A Clean Slate
Designing AMIE—the world’s first 3-D-printed structure
NOTE FROM THE VICE CHANCELLOR

Many researchers begin their path to discovery at a point of curiosity. The answers they seek might solve a problem, determine a meaning, or detect a reaction. Sometimes they simply ask, “Is it even possible?” In this edition of Quest, you will see some shining examples of curiosity-driven research that is laying the foundation for future discoveries.

Nuria Cruz-Camara
La mujer moderna en los escritos de Federica Montseny (2015)
The Modern Woman in the Writings of Federica Montseny explores the figure of the modern woman in the essays and fiction of Federica Montseny, a prominent Spanish anarchist leader during the 1920s and 1930s. It examines in depth the author’s theories of gender in light of the basic principles of anarchist political thought and philosophy. In addition, Montseny’s novels are shown to engage in an elaborate and critical dialogue with scientific and cultural discourses on women that proliferated during the first four decades of the twentieth century.

Boyce N. Driskell & Robert J. Norrell
Tuckaleechee Cove: A Passage Through Time (2015)
Tuckaleechee Cove’s rich past emerged from years of archaeological and historical research that began in 1999 when a state highway project uncovered a wealth of Native American and Euro-American remains, including burial mounds, fragments of tools, weapons, cooking vessels, and other evidence of past activity. This beautifully illustrated book combines details from that study with fascinating bits of history to tell the story of the cove, located near Townsend, Tennessee, and its disparate peoples.

Asafa Jalata
Phases of Terrorism in the Age of Globalization: From Christopher Columbus to Osama bin Laden (2016)
Jalata critically examines the problem of terrorism from above and below using case studies from around the world. He demonstrates how the frequency, intensity, danger, and volume of terrorism have increased along with the development of global capitalism, advancements in technology, and the production of powerful weapons.

Stephen H. Blackwell
Fine Lines: Vladimir Nabokov’s Scientific Art (2016)
Although Vladimir Nabokov’s literary achievements are renowned, his contributions as a scientist have long been neglected. Nabokov created more than a thousand technical illustrations of the anatomical structures of butterflies, seeking to understand the evolutionary diversity of small butterflies called Blues. Fine Lines, the first full appraisal of this work, reproduces 154 of Nabokov’s drawings, few of which have ever been seen in public, with essays by ten leading scientists and Nabokov specialists.

Dorian L. McCoy
co-author
Critical Race Theory in Higher Education: 20 Years of Theoretical and Research Innovations (2015)
Critical race theory was introduced in 1995 and has been used as a tool to examine the experiences of people of color in higher education. This monograph explores critical race theory’s introduction to higher education and its appropriateness as a theoretical framework, analytical tool, and research methodology for addressing race and racism. Scholars and educators are called upon to extend their commitment to social justice and to the eradication of racism and other forms of oppression.
VIRTUAL BABY MONITOR

The UT College of Nursing has developed an app to help future nurses learn how to monitor babies and their mothers during labor. The simulation allows instructors to set the electronic baby’s heart rate, frequency of contractions, and other variables that could indicate trouble. The information is transmitted to students who practice interpreting the signs using an iPad. The developers are working with the UT Research Foundation on distribution and marketing strategies so students around the world can benefit from their innovation. Upgrades are planned to mimic the swoosh-swoosh sound of a baby’s heartbeat heard through an actual monitor. The app shows great potential because labor and delivery nurses must test for a certificate in fetal monitoring and document their competency each year.

INVISIBLE TOUCH

A team of materials science and engineering researchers from UT and Oak Ridge National Laboratory is perfecting the next generation of transparent conductive films used in touchscreen devices. Today the electronics industry relies heavily on the scarce metal indium for the right balance of transparency and conductivity. The material under development features rare earth elements terbium and dysprosium—both about ten times more abundant than indium—making it significantly less expensive to produce. Although the discovery is based on research that began nearly thirty years ago, it will be about three to five more years before commercial applications like smartphones, tablets, computers, and televisions can benefit from the new technology.

