and see how my work fits into an overall plan for nuclear security.

I wish to pursue my Ph.D. in Nuclear Engineering at UC Berkeley because I think much of the work done in the department directly lines up with my interests. I am interested in developing gamma and neutron imaging methods for nonproliferation, much like the research being done by Dr. Vetter and Dr. Norman. I also have enjoyed my experiences involving numerical methods, so I would be interested in working with Dr. Slaybaugh on neutron transport methods with nonproliferation applications. Pursing graduate studies at UC Berkeley would allow me to achieve my goals of developing new technology for proliferation detection, while also collaborating with nearby national laboratories. This would allow me to make valuable connections for me to pursue career opportunities once I have completed my graduate work.



One of my favorite experiences in the past few years was completing a neutron detection laboratory with a group of students at the VR-1 Research Reactor in Prague. Through the course of this trip, we visited many Czech nuclear sites including Bukov Mine, the Temelín Nuclear Power Station, and the Řež Research Center. We also visited the United Nations complex in Vienna. Here we attended talks by the International Atomic Energy Agency (IAEA) and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBT). This experience exposed me to a whole new world of jobs that I was previously only aware of in my periphery. Prior to this I thought that most of the jobs associated with nuclear security required policy people – I was not aware of the value I could bring to the table as a technical worker.

### Intro/basic interests

During my undergraduate career, I have found that I most enjoyed the courses on how radiation interacts with matter and radiation detection. I find everything from the physics of the radiation losing energy to the electronics of detectors to be fascinating. My interest in nuclear detection paired with the appeal of working in a field that makes our world more secure has brought me to a decision in what I would like to do for my career. I wish to work in the nuclear security and nonproliferation sphere. Between my love of travel and desire to work in this area, I would be interested in someday working at the IAEA. I have also been exposed to the national laboratory environment and found it appealing, so I can envision myself conducting research on nuclear nonproliferation and security at a national laboratory.

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### Past experience

In the early years of my undergraduate education, I conducted research concerning the use of pyrochlore crystalline structures as nuclear waste forms for the immobilization of High Level Waste. This research position involved experimental laboratory work, so through this position I learned that I enjoy hands-on laboratory work. I also learned about long term storage and the proliferation concerns that come with high level waste. I gained research skills such as synthesizing samples, measuring data, and most importantly how to communicate my results. I believe that my experience with undergraduate research has laid a good groundwork for the skills I will need to conduct research on detection in the future.

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### Relevant coursework

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### Research goals

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### What drew you to this university

## Past experience

### What you did

Throughout my undergraduate degree, I have been fortunate to have a variety of internships and research positions. Halfway through my undergraduate career, I took a year away from school to work at Dominion Energy in their nuclear corporate office. Over three rotations, I interned in the core design, spent fuel, and safety analysis applications groups. I also had the opportunity to go to some of Dominion's plants during refueling outages, where I got to tour the plant and see how it operates. While I plan to orient my career toward a more research-based area, I do believe that my experiences interning at Dominion have helped to give me a big-picture overview of the nuclear industry and allowed me to be more comfortable with nuclear engineering.

In the early years of my undergraduate education, I conducted research concerning the use of pyrochlore crystalline structures as nuclear waste forms for the immobilization of High Level Waste. This research position involved experimental laboratory work, so through this position I learned that I enjoy hands-on laboratory work. I also learned about long term storage and the proliferation concerns that run alongside it. I gained research skills such as synthesizing samples, measuring data, and most importantly how to communicate my results. I believe that my experience with undergraduate research has laid a good groundwork for the skills I will need to conduct research on detection in the future.

