Middle East Studies is a new interdisciplinary major that focuses on the region of the Middle East, past, present, and future.

My Middle East Studies concentration has provided me with some of the most fascinating and compelling coursework, and my Arabic classes greatly enriched my understanding of the world. This program led me on some of the most fantastical adventures of my life in Oman, Saudi Arabia, and Dubai, and ultimately as a 2017 Boren Scholar in Jordan. I cannot imagine my college experience without this program.”

- LUCY GREER (’18)

Pictured on the cover: Since 1990, spectacular images of the cosmos transmitted by NASA’s Hubble Space Telescope have allowed us to see what once existed only in scientists’ computations.
Introducing **HIGHER GROUND 2017**

In the College of Arts and Sciences, we work to set ourselves apart and create a student experience that reaches beyond the ordinary. The stories in this year’s annual report highlight educational opportunities that cultivate curiosity in our students and engage them in the global society.

4 BEYOND THE ORDINARY
6 UNCOVERING MICROBIAL MYSTERIES
10 THE NEUTRON STAR FRONTIER
13 A CRITICAL RACE PERSPECTIVE
16 SERVICE LEARNING: A GLOBAL EXPERIENCE
18 STUDYING THE MEMORY OF WAR
20 AN ACT OF FAITH
23 EXAMINING THE LIFETIME OF A BRAIN
24 SYSTEMS DEEP DIVE: BIOLOGY AT THE MOLECULAR LEVEL
26 RESEARCH THAT MATTERS
28 FROM BUDDHIST SCRIPTURES TO DISTILLED SPIRITS
30 THE WRITE INVESTMENT
32 JOIN THE JOURNEY
34 FISCAL YEAR 2017
35 A STRONG LEGACY

**HIGHER GROUND** is the annual report of the College of Arts and Sciences at the University of Tennessee, Knoxville.

DEAN
Theresa M. Lee

EDITOR/WRITER
Amanda Womac
Director of Communications

ART DIRECTOR AND DESIGNER
Susanne S. Cate
Print Communications Manager

WEB DESIGNER
Jeremy Hughes
Digital Communications Manager

All qualified applicants will receive equal consideration for employment and admission without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, genetic information, veteran status, and parental status. In accordance with the requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990, the University of Tennessee affirmatively states that it does not discriminate on the basis of race, sex, or disability in its education programs and activities, and this policy extends to employment by the university. Inquiries and charges of violation of Title VI (race, color, and national origin), Title IX (sex), Section 504 (disability), the ADA (disability), the Age Discrimination in Employment Act (age), sexual orientation, or veteran status should be directed to the Office of Equity and Diversity, 1840 Melrose Avenue, Knoxville, TN 37996-3560, telephone 865-974-2498. Requests for accommodation of a disability should be directed to the ADA Coordinator at the Office of Equity and Diversity. PAN E01-1001-004-18 CAS JOB 18-059
Beyond the Ordinary

From microbes in the depths of the ocean to neutron stars in galaxies far, far away, teaching and research opportunities in the College of Arts and Sciences cultivate curiosity in our students. Outreach and study abroad programs engage our students in the global society that waits for them upon graduation. As students of the liberal arts, they experience the breadth and depth of what an academic career can offer, see that learning put into action, and develop a thirst for knowledge that stays with them for a lifetime.

We work to set ourselves apart and create a student experience that reaches beyond the ordinary. Through out-of-classroom educational experiences such as internships, research opportunities, community service-learning, and study abroad programs, our students take what they learn in the classroom and apply it to real-world situations. They discover how knowledge is applicable and relevant during their university experience, which provides a foundation for careers and life-long learning.

Our expanding advising staff help our students explore academic, experiential, and career choices. Students receive good advice on possible academic paths based on career assessments and time our advisors spend talking to them about their interests and career goals. Our exploratory program helps students discover all we have to offer in the College of Arts and Sciences and chart their academic careers.

The diversity of academic programs offered at the undergraduate and graduate level sets us apart on campus. In addition, each of our graduate programs is ranked among the top one percent of their peer programs or departments in other four-year schools. Faculty in these departments attract high-quality students from all over the world who want to engage in exciting research and creative endeavors. Graduates of these programs carry the torch for academic excellence to other universities, set the stage for creative expression in their communities, and make an impact as engaged, global citizens.

We continue to build on this foundation of academic excellence in several ways. Online summer education programs provide students with more opportunities to engage in learning and help them finish their degree in a timely manner. Strong Hall, which opened for courses in June 2017, is a state-of-the-art science facility designed for an active and exploratory approach to learning. Leaders at universities across the country are using the design as an example for renovating their own teaching and research facilities. In the coming year, we will open the Mossman Building, which will house faculty from our Departments of Biochemistry and Cellular & Molecular Biology, Microbiology, and Psychology.

We remain focused on diversity and are hiring more underrepresented faculty and attracting more out-of-state students. Our faculty members are active in cutting-edge research and creative endeavors, political and social justice issues, and take pride in being a Volunteer. Our students are engaged leaders who are making an impact on campus, in our Knoxville community, and around the world.

Most of our success is possible due to the generosity of our Volunteer family. We launched the Join the Journey campaign with a goal of $100 million to support faculty, students, and strategic opportunities in the College of Arts and Sciences. Thanks to the support of our donors and alumni, each year of the campaign we move closer to our goal. This year, we are on track to raise more than $20 million, which will be the biggest year yet. We hope you continue to join us on our journey to the top and help make an impact in Tennessee, the nation, and the world.
Pictured above: College of Arts and Sciences Dean Theresa M. Lee and members of the Dean's Student Advisory Council.
Karen Lloyd spends most of her waking hours thinking about mud. Specifically, the mud at the bottom of the ocean and trying to determine how deep into the earth she can dig and still find something alive.