DOCUMENTING DEPENDENCE

A group of journalism students from the UT College of Communication and Information worked with the Metro Drug Coalition to produce a thirty-minute documentary about the region’s growing opiate epidemic. In 2015, nearly a thousand babies in Tennessee were born drug dependent. Reaching Recovery: Pregnancy and Addiction in East Tennessee was produced by UT’s Land Grant Films and directed by journalism professor Nick Geidner. The film presents a comprehensive view of the problem through interviews with medical experts, addiction specialists, policy makers, and mothers who have struggled with addiction. “The learning process for the students involved has been challenging because of the serious subject and heart-wrenching stories they heard. I am very proud of the dedication they have demonstrated in producing a quality documentary that offers a real service to important groups in our community,” Geidner said.

SOWING THE SEEDS OF SCIENCE

Student startup Grow Bioplastics was awarded the $15,000 top prize in the most recent Boyd Venture Challenge. Founded by Tony Bova and Jeff Beegle, both doctoral candidates with UT’s Bredesen Center for Interdisciplinary Research and Graduate Education, the company has developed a low-cost renewable biopolymer that naturally degrades in soil and can be used to produce mulch films and planting containers. This allows plants to be sown in their containers and the films to be plowed into the ground after harvest, saving growers time and money associated with plastic disposal. The entrepreneurs plan to use the funding to build a degradation testing incubator and produce its first round of prototypes. The Boyd Venture Challenge is administered through the Anderson Center for Entrepreneurship and Innovation in UT’s Haslam College of Business.

GATHERING EVIDENCE

A recent study at UT’s Anthropology Research Facility—commonly known as the Body Farm—indicates that human decomposition is much more variable than that of pigs or rabbits. This new knowledge could impact court cases around the world, because animal models are frequently used to estimate the time of death when access to human data is not available. To evaluate the differences, researchers studied fifteen bodies of each species (pig, rabbit, and human) over three seasons (spring, summer, and winter). The overall findings revealed major variances in decomposition rates, insect activity, and scavenger activity between human and nonhuman subjects. “Our research provides guidance to lawyers and judges concerning the admissibility of testimony by anthropologists and entomologists,” said Dawnie Steadman, the project’s lead principal investigator and director of the UT Forensic Anthropology Center.
The seventh row of the periodic table is now complete thanks to some very curious research.

BY AMANDA WOMAC
PHOTOGRAPHY BY BRIAN NOTESS

Research can have various forms of impact. Some discoveries shape the very nature of our existence. Others can be extremely important to the scientific community but barely make a ripple for the rest of society.

The research conducted by UT physicist Robert Grzywacz probably falls somewhere in between. His claim to fame is contributing to the discovery of four new elements recently added to the periodic table—atomic numbers 113, 115, 117, and 118.

Why is this such a big deal? Most people will probably never interact with a super-heavy element. But in the world of nuclear physics, the data acquisition technology developed by Grzywacz and his colleagues at Oak Ridge National Laboratory (ORNL) is a game changer.

“It’s a major shift in how other scientists will conduct experiments on super-heavy elements in order to understand how they were created in the first place,” explained Grzywacz, who is also the director of the UT-ORNL Joint Institute for Nuclear Physics and Applications.

In the world of nuclear physics, the data acquisition technology developed by Grzywacz and his colleagues at Oak Ridge National Laboratory is a game changer.

From the beginning of his career, Grzywacz experimented with producing new isotopes—versions of an element with different mass—by measuring very short radioactive decays. “We successfully expanded the pool of isotopes by creating unusual combinations of protons and neutrons,” he said.

Unfortunately, the technology available at the time limited the amount and variety of data that could be collected. So Grzywacz and his ORNL colleagues decided to take the only logical course of action and develop a better data acquisition system. By employing a new type of digital signal processing, they could measure nuclear decays down to one millionth of a second.

The upgraded detector system uses a piece of silicon with horizontal and vertical strips that produce an electrical signal at the intersection when a beam hits the target. The problem with the old system was capturing enough information from the second signal after measuring the first one. Grzywacz solved the speed problem by taking a photographic signal of the whole pulse. That way any information that appears later can still be recorded.

Grzywacz compares the new technology to what happens when someone photobombs a picture you are trying to take. “When someone sticks their head in right before you take the picture, you see it,” he said. “We are trying to see the kind of intruders that are sticking their heads into the picture.”

The researchers are ultimately looking for several consecutive decays in the same location in order to identify a unique signature of the decay.

“We always thought this would be a great system to use for super-heavy element research because it’s reliable and capable of measuring fast decays,” Grzywacz said. “But it took a while to get the first experiments on board.”

Together with his ORNL colleagues, Grzywacz worked directly with scientists from Russia and Germany.