### How it prepared you for grad school

This past summer I completed an internship at Argonne National Laboratory, where I found that I enjoy working in the national laboratory setting. My task for the summer was to develop code in Fortran to update the input processor SAS4A/SASSYS-1, a deterministic analysis code for fast reactors. I wrote documents describing the design of my software and my plan for testing its functionality. I also learned about version control and how to work with others to develop code. A large part of my internship was extending unit testing capabilities of SAS4A/SASSYS-1, so I became well acquainted with the process of testing new pieces of code. This internship experience will be valuable to me in my graduate studies because it greatly increased my competency with coding, which could serve me well in tasks such as writing scripts to help with data analysis.





# PERSONAL STATEMENT

- Background and life experiences, including social, cultural, familial, educational
- What opportunities or challenges motivated your decision to pursue a graduate degree at this university?
- Have people read it
- 500-word limit
- If there is a university fellowship that you believe you are eligible for, include details pertinent to that here
- A great place to talk about ‘gaps’ in your application (e.g. low GPA)
- Look at examples!

When I decided to pursue nuclear engineering, I was not aware of the large gender disparity in engineering. This fact quickly became obvious to me in my first-year engineering courses when I walked into large lecture halls and saw only a handful of women. It can be difficult to feel included as a woman in engineering, which is why I have found myself drawn to groups that are committed to diversity and inclusion (D&I). It is easy to become frustrated after being ignored in group projects, receiving “soft” tasks like report writing, and hearing that I only got my internships because I am a woman. However, one thing I have always found energizing when I feel discouraged is involvement with D&I work.

In the past few years, I have served in leadership roles for groups such as Women in Nuclear and the Society of Women Engineers (SWE), as well as serving on my college’s Women’s Leadership Council. Through my high level of involvement in D&I affairs in my college, I have noticed that there is a large effort to recruit women into engineering at many universities, but not a whole lot of effort focused on retaining them. I also notice this in my classes – as I look around, I notice the number of women becomes fewer and fewer every year. I know the women around me are qualified and capable, so why are they switching to other fields? I cannot help but to think it is because many of these women do not feel included. One way I have tried to tackle this problem is through my involvement with SWE. Last year I oversaw our mentorship program, which has a stated goal of improving retention among women in engineering. In this role, I created professional development goals for mentees to complete and ensured that pairs were meeting up to complete them. This program has a twofold effect of letting mentors and mentees feel like competent professionals, but also allowing them to feel included by finding a friend within SWE. I am closing out my undergraduate career by serving as the president of SWE, where I bring in female engineers from a variety of companies to talk about their experiences as women in the engineering field.

I am attracted to graduate studies at UC Berkeley because I have noticed an exemplary dedication to D&I. I am very impressed by the faculty equity advisers incorporated in each department in the college of engineering. Additionally, at SWE conference this year, I spoke with current Berkeley students and learned about how involved the SWE section is. It is important to me to know that outside of my graduate coursework, I will have a space to work on the diversity initiatives that I find valuable. It is also important for me to feel included for the next several years as I pursue my career, and it is good to know that I will be welcome at UC Berkley.

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# LETTERS OF REC

- You need 3!
- Ask people who know you best
  - Research advisors
  - Internship mentors (industry or national lab)
  - Instructors
  - Advisors of clubs you're involved in
  - You **MUST** have a relationship with them – a generic letter is about as good as no letter at all
- Ask early (2+ months before deadline)
- Making the ask
  - Explain plans – what schools you're applying to, what research interests, etc.
  - Why you're asking them
  - What you'd like them to highlight
  - Say thank you!
  - Be humble, remember they are busy
  - Provide materials: draft essays, resume, info about graduate program
  - If applying to multiple, make clear list with instructions, send updates

# LETTERS OF REC

- Follow up
  - Reminders, continuous updates, specific instructions, be clear
  - Thank you a bunch of times
  - Let them know where you get in
  - Let them know where you decide to go
  - Write a thank you again at the end!
- Other tips
  - Make sure they can write you **STRONG** letter

Hello [REDACTED],

I hope you had a good weekend! I have opened all of my graduate school applications, and they require letters of reference. I am applying to 5 schools for Nuclear Engineering PhD programs - U of Michigan, University of Wisconsin, UC Berkeley, MIT, and NC State. I might apply to a few more, but that is yet to be determined. Would you mind writing a letter of reference for me for these?