“There is a vast and highly diverse microbial biosphere living under the ocean floor we hardly know anything about,” says Lloyd, assistant professor in the Department of Microbiology.

Microbes exist in every environment and often come from deep evolutionary branches of life. Uncovering the mysteries of these deep-sea microbes is changing how Lloyd and other scientists understand life on earth.

In the 1980s, scientists started using DNA to tell microbes apart. They sequenced the DNA of microbes and discovered they are more distantly related to each other than they are to humans. This revelation threw scientists for a loop. Three decades later, Lloyd and her colleagues had their own revelation.
“We discovered several new categories of microbes,” Lloyd says. “It’s really putting our assumptions of how all microbes are related to each other in disarray.”

Lloyd studies microbes across the globe – from Arctic fjords to Costa Rica subduction zones – and each project provides an opportunity for her graduate and undergraduate students to conduct research on a variety of topics.

In the Arctic fjords, Lloyd, two doctoral students, and an undergraduate student are examining the effects of climate change in the polar regions by studying microbes and marine sediments at the foot of receding glaciers. Microbial life actively changes its environment and leaves its impression in recently deposited sediment layers. By studying these layers, Lloyd and her students are able to get a snapshot of the earth across climactic changes. Understanding the current microbial activity and comparing it to how it changes with different types of sediment layers help Lloyd and her team learn more about the future of the planet.

Lloyd’s project in Costa Rica, “Biology Meets Subduction,” involves a team of petrologists, geologists, geochemists, volcanologists, and microbiologists. Their goal is to understand the active subduction zone between the Caribbean and Cocos tectonic plates.

“In order to get at the question of how deep into the earth life actually goes, you need to have some interaction with people who understand how deep-earth processes work,” Lloyd says. “The whole point of this project is to get us working together to solve that question.”

An important aspect of the project is to study the interface of life and volcanic systems to understand how carbon cycles between the earth’s surface and interior in the active subduction zone that runs from Panama to Nicaragua. The movement of these tectonic plates is what
causes earthquakes in Central America. Understanding how the movements happen and what gives rise to the deep-earth processes will aid in efforts of understanding the entire system and how it causes earthquakes, which are currently completely unpredictable.

“All of these geological processes are being affected by microbes, which are part of the puzzle that have been completely ignored,” Lloyd says. “It could be that there’s very little happening, but historically speaking, once we start looking at how microbes affect any environment, we discover they are behind a lot of the processes.”

Microbes fill every niche on earth – from the base of the Mariana Trench to the stratosphere. As Lloyd and her colleagues continue to find ways to study the highly diverse microbial systems, they will one day be able to provide the answer to what life, all of life, is like on earth.

micro.utk.edu
Although he was interested in astrophysics at a young age, **Andrew Steiner** was never a big telescope person. Growing up, he preferred books by science giants, such as Carl Sagan, and loved math. He gravitated towards theoretical astrophysics during college and now works on the cutting edge of answering fundamental questions about the universe.

“Neutron stars have the potential to teach us more about where we came from and answer the fundamental questions about how our universe works,” says Steiner, assistant professor of physics. “In the field of nuclear physics, one of the big questions is what is the nature of dense matter. Neutron stars are the only place to answer that question.”

Neutron stars are very small celestial objects with high density. They are composed predominantly of closely packed neutrons.

In August 2017, scientists at the Laser Interferometer Gravitational Wave Observatory (LIGO) in both Livingston, Louisiana, and Hanford, Washington, detected gravitational waves from a merger of two neutron stars. Gravitational waves, first predicted by Albert Einstein in 1916, are essentially ripples in the fabric of space and time caused when an object with mass moves. They are extremely weak, and it was not until 2016 that researchers successfully detected the first direct evidence of gravitational waves from a collision of two black holes. The 2017 detection was the first from merging neutron stars.
“The detection of gravitational waves by LIGO is a significant accomplishment and an important step for our community because they provide a new window into neutron stars and our universe,” Steiner says.

Since detecting gravitational waves is still new, it is important for physicists to have an approximate idea of what they are looking for in the data before they look for it. That is where Steiner and his research team come in.

“It’s important for the physicists at LIGO to have a good educated guess of what kinds of signals they are likely to see,” Steiner says. “Part of what we do is try to make that educated guess. We are pushing forward to find out what are the limits on realistic signals in terms of this parameter called tidal deformability.”

A critical parameter to understanding why some neutron stars are better at generating gravitational waves than others can be called squishiness, which is a measure of the response to tidal forces and very similar to how the Earth responds to the tidal force from the moon. Using neutron star models, Steiner and his research team estimate neutron star masses and radii.

“The squishiness of a neutron is correlated with radius,” Steiner says. “A large radius implies large squishiness. If we can measure neutron star radii, we can predict tidal deformability. So far, our research group’s predictions of neutron star tidal deformabilities are spot on.”

Understanding neutron stars provides opportunities to study other cutting-edge physics problems.

“Neutron stars provide a window for us to test our knowledge and gain a better understanding of the properties of nuclear matter, which will also help boost generations of endeavors from both nuclear theorists and experimentalists,” says Xingfu Du, a third-year graduate research assistant in Steiner’s group.

As Steiner and his research team continue to push the frontier in neutron star data analysis, humanity’s long-lasting quest to understanding the universe and our relationship to it comes more into focus.