Over the next thirty years, Grzywacz hopes someone will build on the technology to create even more super-heavy elements. For now, he and his fellow nuclear physicists are studying the decay of fleeting nuclei that can explain nuclear reactions in stars. Maybe then we will be able to understand the chemistry we were made of and how they were generated in the universe. Now that would make quite an impact.

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Together with his ORNL colleagues, Grzywacz worked directly with scientists from Russia and the United States who were responsible for the discovery and confirmation experiments of elements 115 and 117. The data acquisition system initially applied in the ORNL-based experiments was already used in studies searching for and detecting super-heavy nuclei in Russia and Germany.

“What we’re really trying to find out is if we make something new, what will cause it to survive,” Grzywacz said. “It’s really perfectly esoteric research from the point of having any kind of immediate application. This science is curiosity-driven.”

He noted that engaging in research out of curiosity is what helps lay the foundation for future discoveries. “I don’t know if even Mother Nature made these elements. Think about that. We’re creating samples of elements that we don’t know if they ever existed anywhere in the universe,” Grzywacz said.

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“The seventh row of the periodic table is now complete thanks to some very curious research.”

—Robert Grzywacz
GET IN THE GAME

Active video games prove to be a convenient and entertaining way to get young children moving again.

BY WHITNEY HEINS
PHOTOGRAPHY BY DANI ROSE

Every parent wants their children to live full and healthy lives. But with the prevalence and popularity of fast food, sugary treats, television, and video games, many of America’s children may not get that opportunity.

As former Surgeon General Richard Carmona put it, “because of the increasing rates of obesity, unhealthy eating habits, and physical inactivity, we may see the first generation that will be less healthy and have a shorter life expectancy than their parents.”

According to statistics from the American Heart Association, one out of three children in the United States is overweight or obese. Childhood obesity rates have more than tripled from 1971 to 2011, making it the number one health concern among parents.

Although numerous factors are contributing to this epidemic, some health officials point to the advent of computer-based video games as the main reason for climbing obesity rates. But the results from a recent UT Department of Nutrition study indicate that some video games may actually increase physical activity.

The research was the subject of Britt MacArthur’s master’s thesis, which was completed with guidance from Dawn Coe, associate professor of exercise physiology, and Hollie Raynor, professor of nutrition and director of UT’s Healthy Eating and Activity Lab.

“The Centers for Disease Control and Prevention recommends that children participate in at least sixty minutes of moderate—bicycling or walking briskly—to vigorous—running or bicycling uphill—physical activity most days of the week, but a majority of children aren’t doing that,” Raynor said. “Sedentary screen-based activities like video games are often considered a barrier to physical activity because they may be competing for time.”

Fortunately, advances in technology over the past decade have spurred more engaging video games. Today’s gamers can get up and dance, bowl, or even go whitewater rafting without leaving the house.
The data showed that children playing the video game spent more time engaged in moderate to vigorous physical activity compared to those playing outdoors.

“It is almost beginning to move into virtual reality,” Raynor added. “And because you have to stand and use full-body movement in these active video games, the amount of energy expended is much greater than those games where you are just sitting.”

The next logical step was for the researchers to measure activity levels for children on a playground and compare them with those playing active video games. To investigate, they observed sixteen normal-weight children during two twenty-minute play sessions—one outside on a playground with balls, hula hoops, and trees, and the other playing the video game River Rush, which requires jumping to navigate winding rapids.

The data showed that children playing the video game spent more time engaged in moderate to vigorous physical activity compared to those playing outdoors. Although upper-body movements were similar in each session, there was more lower-body movement while playing the video game—meaning more ground was covered.

The takeaway for parents is that active video games can be a source of moderate to vigorous physical activity, but more research needs to be done.

“‘These games remove the time issue because they can be done at any time, and they address parents’ safety concerns about their children playing outside.’”

—Hollie Raynor

Raynor became interested in obesity even before it became a national epidemic. She has always been fascinated with why people choose the foods they eat. Now she feels compelled to tackle this enormous health challenge.

“We have work to do,” she said. “Obesity puts children—and adults—at greater risk for health issues like type 2 diabetes, heart disease, stroke, and high blood pressure. As an obesity researcher, I am very interested in identifying better ways for us to understand how to be more effective in terms of our interventions so that we can improve the health of the nation.”

