This first issue of *Kaleidoscope* is respectfully dedicated to Professor **Louis J. Swift** who has done more than any other faculty member to encourage and support undergraduate scholarship at the University of Kentucky. Among his many other services to undergraduates, during his tenure as Dean of Undergraduate Studies, Prof. Swift fostered the UK Undergraduate Research and Creativity Awards program, served on the national board of the National Conference on Undergraduate Research (NCUR), and was the driving force behind UK hosting the 2001 NCUR conference.

Kaleiscope, Volume 1, Fall 2002

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Lee T. Todd, Jr., President

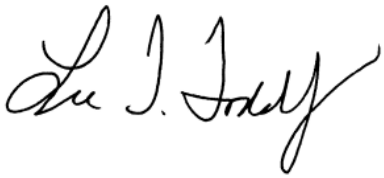
It is with great pleasure that I welcome you to this inaugural issue of *Kaleidoscope*, the new University of Kentucky Journal of Undergraduate Scholarship.

The extraordinarily high quality of the contributions by UK undergraduates is most impressive. I am also struck by the breadth of disciplines and styles represented. The articles come from the humanities, social sciences and engineering, and include fiction, personal narrative, a technical report, and two beautifully designed historical maps. The pieces relating to adolescent alcoholism are particularly timely. Excessive alcohol consumption, binge drinking, and all of the associated risks remain an issue on college and university campuses across the country. These two candid discussions of the personal impacts of alcoholism and the realities of dealing with it should serve as an awakening for us all.

I've said all along that University of Kentucky students can compete with students anywhere. This year, for example, our undergraduates have won a British Marshall Scholarship, two Truman Scholars awards, and two Beckman Foundation Scholars awards, among many other national, regional, and local honors. In addition, the level of scholarship displayed by our students continues to amaze and thrill me; it makes me proud of them and of the educational experiences offered at UK. Hundreds of our undergraduates work with their faculty mentors as full-fledged partners, participating in research laboratories and other scholarly endeavors, and authoring or co-authoring publications that have appeared in some of the most prestigious journals in their fields.

All top-20 universities have outstanding undergraduate programs that serve as the foundation for the institution's excellence in research and service. In its quest to become a top-20 university by the year 2020, UK is committed to further enhancement of its already strong undergraduate experience. We are strengthening such current offerings as the undergraduate research opportunities and the Freshman Discovery Program. In addition, we are developing new innovative and exciting undergraduate options for students, such as publishing their work in this peer-reviewed journal. Also, we initiated a program this summer that allows 22 of our African-American undergraduates to receive support while conducting research with several of our "Bucks for Brains" professors.

The extraordinary talents and scholarly productivity of our undergraduates is clearly demonstrated by the quality of this first issue of *Kaleidoscope*. I am certain that this journal will continue to provide an exciting venue for undergraduate students to showcase their scholarly productivity. *Kaleidoscope* will demonstrate to the people of the Commonwealth and the nation that the students at UK meet and exceed the highest academic standards while conducting research and other scholarly pursuits that are of national interest and importance. I look forward to reading future issues.



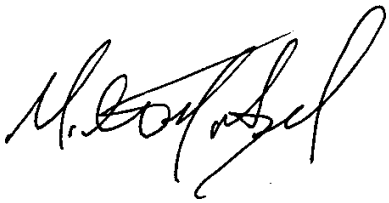
Michael T. Nietzel, Acting Provost

The University is extremely proud to publish the first issue of *Kaleidoscope*, the University of Kentucky Journal of Undergraduate Scholarship. This journal affords UK undergraduate students a new and very important opportunity to participate in the full process of intellectual discovery and public scholarship. It provides an opportunity for UK undergraduate students to develop and refine their abilities as investigators and authors, and it serves as an outlet for work that spans the complete intellectual spectrum of the University — the natural sciences, the humanities and creative arts, the social sciences, and technical and professionally related topics. The articles contained in this inaugural issue illuminate that spectrum and display the outstanding talent of UK students.