“In everyday life, ingredients of science and technology are permeated in education, political geography, military, space science, entertainment, literature, and history,” says Sophia Han, postdoctoral research associate in Steiner’s group. “Satisfying society’s scientific interests and curiosity is a vital part of the role of scientific research. The fact that elements as building blocks of life on earth are dated back to endpoints of stellar evolution far, far away in space time still strikes me. I believe this is a breathtaking era to extend the frontier of our knowledge and tackle complex problems in science for the common good.”

phys.utk.edu

“I find the mere fact that objects such as neutron stars exist to be incredible and awe inspiring.”

-Spencer Beloin, graduate research assistant
A Critical Race Perspective

A new program in the Department of Sociology is attracting more diverse and highly qualified applicants interested in studying the structural foundation of racism.

The Critical Race and Ethnic Studies program offers a variety of courses at both undergraduate and graduate levels to prepare students for understanding the issues of race and ethnicity in the 21st century.

We live in an increasingly diverse world and need to train our students for it.

CRITICAL RACE defined:

A critical race perspective focuses on the foundational, structural, and contextual nature of racism and helps to explain the deeply entrenched racial inequalities plaguing nearly every domain of social life. It has revolutionized the way scholars in multiple disciplines understand race and ethnicity in the United States and beyond.
“We live in an increasingly diverse world and need to train our students for it,” says Stephanie Bohon, associate professor of sociology. “Ultimately, a big part of our job here is to prepare a future generation of people for the labor market. Students are not only going to work in a racially diverse environment, they are going to have a racially diverse set of clients and customers and engage in actions that could potentially cause racial harm or racial good. They need to be prepared for it. The university preparation is a big part of it.”

Several faculty in the department already incorporate race as part of their teaching and research, so developing a concentration area in critical race and ethnic studies was a natural next step. Fitting it into the broader social justice curriculum was an important component to figuring out what kind of program they could offer.

“We had already been trying to establish ourselves in doing social justice work and wanted to make sure that adding this concentration area would follow along those lines, which led us to emphasizing critical race theory,” says Michelle Christian, assistant professor of sociology. “As we were doing prep work for the program, we realized we could potentially have a unique niche in the larger sociological world.”

Most critical race scholars at other universities are the only faculty member in their department or program who engage in the research and end up taking on the bulk of the graduate students interested in study critical race. At UT, however, there are several faculty with whom graduate students can work, which has had a significant impact on the number of applicants to the program.

“We thought we would get an applicant or two and over time, the program would grow,” Bohon says. “It was not like that at all. More than a quarter of all the applicants to our graduate program this year were applying to the critical race program.”
The other noticeable difference was the quality of each applicant. In a typical recruitment cycle, the sociology program competes with universities such as North Carolina State for students. Now, they are competing with Columbia, Berkeley, and Duke.

“It was pretty overwhelming,” Bohon says. “I’m convinced any one of these applicants we received would be competitive and apply to the top five institutions in race in the country.”

Bohon also noticed an unusual response from each applicant accepted to the program.

“Normally you send out admission decisions and students might send a nice email that says ‘Thanks for the good news,’ but the emails we received this year were ‘This has made my day!’ or ‘I’m so excited and can’t wait to come to Tennessee!’” Bohon says. “I’ve been astonished with the amount of excitement the students have for coming to UT.”

Christian thinks it is important to have a Critical Race and Ethnic Studies program at UT because of the long history of racial inequality in Tennessee.

“It really should be here, at our flagship institution, where we can discuss that history and how we can address it,” Christian says. “We are attracting a diverse pool of students across the United States who want to come here and study with us because they want to have this particular form of training rooted in a region with a wealth of work to be done. We’re trying to help our college and the university do the work we’ve been saying we wanted to do – diversify.”

Adria Mclaughlin, PhD CANDIDATE

“When I was exploring doctoral programs, many of the ones I found were rooted in the status quo. UT’s critical race program, along with its social justice umbrella, offered me the opportunity to study and learn through a critical lens. I think the critical race program is one of the things that links all the other tracks within the sociology department. I am excited to be working with so many incredible faculty members.”

Aya Barnes, SENIOR

“I am proud to be one of the first cohorts of students studying critical race and ethnicity. It provides evidence on the one thing many people argue doesn’t exist anymore – racism. As a black woman, it has and will help me to stop minimizing racism and address it whenever I see it.”

Kelsea Wilson, SENIOR

“I originally came to UT with the intention of majoring in civil engineering, but changed my major to sociology after taking a career assessment and talking with my advisor. Overall, this was the best decision I could have made. The critical race program is not only beneficial for people like me that want to pursue a career within diversity, but also to grasp a true understanding of the inequalities that are evident in our society today.”

Kelsea Wilson, SENIOR

“I originally came to UT with the intention of majoring in civil engineering, but changed my major to sociology after taking a career assessment and talking with my advisor. Overall, this was the best decision I could have made. The critical race program is not only beneficial for people like me that want to pursue a career within diversity, but also to grasp a true understanding of the inequalities that are evident in our society today.”
In the summer of 2017, Lisa Y.F. Parker faced a challenge – to recruit and teach a service-learning course in Costa Rica. Armed with a travel grant from the UT Ready for the World program, she met with the Costa Rica International Study Abroad team to collaborate on a redesign of the Spanish 491 course.

“Service Learning: A Global Experience”

“We wanted to focus on specific learning objectives such as a student’s personal growth, civic learning, cultural competency, academic application, and reflection,” says Parker, Spanish lecturer and assistant director of the Language and World Business program in the Department of Modern Foreign Languages and Literatures.

Another unique value Parker wanted to include in the proposed course was for students to be able to develop a preliminary thesis topic based on their service-learning experience.