Thank you,

**Kalie Knecht**

President | UT Society of Women Engineers

Undergraduate Research Assistant | UT Nuclear Engineering

[kknecht2@vols.utk.edu](mailto:kknecht2@vols.utk.edu) |

Hello [REDACTED],

I hope your week is off to a great start! Thank you again for providing a reference letter for me in all of my graduate applications! I started to hear back a couple of weeks ago, and have now heard something from everyone so I wanted to give you an update:

[REDACTED]

I'll keep you updated when I make a decision. It is a little bit overwhelming right now, so I'm not exactly sure what I'll ultimately end up picking. Thank you again for helping out! This would not have been possible without you.

Thank you,

**Kalie Knecht**

President | UT Society of Women Engineers

Undergraduate Research Assistant | UT Nuclear Engineering

[kknecht2@vols.utk.edu](mailto:kknecht2@vols.utk.edu) |



# APPLICATION TIMELINE

- September/October: Applications open
- December/January: Applications close
- February: Start hearing back from programs, maybe some phone convos/interviews
- February/March: Visit weekends
- April 15: Decision deadline





# THE VISITS

- It IS an interview
- Current grad students CAN provide input
- A fun opportunity to meet your future cohort!

# MONEY SAVING TIPS - GRE

- GRE Fee Reduction
  - 50% discount (\$205 -> \$102.50)
  - Limited quantity – first come, first serve
  - Requirements
    - Receive financial aid
    - EFC less than:
      - \$2500 (FAFSA dependent)
      - \$3000 (FAFSA self-supporting)
  - Also get access to free test prep resources!
  - Will still have to pay to send your test to additional schools! \$27/additional score (send 4 for free)



# MONEY SAVING TIPS – APP FEES

- Application fees CAN BE WAIVED
  - Fees usually range \$35-\$125
  - Visit university booths at conferences like WE20 and ask for fee waiver (maybe not this year...)
  - Literally just email the admin in the department you are applying to and ask for one



# MONEY SAVING TIPS - TRANSCRIPTS

- Official transcripts aren't usually required until you are accepted
  - Buy a PDF of your transcripts (~\$10) and upload to all of your applications
  - Some schools might even accept the free way to export a 'transcript' through Academic History/My Grades on myutk
  - Don't send official transcript until you've accepted and they ask for it

# TRICKS & TIPS

- Do everything you can to make yourself 'known'
  - Email professors you're interested in working for
  - Go to conferences to network with prospective advisors
  - Make a professional Twitter for networking
- Ask a professor for candid advice
- Reach out to your support network
  - Help with putting the application together
  - Stay in touch with people who believe in you! Emotional support is important during this process too!
- Don't think that you must be 'good enough' for a grad school
  - Bad mentality!!!
  - You ARE good enough
  - Realize that you have value
- What do you value in a grad school, and can the school offer that to you?

# RESOURCES

- [Strategies for a Strong Grad School Application](#)
- [Kristine's Declassified Grad School Survivor Guide](#)
- [GradSWE Mentoring program](#)
- [Katie Mummah's grad school visit advice](#)
- Reddit
  - [https://www.reddit.com/r/gradadmissions/comments/d2hrqr/the\\_ultimate\\_guide\\_to\\_applying\\_to\\_engineering/](https://www.reddit.com/r/gradadmissions/comments/d2hrqr/the_ultimate_guide_to_applying_to_engineering/)
  - [https://www.reddit.com/r/GradSchool/comments/2banmm/what\\_to\\_know\\_about\\_applying\\_for\\_graduate\\_school/](https://www.reddit.com/r/GradSchool/comments/2banmm/what_to_know_about_applying_for_graduate_school/)



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QUESTIONS?

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KALIE.INFO

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