The University of Kentucky understands that its success in becoming one of the nation's leading public research universities requires that it offer the best undergraduate education possible. The University also believes that the key to excellence in undergraduate education is to involve students as early and as frequently as possible in the culture and the methods of scholarly inquiry, analysis, and integration. *Kaleidoscope* now joins several other initiatives at UK, such as the Discovery Seminars, the undergraduate research program, and several externally supported research opportunities that give our students varied and in-depth experiences in the research enterprise.

I want to express my appreciation to the faculty and staff who serve on *Kaleidoscope's* Editorial Board for their investment of time and dedicated attention to cultivating and reviewing the articles published in the journal. I am particularly grateful to associate provost Phil Kraemer for his energetic support of this venture, and to Bob Tannenbaum for his excellent work as the first Editor of the Journal.

Finally, I congratulate the students whose work is published in this inaugural issue. Not only do your fine contributions reflect your individual excellence, they bring great credit to the University of Kentucky. I hope they also encourage other students to follow in your footsteps and be future authors in *Kaleidoscope*.



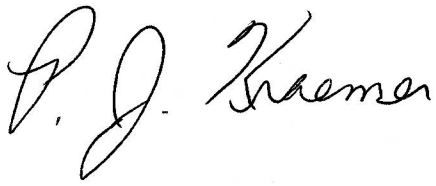
Philipp J. Kraemer, Associate Provost for Undergraduate Studies

One of the defining attributes of the American system of higher education is the research university. These venerable institutions have made pervasive contributions to society through their multiple missions: research, education, and service. As the University of Kentucky aspires to be among the very best public research universities, it is imperative that we express excellence in each of these missions. One strategy by which we can achieve that goal is to strengthen connections between faculty scholarship and undergraduate education.

For the institution, this strategy reflects a way to exploit the strength of a research university in terms of resources and personnel; for students, it provides a special learning opportunity that distinguishes the curriculum. By fostering active involvement of undergraduates in the exciting and diverse scholarship conducted by eminent UK faculty across all fields of inquiry — from the sciences and the arts, to the applied disciplines and the service professions — the University can advance scholarship and undergraduate education simultaneously. The opportunity to work side-by-side with world-renowned scholars affords UK undergraduates a kind of education that is only available at a research university; a kind of education that stimulates the intellect, excites the imagination, and motivates strong academic engagement.

In this inaugural issue of *Kaleidoscope*, we celebrate this important element of the educational experience at UK. Beyond highlighting scholarship as an academic opportunity, the quality of the contributions to this first volume of *Kaleidoscope* reaffirms that students at the University of Kentucky are as talented and dedicated as those to be found at any college or university in the country. Equally important, this new journal serves as an invitation to future scholars. We encourage more students to take advantage of the extraordinary learning opportunity available through the University's research mission. This opportunity affords a signature academic experience that reflects the educational potential of a world-class research university.

I am pleased and proud that the Office of Undergraduate Studies is sponsoring this journal as a part of our on-going commitment to providing the finest possible undergraduate education to all UK students.



Robert S. Tannenbaum, Editor

I have had a wide variety of interesting and challenging assignments during my years as a professor and university administrator, but editing this premier issue of *Kaleidoscope* has been particularly enjoyable and rewarding. The distinguished editorial board has provided excellent advice and support, both on the general conception of the journal and on soliciting and reviewing specific contributions. The University administration — the President, Provost, and Associate Provost — have been enthusiastically supportive of the concept and the development of *Kaleidoscope*. Professor David Atwood, a long-time champion of undergraduate research, kindly volunteered to contribute the article on the involvement of undergraduates in his research laboratory. The student authors and their mentors have all been totally cooperative and helpful in preparing the published versions of their works. And, our production staff members — Teresa Shear, graphic designer/production coordinator; Evie Russell, administrative assistant; and UK sophomore Zach May, Web designer/programmer — are outstanding. Their product speaks for itself.

It has always been my intention to be as inclusive as possible in the range of materials and disciplines published in *Kaleidoscope*. Therefore, from the start we have planned an electronic version of the journal as well as the more traditional print version. In that manner we will be able to publish materials that would not otherwise be available, for example, the entire text of a Gaines thesis, a number of art works, a musical performance, or a "walk-through" of an architectural design. The Web version of this issue of *Kaleidoscope* contains additional and expanded versions of the articles and illustrations from the paper journal. It also contains links to other related materials, and forms for feedback. We would be particularly interested to hear your reactions to any aspect of the journal or to any of the articles.