“My primary objective for this course is to enforce key concepts through empirical observation that demonstrates the students’ capacity for research and a general knowledge of the history, culture, and current events of the Hispanic country where they served in hopes of one day being able to return as future researchers,” Parker says.

The original Spanish 491 course was part of the study abroad program in the Department of Modern Foreign Languages and Literatures for two summers before the redesign. Now, as the first study abroad service-learning course offered in the department, Parker hopes it will serve as a template for other language programs.

“This is a great opportunity for our students to engage in research and outreach with a global perspective,” Parker says.

mfll.utk.edu/lwb
Miranda Johnson
Major: Anthropology and Hispanic Studies
Year: Senior
Hometown: Harrisburg, NC

“In the spring of 2015, I studied abroad in Costa Rica and was looking for a way to go back when I received an email from Dr. Parker. The course gave me the final three credit hours I needed for a Spanish minor, which was my original intention for signing up for the class. It was so much more beneficial than I could have ever imagined that I ended up staying an extra year! One of the best experiences was working hands-on in the museum with artifacts from the Maya, Aztec, Olmec, and local tribes. I came home with professional connections and an idea for a research project, which turned into a Fulbright application. I am currently a semi-finalist. I would not trade my experience for anything!”

Kishen Patel
Major: Chemical Engineering and Hispanic Studies
Year: Junior
Hometown: Cookeville, TN

“I have always had an interest in volunteering when and where I could, so going to Costa Rica was right in line with my interests. Dr. Parker also convinced me it would really improve my Spanish speaking abilities. She was right! I got lost on the way to the conservation park where I worked, but found my way by relying on my Spanish. My biggest take-away was the concept of pura vida, or pure life. In Costa Rica, the emphasis is on enjoying life, which is opposite of my college ideology of ‘just get through it.’ It opened my eyes to the importance of my own time and living life for me. The experience changed my life. I returned being more me than I had ever felt before.”

Laura Harmon
Major: Nursing and Hispanic Studies
Year: Senior
Hometown: Ripley, TN

“When Dr. Parker reached out to me about the Costa Rica program, she told me it would be a unique opportunity. I looked more into it and absolutely agreed. I decided to go because it would aid me in my ability to work and care for a diverse population in my future career as a nurse. My experience will make me a better nurse because it taught me the importance of the nurse/patient relationship. No matter what country you are from or what your background is, a nurse must have the ability to care for everyone. I also learned remarkable things about the language and culture. The experience was the highlight of my college career. I would not trade it for anything. It genuinely changed my life.”
Memory creates powerful narratives that inform several aspects of a nation’s identity. During the summer of 2018, undergraduate students at UT will travel to Europe and visit key memory sites related to World War II as part of the Normandy Scholars Program.

“The goal of the program is to expand students’ ability to analyze how we reduce the complexity of World War II in ways that serve contemporary political and cultural agendas,” says Dan Magilow, associate professor of German in the Department of Modern Foreign Languages and Literatures and director of the Normandy Scholars Program.

The program has two components. First, the students take a three-hour spring course focused on the memory of World War II and why it maintains such a powerful hold on the popular imagination, including an examination of the American narrative of the “Greatest Generation.” The study abroad component is a summer mini-course where they start in the United Kingdom, ferry over the English Channel to France, and end their trip in Germany, symbolically retracing the path of the D-Day invasion.

“I was thrilled to learn of this dynamic, interdisciplinary program for undergraduate students,” says Claire Mayo, doctoral candidate in history and the graduate student assistant for the course. “It combines the rigor of theory on memory studies with its practical application in Europe. Students from a variety of disciplines can engage with the material, share their own experiences, and gain a broader understanding of our shared history.”

The program is very competitive mainly due to the $3,000 scholarship each student receives to help with the study abroad costs. Most of the first cohort of students are Honors Students with an average cumulative GPA of 3.74. Each one of them is extraordinarily talented and enthusiastic about the program.

Even though its home is in the College of Arts and Sciences, the Normandy Scholars Program is open to undergraduates from any college. Jonathan Winfiele, a third-year student of architecture, is interested in the program because it gives him the opportunity to look at the history and events of World War II from an architect’s perspective.

“With my knowledge of architectural space, I will be able to share, through the eyes of a future architect, how designs of memorials play a vital role in how memories are commemorated,” Winfiele says. “I am interested in how the engaged experience can make an individual remember the events of war to prevent future acts.”

Magilow hopes each student will walk away from the experience equipped with some of the conceptual tools for thinking about memory on a variety of levels and be able to talk about the past, especially traumatic pasts, with a healthy and historically informed skepticism. Today, the youngest remaining witnesses to World War II and the Holocaust are elderly, but the memory of the war and the crimes committed during it, as well as its complex geopolitical aftermath, still powerfully informs contemporary politics and culture.

“Even 75 years after the fact, you can scarcely turn on the TV or look at the internet without seeing some mention of World War II, Hitler, or Nazis,” Magilow says. “To me, the question is not only is that reference historically accurate, but also with so much death and destruction in human history to choose from, why do we always draw on World War II? Why do you call someone a ‘grammar Nazi’ rather than a ‘grammar Stalinist’ or a ‘grammar Maoist’?”

The Normandy Scholars Program gives UT students the opportunity to understand specific ways national narratives are created and how they differ between countries. Each destination will take students on a journey to see a side of the country they might not see as a tourist. Magilow and Mayo hope the experience will attach a special significance to this particular chapter of the students’ UT experience for years to come and illuminate their own uniqueness as a person, an American, or a Volunteer.

mfil.utk.edu/normandy
Cal MacLean is starting to plan the 2019-20 season for the Clarence Brown Theatre, but is missing one key component – a play. A unique program in the Department of Theatre, however, will ensure the season will be complete by the time the curtain opens.