Raynor’s hope is that her work can help reverse a very disturbing trend—and prove the surgeon general’s prediction wrong.
Architecture students contribute innovative design ideas for the world’s first 3-D-printed building.

BY DAVID BRILL

For the first time in more than a century, architects are witnessing the birth of an entirely new building system—something that hasn’t happened since the mass production of steel and glass. The additive manufacturing (3-D printing) revolution has already changed the way items like prosthetics and musical instruments are produced. Now it is providing architects with a whole new suite of construction materials.

Structures of the future will be printed one layer at a time, and UT’s College of Architecture and Design is getting in on the ground floor of 3-D printing technologies and techniques for buildings. Case in point is the Additive Manufacturing Integrated Energy (AMIE) project, the world’s first zero-energy structure created entirely by a 3-D printer and the first to reciprocally share energy with a 3-D-printed vehicle.

AMIE is a collaborative venture from the UT-ORNL-SOM Governor’s Chair for High Performance Energy Practices in Urban Environments, which includes partners UT, Oak Ridge National Laboratory (ORNL), and international architecture firm Skidmore, Owings & Merrill (SOM). James Rose, director of UT’s Institute for Smart Structures, and architecture students in the Governor’s Chair Design Studio in Energy and Urbanism contributed to the design process and were engaged at the project’s earliest phase.

IN THE BEGINNING

Initially the students were presented with a challenge, described by Rose: “Science has given you a new material. Figure out what it wants to be and design a structure.” Professional oversight was provided throughout the process by Governor’s Chair Philip Enquist and Lucas Tryggestad of SOM’s Chicago office.

Some of the students took design cues from nature and studied bones and nautilus shells. “Like 3-D-printed materials, bones and shells are built layer upon layer,” Rose said. “They’re also lightweight and remarkably strong, qualities that we knew would be important for the AMIE structure.” Other students explored the art of origami, which turns a flat sheet of paper into a 3-D object.

The students brought their ideas to life using the powerful computers and small-scale 3-D printers at UT’s Fab Lab. Each rendering reflected the character of the material it was inspired by: open vertical cavities found in bones, adjoining chambers similar to those in nautilus shells, and origami’s ridges and valleys.
CONCEPTUAL COMPONENTS
AMIIE’s final form—designed by SOM in collaboration with Rose and ORNL—echoes elements found in the student projects.

For instance, the shell group created a series of printed rings, representing walls, ceiling, and floor, which could be joined to form the structure’s open, unsupported interior. AMIE features ten of these interlocking rings, each formed from two C-shaped components joined top and bottom.

The origami group proposed a partially collapsible structure with louvred sides like the bellows of an accordion. AMIE’s louvred sides have inset windows that can be positioned to allow penetration of warming sunlight in colder climates. For warmer climates, the structure can be oriented to block sunlight. The origami group also conceived a central interior island with a sink, dishwasher, stove, microwave, refrigerator, and bed.

Although the work of the bone group does not apply directly to the final design, it may yet influence future 3-D-printed architecture. “Often, students haven’t learned yet that something is impossible,” Rose said. “And they go on to demonstrate a new way of looking at a problem.”

One of 3-D printing’s limitations is the inability to print unsupported horizontal structures because the thread of molten plastic will collapse before it can harden. The bone group solved the problem by printing a barrel arch that leveraged the print head’s ability to deposit material at a 40-degree angle. The structure’s walls incrementally gained thickness with each pass until they joined at the center of the interior space.

SOME ASSEMBLY REQUIRED
Parallel to the student work, architects from SOM completed the final design and delivered it to ORNL as a computer file. All of AMIE’s parts were formed by layering building material—a polymer blended with 20 percent carbon fiber—extruded from ORNL’s big area additive manufacturing printer’s print head.

The composite parts were then transported to Clayton Homes in Andersonville, Tennessee, for assembly of the twelve-foot-wide by thirteen-foot-high by thirty-eight-foot-long structure. From the moment the students were engaged to finished product took only nine months. AMIE then embarked on a US tour in the fall of 2015.

Rose believes adaptations of AMIE’s basic design and 3-D construction have many potential applications such as military barracks, refugee shelters, and micro-apartments for students. Because 3-D printers have a modest energy demand and can be made portable, structures can be printed on-site. And since the process is so precise, there is very little waste.

WHAT’S NEXT?
Architecture is an iterative process, and successful practitioners look into the future even as they glance back at the past. Barrel arches, for example, trace back to the Roman Empire. But the students were able to use a novel building system to give the arch new expression.