The largest part of my pleasure in editing this journal comes from the superb contributions by the student authors. Jackie Goins' maps are well designed and instructive. They show clearly, in just two images, an enormous amount of information about four years of war in the Pacific. Allison Perry's delightful story about a young woman's struggle to get up the courage to introduce herself to a young man in her class is written beautifully. It is a joy to read. Karla Conn's description of the improvements that she made to the "smart" wheelchair is clear and understandable, and it provides further evidence of our students' continuing concern with turning their knowledge and skills to benefit others.

The two remaining pieces, Jessica Couch's personal reflection and Finn Green's abstract from his Gaines thesis, are concerned with adolescent alcoholism and substance abuse. There may be no more timely issue for the current generation of students. National statistics on substance abuse, particularly alcohol, among college students are extremely alarming and do not seem to be improving. I did not solicit articles specifically on this subject, but I am very pleased to have two such powerful pieces to include in this first issue of *Kaleidoscope*. They are both deeply moving in their personal testimonies to the effects of substance abuse on young people, perhaps because they are both so well written and tell their stories in the first person.

I am extremely proud of this first issue of *Kaleidoscope* and I hope that you enjoy reading it. The success of this journal rests upon the outstanding undergraduate students at UK and their mentors. I hope that each of you will consider submitting your best work or that of your students for possible publication in future issues. A call for papers is included in the back of this issue.

AUTHOR

Jessica Couch

I am a junior English major and Women's Studies minor. For the three semesters that I have been at UK, I have been on the Dean's List with a 4.0 average. Also, I just received a $1000 merit scholarship from the College of Arts and Sciences.

In this personal essay, "A Very Small Ledge," I reflect upon the alcoholism prevalent in my closest relatives, while also examining my own drinking habits. I juxtapose anecdotes of family members with my own experiences of alcohol. In the end, I conclude that my family's habits, however detrimental, do not curb my own. In this self examination, I realize that I choose to live on a very small ledge.

In the future, I hope to become a professor of both English and Women's Studies. As writing is one of my great loves — a love that I hope to share with my students one day — I find my personal reflections, such as this submission, a passionate yet necessary medium for my advancement. For this piece, I was forced to objectively analyze my family's use of alcohol as well as my own. Such honesty was greatly encouraged by my mentor, Erik Reece.

When I'm not writing or doing homework, I'm usually working. I work at a private company called "Patient Advocates" that helps find medication for people in Kentucky who otherwise could not afford it. Fortunately, it's a job that is both rewarding and fun.

Mentor: Erik Reece, Lecturer, Department of English

How many writers who come from a family of congenital alcoholism can face up to that brutal lineage — and face it down — with skill, honesty, and courage? Jessica Couch can. "A Very Small Ledge" is a collection of searing, unflinching portraits of a parent, grandparents, and uncles whose lives were hollowed out and ultimately cut short by alcohol. But be forewarned: this is not a morality tale. Jessica is looking for the truth; she isn't satisfied with easy answers or neat summations. That, after all, is not the essayist's job. Between each family portrait, Jessica turns the camera on herself to examine a complex series of events that lead to her own "very small ledge," From there, she must stave off her family's demons — even as she beckons them toward her. As the writing instructor who watched this piece develop, where would I rank it? Right beside Pete Hammil's *The Drinking Life*, Scott Russell Sanders' "Under the Influence," and Robert Stone's "Helping." Jessica brings poetry to a subject that could not sustain itself without that healing voice.

A Very Small Ledge

A Personal Reflection

Somewhere, spiraling in the tightened coils of my genetic code, a hidden culprit attaches with inexorable force to my x chromosomes like a rabid dog to a helpless child — the dominantly diseased inheritance of German and Swedish stock. This entity resides in each cell of my body, resting quietly and waiting for the ambush during that lowest valley of human emotion, the most stressful of deadlines, or any mundane moments of a long workweek. This being preys on its victim like a sucking parasite on the intestinal wall, extracting personality and nutrients until the real person only flickers in between red eyes and belligerent rantings. The person *becomes* this being, feeding it, nurturing this whining child and its insatiable belly. More. More. More. Unable and unwilling to realize the loss of will, the person, marked by a parched tongue and unseen driving force, looks into the fridge, the pantry, the linen closet, the marble top bar, and even the spice cabinet. Wherever it can be found, the main ingredient is constant: alcohol, the purer, the better.