Since 2014, MacLean, artistic director and head of the Department of Theatre, has commissioned a playwright to come to campus to write and develop a play specifically for an MFA acting ensemble. The actors meet with the playwright during their first year of training to discuss ideas for a new play and then work together over the next three years to bring it to fruition. In their third year, the play is fully produced in the Clarence Brown Theatre season, with the students performing it.

“This experience gives our students a unique perspective on the craft and the business of the actor that other training programs do not provide,” MacLean says. “The major contribution to their education during this project is an opportunity to really see how a play is crafted and developed over time. It’s risky and it’s daring and it may work out great or it may not; we just don’t know.”

Lauren Pennline met playwright Christopher Oscar Peña in 2015 during the first year of her MFA theatre program. She took the stage in February 2018 for the Clarence Brown Theatre-commissioned world premiere of *the strangers*. 
MFA Students perform *the strangers*. From left to right are:
Aaron Orlov
Jeffrey Dickamore
Charlotte Munson
Carlène Pochette
Emily Kicklighter
Lauren Pennline
Miguel A. Faña
Jude Carl Vincent

“Our students are taking their place in the profession, but more to the point, they are getting an education of how to behave and present themselves as well as how to take their place in the professional environment that few schools can offer.”

-CAL MacLEAN
“Working on a new play for my graduate acting class was incredibly humbling and a rare opportunity,” says Pennline, a third-year MFA student. “Usually actors enter the process of producing a play after the play’s creation, so the chance to be part of the entire production process was a very unique and rewarding experience.”

Very few theatre programs take on this type of project, which gives the UT Department of Theatre a competitive edge on other programs when it comes to recruiting MFA students.

“It’s hard to commit to a play in production that has not even been written yet,” MacLean says. “Some of it is an act of faith that something will be presentable as we start planning a season. I think this gives some schools of theatre a certain amount of pause, but I’m proud of the fact we have this interest and commitment to new work.”

Jed Diamond, associate professor of theatre, says the commissioned playwright is a major draw for many students looking at UT as a choice for their MFA acting program.

“To give the actors a chance to develop a play that is written for them is a big deal,” Diamond says. “To work with a playwright and a director to develop new work and originating a role is a big positive. The students I recruit are always very excited about it.”

Another benefit of this program is a resume-builder for theatre graduates. Christopher Oscar Peña, whose plays are produced in the United States and United Kingdom, writes for HBO and the CW. Plays by the first commissioned playwright, Rob Caisley, are also being produced across the country. His play The Open Hand, which had its world premiere at the Clarence Brown Theatre in March 2016, was published with a list of all the UT MFA actors on the title page.

“Now more than ever, new work is happening all over the country,” Pennline says. “We are experiencing an upsurge in contemporary plays, but also in classic stories rewritten with a contemporary twist. It is important to gain experience with new and emerging plays and their creators. Not only do we leave this program better prepared for the collaboration with a playwright on a new play, we’re also better prepared to collaborate with another passionate group of artists on our own work in the future.”

The UT Department of Theatre is one of 12 theatre programs in country with a resident, professional theatre on its campus. The Clarence Brown is a member of the League of Resident Theatres (LORT) and provides students with the opportunity to work with professional actors, directors, and designers. Its national reputation attracts students from all over the country who, when they graduate, often excel in a very challenging profession.

“Now more than ever, new work is happening all over the country,” Pennline says. “We are experiencing an upsurge in contemporary plays, but also in classic stories rewritten with a contemporary twist. It is important to gain experience with new and emerging plays and their creators. Not only do we leave this program better prepared for the collaboration with a playwright on a new play, we’re also better prepared to collaborate with another passionate group of artists on our own work in the future.”

The next commissioned playwright was on campus in early March meeting with the new first-year MFA students to begin brainstorming ideas for the play that will complete the 2019-20 season at the Clarence Brown Theatre.

theatre.utk.edu
The human brain weighs a little more than three pounds and makes up about two percent of a human’s body weight. It contains more than 80 billion nerve cells and billions of nerve fibers connected by trillions of synapses. It interprets every piece of information humans receive from the outside world. It embodies the essence of mind and soul.

This master organ has countless mysteries, many of which are still undiscovered. Faculty in the Cognitive & Developmental Science area of the Department of Psychology, however, are working to unlock a few of these mysteries in order to gain a better understanding of how humans change over the course of a lifetime.

Developmental psychology is the study of how and why human feeling, thinking, and behavior changes throughout life. Originally concerned with infants and children, the field now includes the entire lifespan.

In the Department of Psychology, faculty interests focus more specifically on understanding the early development of action, perception, cognition, and language. Each area of research will enhance the current body of knowledge of developmental processes. The interdisciplinary approach to research provides opportunities for faculty and graduate students to learn a variety of methodologies and theoretical approaches used in the field.

**AARON BUSS**
Executive function is a set of skills that allow people to engage in goal-oriented behavior. Aaron Buss, assistant professor of psychology, aims to explain how neural activity gives rise to this behavior. Specifically, he examines how executive function develops in early childhood, the dynamics of it in young adulthood, and its decline in elderly adults.

“These skills are important for everyday behavior,” Buss says. “Measures of executive function during early childhood are predictive of academic achievement later in childhood and quality of life outcomes into adulthood. Declines in executive function in aging are associated with a wide array of outcomes like injury and car accidents.”

Understanding the mechanisms associated with the structure and organization of behavior will allow Buss and his team to develop interventions to improve development in children and the declines in behavior associated with aging.