Architecture is also an additive process—like 3-D printing itself—ever building on past innovations. Rose’s Governor’s Chair studio is already devising the next phase of AMIE’s evolution: individual 3-D-printed modular rooms that will snap together like Lego bricks and stack to create high-density housing. As for the configuration and features of the rooms themselves—including 3-D-printed fixtures and even furniture—the decisions would be left up to the occupants. From a design perspective, 3-D printing enables a shift from mass production to mass customization.

“With 3-D printing, there’s no penalty in cost or materials for printing every part differently,” Rose said. “And 3-D printing also liberates architects from the hard edges imposed by traditional building materials and allows them to create fluid lines.”

Granted, it’s a large leap from miniature snap-together rooms to a habitable apartment building. But even Christopher Wren began St. Paul’s Cathedral with a scale model and a vision.

For more information about AMIE, visit tiny.utk.edu/amie.
AMIE’s Anatomy

AMIE’s rooftop-mounted 3.2 kW solar photovoltaic system powers the structure’s lights and appliances.

An ORNL-designed computer system monitors and manages the flow of energy inside the structure and between structure and vehicle.

If the structure’s energy store runs low, the vehicle’s battery and on-board natural-gas generator feed electricity to the structure via a wireless charging pad.

AMIE’s battery stores excess energy for use after sundown or for charging the battery in the hybrid vehicle.

The 3-D-printed panels create a structural design optimized for live loads, lateral forces, and impact resistance.

The precise additive manufacturing process can lead to zero-waste construction and buildings that can be ground up and reprinted in different forms.

AMIE’s integrated panel system combines the functions of a conventional wall system—structure, insulation, air and moisture barriers, and exterior cladding—into a single unit.

A central island features sink, dishwasher, stove, microwave, refrigerator, and bed.

Three-dimensional printing allows for complex organic geometries with rounded corners and curved surfaces that reduce localized stress and mitigate turbulent exterior airflow.
Engineering intelligent “eyes” to aid those without sight.

BY DAVID GODDARD

PHOTOGRAPHY BY BRIAN NOTESS


What’s that sound? If you are standing at an intersection in the heart of a major US city, it’s most likely an accessible pedestrian signal—a device that provides visually impaired people with audible cues about the status of a walk signal.

Obviously the repetitive sounds are better than nothing, but they can’t actually tell someone whether it’s safe to cross the street or not. Reckless drivers, objects in the crosswalk, and potholes can present dangerous obstacles.

But what if there were a way to alert blind pedestrians to these potential pitfalls? That’s exactly the question Jindong Tan is trying to answer.
“Mobility is about three things: direction, range, and access. Being able to address all of those things at once is the key to truly opening up the world for the visually impaired.”
—Jindong Tan

Tan, a professor in the UT Department of Mechanical, Aerospace, and Biomedical Engineering, is working on a unique device that could improve mobility without being overly cumbersome. It’s called Guide Glass.

The wearable tech resembles a pair of sunglasses, with the addition of a small GoPro camera on one side. The camera and a variety of sensors are connected to an onboard microprocessing unit that converts the visual information into data. Proprietary software analyzes the data to evaluate the surroundings in real time. The results are translated into words and transmitted to the wearer through an earpiece.

Guide Glass might look a bit like the ill-fated Google Glass product, but “we actually filed paperwork on ours before Google came out with theirs,” Tan said. “It just happened to work out that the designs are similar.”

Tan’s team began by studying how the eye transmits signals to the brain—where the decisions about movement are made. For example, a person standing on the curb unconsciously calculates whether or not they have time to cross the street based on what they see. “If a person’s brain could make such a calculation, so could a computer,” Tan rationalized.

They placed a premium on creating a practical compact design using small but powerful components.

“Mobility is about three things: direction, range, and access,” Tan explained. “Being able to address all of those things at once is the key to truly opening up the world for the visually impaired.”

Unfortunately, the most common methods available to help visually impaired people navigate can’t address all three at the same time. Guide dogs can help with direction and range but can’t warn of access restrictions like low-hanging branches. Walking sticks help users detect obstructions and distance but fall short of providing direction.

Finding a way to deliver all three elements concurrently with a gadget the size of a cracker is the challenge Tan and his team are facing. “The current version of Guide Glass is able to convey angle, depth, distance traveled, whether a door is open, things like that,” he said. “It tells the person the info they need, when they need it.”