Most people know where they come from by their connections with a region of the world, a warm home, and close relatives. For me, the story of my ancestors, my relatives, where I come from, and where I might end up is in my blood. My blood faintly whispers the family secrets of weak fathers, grandfathers, grandmothers, and uncles so thirsty they would give their career, their life savings, and even the love of their family for just a drop of sweet oak bourbon, the froth of a dark beer, or the olive at the bottom of a dirty martini. No, that's not right. They'd settle for the worst beer, the cheapest vodka . . . even cooking sherry. Their quivering hands fumbling through the cabinets of the house for that drop, that fix, that smooth buzz, they sought a liquid filler for a void that wasn't just in their stomach but in their minds.

I remember the first time alcohol touched my lips. Spending my usual weekend at the house of my friend, Sarah, we sat on the barstools next to the kitchen counter, while her mother, Pam, concocted the makings of strawberry daiquiris. Carefully slicing fresh strawberries that a migrant farm worker from up the road gave her, she added the juicy halves with the margarita mix we bought at Ralph's and placed them into the glass blender. She added ice. Waiting for all the ice to grind down into a smooth puree, we awkwardly danced to Mariah Carey's "Dreamlover," the version with Old Dirty Bastard. We all sang, "Me and Mariah, go back like babies and pacifiers." We laughed. Three white girls with no rhythm.

I remember thinking how cool Pam was, shaking her big booty on the light brown wood floors of her always-fun house. The daiquiris were done. Because we were younger, she made them virgin. A fifth of Bacardi rum stood stately next to the blender, a few swigs short of a full bottle. She poured herself a glass, leaving an inch or so to add the rum. Swirling the rum into the red mixture with a long, glass stirrer, she walked barefooted out onto the porch. The sun was starting to hide behind the rolling hills of San Luis Rey — the hills that formed what looked to be the body of a man, a sleeping Indian, they say. The faint glimmer of the ocean disappeared over the hills. Crosby, the golden retriever Sarah failingly taught for the seeing-eye dog program, shot through the door behind Pam. Then, Pam popped her head back in the door.

"Now there's rum next to the blender, girls. I'm out on the porch, so I won't know if you pour some in." Her auburn hair hung in front of her sun-tanned skin. A big goofy smile crossed her face. Laughing in staccato, she closed the patio door. Meanwhile, Sarah and I poured too much rum in our wine glasses of daiquiris. What I really remember, though, was that sensation in my temples; it really was buzzing. I felt loose. I felt like I could dance. I felt like I could drink more.

My mother raised my brother and me to fear alcohol. On many occasions, my mother said, in exasperation with my consistently rehabilitated uncle, "I wish you kids could get genetically tested for alcoholism, and then have it taken out. Because Lord knows you two have it." She would say this after dragging Jason and me in tight clenched hand-holds to the rehab center where my uncle, Steve, was a regular. I remember the green of the walls and the Parkinson's shake of his detoxified body. She would explain to us, "Your uncle drinks too much beer. It makes him sick in his mind and his body. You guys should never drink that stuff. Promise me, you won't, okay?" In our obvious cluelessness, we, of course, said we never would. My mom preached like Jonathan Edward in "Sinners in the Hands of Angry God." Though she had no pulpit, she nearly infused the idea that drinking alcohol equated to eternal hellfire and damnation. Yet, I later found that her fear was rooted in the past — a lineage of disease-tainted blood. Her father was a drunk. Her brother was a drunk. Her first husband was a drunk — an abusive drunk at that.