**GREG REYNOLDS**
Cognitive development during an infant’s first year of life includes visual attention and recognition memory. Greg Reynolds, associate professor of psychology, examines the early development of attention and the impact of developmental change in attention on perceptual preferences and recognition memory.

“Categorization is critically important for making sense of the world in an efficient and functional manner,” Reynolds says. “Infants demonstrate increasing specificity in their ability to categorize across the first year after birth. Discovering how human infants develop the ability to categorize is important for advancing scientific knowledge regarding early cognitive development.”

Using computational modeling of EEGs, Reynolds aims to determine the areas of the brain involved in infant categorization in order to understand the effects of learning conditions on infant categorization, specifically of faces and objects.

**SHANNON ROSS-SHEEHY**
Young infants learn everything about the world through their senses, which supports cognitive development across a person’s life span. Shannon Ross-Sheehy, assistant professor of psychology, focuses on identifying and understanding the components of this early learning in young infants, such as attention, working memory, and perception.

“My hope is that this work will allow us to identify the key attentional skills that support typical cognitive development so that we may one day detect infants most at risk for cognitive deficits,” Ross-Sheehy says. “Our goal is to better support this critical early learning both in typical and atypical developing infants.”

Her work provides support for her UT colleagues engaged in other research focused on language, executive function, and education.
Rachel Patton McCord’s interest in science is in her genes. She learned how to be curious about the natural world and how it works from her parents, who were both scientists.

“I’ve always loved puzzles and solving problems,” says McCord, assistant professor in the Department of Biochemistry and Cellular & Molecular Biology (BCMB), who earned her PhD in biophysics from Harvard University and joined the UT faculty in 2016.

McCord is still solving problems, but the ones she works on now involve 3-D genome structures. In her lab, she focuses on measuring the 3-D interactions between all regions of DNA inside human cell nuclei.

“We start by considering the basic problem that the six-foot long human DNA sequence must fold into a microscopic space,” McCord says. “This compact folding must still allow it to do its basic functions of regulating genes at the right time, replicating itself before cell division, and repairing itself after damage.”

Most genetic analysis treats genes as isolated units along a linear string of DNA. The looping and folding of chromosomes, however, is essential to gene regulation, DNA repair, and properly coping and separating the DNA into two new cells during cell division. Loops in the DNA allow different parts of the genome to talk to each other. If these loops get disorganized, problems such as cancer or developmental defects can be the result.
“The unique piece we work on is how the 3-D structure of the genome and all the loops and domains it forms are affected in situations where there are major physical deformations of the nucleus,” McCord says. “We hope our research will shed light on how the physical reshaping of 3-D chromosome folding contributes to cancer metastasis and premature aging.”

For decades, scientists have studied complex and interconnected ecosystems or anatomical systems. The advent of new experimental techniques, such as the ones McCord uses in her lab, coupled with increasing computing power have allowed scientists to study systems biology at the molecular level.

In order to study the complex gene regulatory networks, scientists need mathematical models, which is the focus of Tian Hong’s work.

“The interactions of our genes are so complex that it is very hard to understand them intuitively,” says Hong, assistant professor in BCMB. “We need help from mathematical models to gain some insight into these gene regulatory networks. By doing this, we get closer to understanding the dynamics of cells and tissues and how diseases occur due to the misregulation of these networks.”

Hong focuses on building mathematical models to study epithelial plasticity and the immune system. The epithelial cell exists in the epidermis and tissues, such as mammary glands. The plasticity of the epithelial cell – its ability to take on characteristics of cells elsewhere in the body – is important because it is the basis of cancer metastasis.

“The onset of the spread of cancer is the transformation of these epithelial cells,” Hong says. “In order to move through the bloodstream, the cancer cells have to undergo a transformation. This type of cell is very migratory. Understanding how these cells start to migrate and transform once they arrive at the secondary organs will help us understand how they proliferate and form a new tumor.”

In the immune system, cells can quickly diversify when there is an infection or pathogen. If there is an excessive response, however, tissues will be damaged.

“We need to protect our body by having some of the more aggressive types of immune cells to fight against the pathogens, but we have to balance the type of immune response,” Hong says. “Some cells will be responsible to fight the pathogens and others will ensure the immune response can be attenuated so that our own tissues do not get damaged.”

Mathematical models will allow Hong to study the immune system and the transformation of the epithelial cell to gain a better understanding of these complex systems. Once scientists understand how these systems work and how they interact with the human body, they will be able to understand and fight diseases that attack these networks.

Systems biology requires significant computing power. The supercomputers owned and operated by UT and Oak Ridge National Laboratory computational scientists offer BCMB faculty and students an unrivaled computing power in the form of TITAN, the fourth most powerful supercomputer in the world.

With such computing power at their fingertips, BCMB faculty and students are on the cutting edge in teaching and research in computational sciences and systems biology.
Students studying international relations in the Department of Political Science have the opportunity to address these critical issues facing the international community thanks to programs at the Howard H. Baker Jr. Center for Public Policy at UT.

Diplomacy Lab is a partnership between the Department of State and the Baker Center. Launched in 2013, the project connects policymakers in the State Department with students and faculty experts to conduct research on a variety of topics of interest.

“This is a great opportunity to get our graduate students really engaged not just in their own research with their heads in the sand, but to really think about outreach and public policy at the international level and to do research that matters,” says Krista Wiegand, associate professor of political science and director of the Global Security Program at the Baker Center.

Wiegand taught the first graduate course offered through the Diplomacy Lab at UT. The State Department tasked the class with research on conflict processes and how the United States can be successful in international mediation efforts.