Tan hopes improvements in GPS technology will eventually allow further refinements, leading to even more precise calculations and directions.

While the promise of Guide Glass represents a tremendous boon for those with permanent visual impairments, there may also be applications for those in situations where vision is temporarily obscured. Firefighters in a smoky building, rescue personnel in a blackout, or police entering a darkened crime scene could benefit from the device since it doesn’t rely on light to make measurements.

“The possibilities for making a big impact on society are exciting,” Tan said. “We just need to secure enough funding to bring it to market.” With proper backing, he believes Guide Glass could begin public trials as soon as 2018.

Even with the obvious positive implications for society, Tan explained, money has been hard to come by because investors are looking for big profit margins. He noted that they are constantly on the lookout for federal dollars, and the Smith-Kettlewell Eye Research Institute has recently expressed interest.

Until the right partner is found, the team will remain focused on improving Guide Glass to ultimately achieve their vision of helping those unable to see on their own.
Art on the Edge

An undergraduate sculptor infuses his work with a touch of perpetual anxiety.

BY KATIE ELYCE JONES
Sculptror Cameron Kite wants you to be a little nervous when you look at his work. You might even take a step back because you think it will tip over. Is that thousand pounds of steel about to come crashing down on the museum floor? No, it’s not going to fail—and that’s what makes it deliberate art, a conscientiously wrought plan by its maker.

“I’m trying to add a kinetic element without actually having something move,” said Kite, a senior in UT’s School of Art sculpture program. “I’m obsessed with pushing things to their visual limit so that when someone observes it, there’s a magic to how it’s staying up in the first place.”

Kite specializes in repurposing materials “that you have to bend to your will”—like steel scraps, rebar, and tie rods—and often juxtaposes them with organic materials like rope and wood or displays them in natural settings.

His sculptures are turning up frequently around Knoxville, having been exhibited at the 1010 Gallery, UT Gardens, also giving the observer a sense that the lumbering structure is dangerously close to a tipping point. The seven-foot, 1,200-pound assemblage of scrap steel includes a waist-high quadrant from a huge gear and a head like a giant light socket that holds a bouquet of dozens of carefully balanced rebar rods. Kite cut out a wavy pattern in the curved body of the piece with a plasma cutter to add another element of motion.

“When you think something is about to fall, it creates an anxiety that adds something to your experience,” Kite said. “There’s a potential energy that you feel.”

Some of his weighty feats of balance also speak to a different kind of balance—the equilibrium between manufactured and natural architecture. Kite’s aptly named sculpture Intuitive Balance is a horizontal wood plane anchored to the floor with tie rods on one side and suspended above the floor on the other, sprouting silver-white baby’s breath. As Kite prepares to start his career in full force, he is focused on private commissions to build functional and specialty pieces—like bookshelves and stair railings for houses—and commissions for art in public spaces. So if you’re out and about and feel a nervous jolt from the captivating sculpture ahead, look for Kite’s name.

For more information about Cameron Kite, visit tiny.utk.edu/art.

“Physical things hang together without actually having something move,” said Kite, a senior in UT’s School of Art sculpture program. “I’m obsessed with pushing things to their visual limit so that when someone observes it, there’s a magic to how it’s staying up in the first place.”

—Cameron Kite

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Connecting the Dots

Early exposure to legal research builds a strong case for preparing law students to navigate realities of the profession.

BY WHITNEY HEINS

You know how it is.

Every law student—past and present—can talk about those times when they felt stressed, overwhelmed, and overworked. But underneath the thousands of pages of reading and dozens of assignments on their plates lies the real reason why most students enter law school in the first place: to help people.

Kris Tobin’s Legal Research II class uncovers this reason early by giving first-year students the chance to help real people in the real world with their work. Through a partnership with the Knox County Public Defender’s Community Law Office (CLO), Tobin’s students research dozens of issues that are then applied to real cases that ultimately improve peoples’ lives.

“I want my students to have the experience where they can figure out what the practice of law really is,” said Tobin, assistant professor and reference/faculty services librarian in the UT College of Law. “I feel really blessed to be able to help students grapple with a real-life project.”

Most law students don’t encounter real-world experience in the first year of school, if at all.

“This kind of exposure is rare and unheard of,” said Tobin.

Tobin got the idea for a first-year experiential learning class nearly five years ago. When she approached Brad Morgan, UT’s pro bono coordinator, for help, he was immediately excited. It was Morgan’s strong belief in the power lawyers have to influence people’s lives that drew him away from a large firm to academia so he could instill this importance in the next generation of lawyers.

“Often as a law student or lawyer, we get caught up with going through the motions—billing hours, moving from one file to the next—but at the end of the day, behind every file and every task in the file, even if it is as small a piece as a research memo, is a person,” Morgan said. “And the work that is being done on that file is being done in furtherance of helping that person.”

Morgan worked to connect Tobin’s students with community partners in need. After hearing a WUOT-FM interview with Mark Stephens, the public defender for the Sixth Judicial District of Tennessee, the two knew they had found the perfect partner.

“Professor Tobin’s project found a way to get first-year students involved in ‘real’ legal work that not only benefited us as students but made a significant impact in an individual’s life.”

—Shelisha Steele

issues needing research on his shelf dating back twenty-five years, was happy to have his load lightened and more of his clients helped while exposing students to legal experience and “what it’s like for a client to have access to justice, or the lack thereof.”

“This class is, in a way, a reality test for students. It can really shape their learning experiences over the next three years,” said Stephens, who couldn’t help comparing the class to his own experience as a law student. “I wasted two and a half years of law school because I didn’t get the point of the theory. It wasn’t until I took the clinic in my ninth quarter and a real, live, breathing person was sitting before me that I connected the dots.”

The students have helped countless clients by researching more than...
forty-five legal issues for CLO cases, dealing with topics like expungement, gang and school zone enhancements, and divorce.

In one case, an attorney requested research to help a client who had blacked out and potentially caused a car accident. “He is diabetic and hadn’t eaten anything that day, and I believe that he had a hypoglycemic shock/coma,” reads the request. “Some research suggests that Prozac (which was in his system) can cause/worsen hypoglycemia in diabetics… What I need to know is if someone is under the influence of a substance that wouldn’t affect the ability of an ‘ordinary’ person to drive, but it affects this individual’s ability to drive because of their known medical condition, is that sufficient for a DUI conviction?”

After the students research the topic, they present a draft of the legal memo to the CLO attorneys, who challenge and question them and offer feedback. The students then bolster and revise the memos for their final draft. The students’ legal memos are added to a database so the information is at attorneys’ fingertips.

“Professor Tobin’s project found a way to get first-year students involved in ‘real’ legal work that not only benefited us as students but made a significant impact in an individual’s life,” said Shelisha Steele, who now works as a law clerk in Atlanta. “My experience overall has not only helped me develop as an attorney but also as a person. I intend to continue to provide pro bono services throughout my legal career.”

“Tobin and Morgan remember one class specifically when a student’s eyes widened and he asked, “You mean, this isn’t a hypothetical? This is real?” The ability to do work for more than a grade strengthens the students’ initial motivation to be lawyers and instills an early appreciation of pro bono service.

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The University of Tennessee is a leader in smart grid technology and research. By monitoring the nation’s power grid, UT faculty and students are creating a more reliable and secure system that better integrates renewable energy sources. Learn about more big ideas at utk.edu

Tennessee alone has a million residents each year who aren’t able to afford meaningful access to a lawyer. For this reason, the Tennessee Supreme Court has an aspirational goal for each lawyer in the state to provide fifty hours of pro bono service per year, an expectation imprinted on UT’s aspiring lawyers.

“Students walk away with an appreciation of the service they have done for the Community Law Office and the clients,” said Tobin. “And they learn that when they become practicing lawyers, they’re expected to help less fortunate and marginalized clients.”

Tobin and Morgan believe UT is the only law school including experiential learning in the first year, but the idea is catching on. They have presented the curriculum at several conferences and workshops and written a chapter for a forthcoming book on experiential learning in the law school curriculum. And they are undoubtedly helping to shape the next generation of lawyers who will speak of law school as well worth their time.

“I really want our students to appreciate where they are and what they can give to others,” said Tobin. "They really get a taste of what it’s like working with legal colleagues,” said Tobin. “This class helps them think about things earlier. Legal research can be very esoteric. It’s not until they apply their legal research to real issues that it all comes together intuitively.”

“Our ideas keep the power flowing.”

Tobin and Morgan
Advances in video game technology are breaking down barriers to physical activity.

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