“Specifically, we looked at what factors would influence the likelihood of success if the United States got involved with mediation where there is a civil war going on, such as in Syria,” Wiegand says.

In addition to the course readings, students discussed research on proven mediation methods, reviewed policies and academic resources, and analyzed data about the success of the United States’ role in international conflict mediation. At the end of the project, the class presented their findings to State Department officials.

“It was a great experience for the students, who are so used to being focused on just academics, to see how this actually played out in the real world,” Wiegand says.

Through the Global Security Program, students also learn about the real-world applications of research on core problems the international community confronts. Wiegand leads the program focusing on conflict processes, which offers courses and events related to global security and foreign policy.

Brandon Prins, professor of political science and Global Security Fellow at the Baker Center, also works on conflict processes and recently finished a Department of Defense funded initiative on maritime piracy. His new project focuses on the effectiveness of United Nations peacekeeping operations in post-conflict environments.
“There are a number of violent civil war conflicts happening around the world,” Prins says. “In many instances, the United Nations is tasked with both trying to resolve the conflict and, after the parties have stopped fighting, help prevent the fighting from recurring in the future.”

Putting peacekeepers on the ground in conflict-prone countries is one way the UN tries to foster peace and stabilization. Previous research showed mixed evidence about the effectiveness of using this strategy within the entire country. Prins’ research focuses on micro areas in these countries.

“We are not just looking at whether or not violence decreases overall,” Prins says. “We want to know whether having peacekeepers in an area of a country decreases violence in that area. This will give us some idea of whether or not they actually have some effect on the ground.”

Involving students in research on timely topics in the international community is key to the work Wiegand and Prins do at the Baker Center, whether their students go into academia or policy work.

“As a professor, my primary objective is to train other academics to further expand the academic realm in international relations,” Wiegand says. “Given the fact there are only so many jobs in academia, however, we are seeing a growth in ‘real-world’ nonacademic career choices.”

Prins sees his role as educating students about current critical issues so students leave UT with a better understanding of the world than when they arrived.

“Clearly the world is increasingly globalized and connected,” Prins says. “I think it’s useful for our students to understand different countries and cultures and be confronted with different ideas. America is not the center of the world. We do not always know the best way to do something and can learn from other cultures and people about how to solve problems.”

polisci.utk.edu
ALUMNI SPOTLIGHT

From Buddhist Scriptures to Distilled Spirits
An alumna’s journey on the path of the liberal arts
As an undergraduate student in the College of Arts and Sciences, Nancy Fraley ('93) learned how to learn. After graduating with a degree in religious studies, Fraley went to Harvard Divinity School and then on to study international human rights at the University of San Francisco School of Law.

“One thing I got from all my liberal arts education and being able to study a smattering of different subjects having both breadth and depth is that I learned how to learn and could teach myself pretty much anything,” Fraley says.

This skill has come in handy because today, Fraley is not teaching Buddhism or practicing law. She is a Master Blender, also known as a “professional nose.”

“I am what people call a super taster,” Fraley says. “I am really sensitive to smell and aroma. Shortly after law school, I started developing an interest in distilled spirits, whiskeys, and various kinds of brandy. I became fascinated with the production of it.”

While working at a law firm in California, Fraley attended a fundraiser where they were serving distilled spirits. One taste of a Cognac-style brandy changed everything. Fraley quit her job at the law firm and traveled through Morocco, Spain, and Mexico.

“I took some time to travel and try to find my purpose in life and ended up working in the Germain-Robin distillery,” Fraley says. “It was an absolute life-changing experience. I knew after that I could never look back.”

Fraley is the owner of Nosing Services and provides custom blending, product formulation services, creation of maturation programs, and sensory analysis for distilleries worldwide. She is also the director of research for the American Distilling Institute, creator of the American Craft Whiskey Aroma Wheel, and a teacher of classes on olfactory and sensory analysis for craft distillers.

She dabbled in political science and spent a brief period as a music major. When she took a couple of courses in religious studies, however, she knew there was no turning back.

“Religious studies was it,” Fraley says. “The thing I really liked about the major was you not only got to study religion, but you got a great smattering of art, architecture, music, economics, philosophy, history, archaeology, law, medicine, and ethics. The discipline of religious studies just touches on so many fields. It was clear that was my path.”

Fraley had support from home for her choice of major, but remembers several people asking her what kind of job she would get with a liberal arts degree. People told her she should go to business school or be an engineer – something more “practical.”

“I never felt the pressure to change my major,” Fraley says. “It’s not just about making money. While that is important, the value that a liberal arts education gives you is to be able to enjoy life and know something about great works of literature, art, or music.”

Fraley is still a champion of the liberal arts and values her experiences in the Department of Religious Studies at the University of Tennessee, Knoxville.

“I think to be an informed citizen, critically engaged in the world, and really understand it, nothing prepares you more for having a high quality of life and being able to enjoy it in a very rich and complex way than to get a liberal arts education,” Fraley says. “I know now more than ever it is really critical to push the liberal arts and encourage young people starting college to explore philosophy and literature and all those great courses. It will serve you well in life.”
Judi Herbert loves to read. She grew up reading books, but when it came time to choose a career, it looked like science or math education would be her path.

“I scored high enough on the entrance exams, so I started out in education,” Herbert says. “During that time, it seemed most girls would be teachers, which didn’t appeal to me at all.”

As a freshman, she took an English literature course and developed a love of English. She became a grader for an English teacher, changed her major, and graduated from UT in 1963 with a degree in English.

She has always been exposed to writing and over the years, continued her work with college students. Recently, however, she has noticed a disturbing trend. Many college graduates do not have good writing skills.

“I would review the resumes of young people coming into my husband’s business and would be appalled at their writing skills,” Herbert says. “When we became re-involved with UT, I wanted to make sure that no one would graduate from our university with the kind of writing skills I was seeing from some other very fine schools.”

Judi and Jim (’62) challenged the UT community to raise $500,000 during the Big Orange Give, a one-day campaign that took place November 8, 2017. The reward? An additional $500,000 to meet the $1 million campaign goal. The Volunteer community exceeded expectations and raised $1.45 million.
The Herberts designated their $500,000 challenge gift to the UT Writing Center. They decided their support could help expand the reach and impact of the center not only for freshman taking an English course, but for students in upper-level courses in different majors as well as graduate students.

“It doesn’t make a difference what students are doing – nuclear physics, business, science, agriculture – they still have to be able to express it,” Herbert says. “It’s one thing to know it, but to be able to communicate it to someone else, to be able to write for applications, resumes, publications or any kind of paper, is important.”

Kirsten Benson, director of the Writing Center, says the Herberts’ gift will make a big impact on the number of students the center serves.

“We’ve pulled back a bit in the past couple of years because we were getting too big and thought we couldn’t provide what the students need,” Benson says. “The Herberts’ gift will help start an undergraduate tutoring program. We will also be able to offer more targeted help to first-year students.”

The Herberts’ generosity will also make it possible to expand the services offered in the Writing Center, including the kind of help offered to upper-division students who are not English majors.

“We want to provide the upper-division students with more discipline-specific support for their writing,” says Allen Dunn, head of the Department of English. “We also want to be able to work with faculty across campus to make sure we are giving students exactly the kind of guidance they need to succeed.”

Jim and Judi Herbert are excited to begin their journey of support for the Writing Center and to give back to the university.

“Jim’s philosophy in life is ‘To whom much is given, much is expected,’” Herbert says. “We make that our philosophy for philanthropy. We’re just thrilled to be at a point in our lives where we can do more and make a difference.”

To learn more about the Writing Center, please visit us online. writingcenter.utk.edu
The University of Tennessee is on a journey to become a preeminent public research institution and position UT among the nation’s elite public universities. As the academic foundation of the university, the College of Arts and Sciences is the largest contributor to all aspects of UT’s missions of instruction, research, and service to society. Our college is the gateway to knowledge for every undergraduate student who enrolls at UT. We are a diverse community of teachers, learners, and scholars who work together to advance the frontiers of knowledge and creativity across a wide range of disciplines.

Our mission is to uphold the highest standards of academic freedom and integrity and to cultivate in our students the critical thinking skills, intellectual inquiry, and understanding of diverse human cultures that are necessary to become an engaged global citizens. Graduates of our college are innovative citizen leaders who pursue path-breaking research and creative expression to enrich lives and seek solutions to society’s problems.

We are working to set ourselves apart and create a student experience that reaches beyond the ordinary. As we continue to bring new and diverse people to campus, their energy and abilities help all of us succeed. Your role in helping us shape the next generation of leaders is crucial to the state and nation.

We ask you to consider joining the journey by making your leadership gift today. Your gift to the College of Arts and Sciences will transform the lives of the next generation of Vols and strengthen UT’s impact on our state, country, and the world.

Join the Journey at artsci.utk.edu.
Sources and Uses of Funds

In Fiscal Year 2017, the college had available resources of $160,378,295 in unrestricted and restricted funds.

**Sources of Funds**
- 46% Recurring College Budget
- 18% Grants and Contracts
- 19% Additional Central Support (benefits, funding transfers)
- 18% Additional Instructional Funding from Central Administration
- 5% Endowment Income and Gifts
- 4% Revenue from Educational Sales and Services
- 2% Central Funding of Joint Institutes, matching funds, etc.
- 2% Net Facilities and Administrative Cost Recoveries
- 2% Summer School Revenue
- 2% Revenue from Educational Sales and Services

**Expenditures**
- 1% Administrative Salaries
- 1% Student Employees
- 4% Clerical and Technical Salaries
- 4% Equipment
- 6% Professional Salaries
- 11% GTA, GA, GRA Salaries
- 17% Staff Benefits
- 18% Operating
- 38% Faculty Salaries

**Fiscal Year 2017**
Colleges of Arts and Sciences

**Funds by Category**
- 38% Operating
- 18% GTA, GA, GRA Salaries
- 11% Staff Benefits
- 6% Professional Salaries
- 4% Equipment
- 4% Clerical and Technical Salaries
- 1% Student Employees
- 1% Administrative Salaries
- 2% Grants and Contracts
- 2% Additional Central Support (benefits, funding transfers)
- 4% Additional Instructional Funding from Central Administration
- 5% Endowment Income and Gifts
- 2% Central Funding of Joint Institutes, matching funds, etc.
- 2% Net Facilities and Administrative Cost Recoveries
- 2% Summer School Revenue
- 2% Revenue from Educational Sales and Services
- 46% Recurring College Budget (state allocation and tuition)
Sophronia Strong Hall, the first women’s dormitory on the UT campus, opened in 1925. It has an unusual history as being the only building on campus to serve as a mess hall, archaeological warehouse, student cafeteria, sorority house, and women’s dorm. Today, it is a cutting-edge research and teaching facility for students and faculty in the College of Arts and Sciences.
Strong Hall Visualization Lab: The past and the future coalesce to form the Visualization Lab, informally known as the “Mission Ops Room,” in Strong Hall, UT’s new state-of-the-art science facility. Read more at higherground.utk.edu.