Footsteps fumbling down the picture-strewn hallway, the stench of alcohol permeated our small house in Chandler, Arizona. As usual, my curly haired father grasped firmly in his large, leathery hands his best friend — a Coors light longneck bottle. His day of horseshoeing was over. He sat brooding in the blue wingback chair in the family room while my mother ran from kitchen to stove to refrigerator to kitchen table, putting the last minute meal preparations together. She made steak, baked potatoes, a Caesar salad, and homemade garlic bread. Six Coors, though, already lay empty in the sink, as his blood churned hot as curry. The danger zone. Awaiting any opportunity to lash out, his temper revved. His voice, a groggy mumble, turned caustic, ranting blame and accusation for what he thought was a dinner not made promptly or tasty enough.

Having been married for six months at this point, my mom sadly accepted this behavior as normal. She learned after the first three weeks of marriage when putting together a mattress frame that anything could anger him, setting him in a rage of physical abuse. Frail and weak in comparison, my mother, dressed in her red-flowered apron, cowered beneath my father's intimidating six foot two frame. Swinging unexpectedly, fingers balled into a fist, his thick hands raised . . . . The burning sting. The scratches seeping blood. The tears trickling down bruised cheeks.

During high school, I drank. I drank like there was a run on the liquor stores. Actually, it was my senior year that I remember (or really, don't remember) most. Having moved from California to Kentucky in 1998, I spent my junior year unsuccessful in finding a group of friends. How-

ever, during my senior year, one Friday night in October, I walked down the narrow steps of a basement that was unfamiliar to me — a friend of a friend's house. There, I found the group (actually a group that I learned were my fellow classmates in the AP English program) that would lift me up into confidence after a dominating relationship that had left me passive and insecure. Unfortunately, the group also helped to feed my alcohol-hungry blood.

The twelve of us would drink Friday nights and Saturday nights at houses where parents were out of town, in the basements of naive, southern Baptists who had gone to bed early, and even under the dark, charcoal sky of Woodford County farms. We recovered on Sundays — some of us even braving church with hangovers — but we were always probing on Mondays, finding where and when the next party was. That year, my drink was vodka; I'd moved on from those days of daiquiris and rum. I'd mix it with orange juice, Sprite, Gatorade — anything to mask the overwhelming aroma of rubbing alcohol on skinned knees. I did learn to shoot it straight up, though. I can still imagine the long streak of burn down my throat and the quick shake of my head as I winced the smell away. I wasn't choosey with my alcohol either. The boys in the group —Jeff, Hawthorne, Will, Brandon, Aaron, and Keith — were farm-raised, Woodford County folk. If you hung with the boys, well, then it was bourbon: Jim Beam all the way.

After a few months of getting to know these guys, especially Will, whose constant outbursts in my Calculus class I had come to expect and love, I was invited to go camping with the boys. I went. Meeting Will on a less traveled street in town, I parked my Lexus inconspicuously in the lot of Big Springs Park. I was supposed to be spending the night with Jenny. My arms hugging my sleeping bag and pillow, I hoisted myself into his white, diesel, Ford truck with an uncomfortably high step. Driving about ten minutes into the Versailles countryside, the leafless trees ticking past us hurriedly, we reached the Riverfarm, Will's dad's winter-barren tobacco fields.

The boys stood around the campfire, pouring diesel fuel on the flames and giving manly approval at the billows of dark smoke. Jeff thrust a blue Igloo cooler full of straight Jim Beam in my cold, purple splotched hands. I drank it, trying not to wince. They rewarded me with pats on the back and phrases like, "Atta girl, Couch," and "Damn, that was pretty good for a girl." I was Couch to them, not Jessica. An impersonal title of fraternity, my last name confirmed that I was one of the guys.

In this new kind of friendship, I continued to drink — bourbon, beer, even a little vodka. Unfortunately, the time lapse of memory for that night lasts only about a half an hour. Of course, I still possess snapshot images of memory — snuggled up to Jeff, trying to stay warm in the cab of Hawthorne's truck, feeling sick and sitting outside the truck, slumped against the big tires, wishing I hadn't drank so much. However, I learned the true story of the night the next sunny morning while swinging my legs off the bed of the truck — a missing left contact and an eaten Gala apple after the fact.

I had puked, puked so long and hard that Jeff had to be my nurse, holding back my thin blonde hair out of my spaghetti dinner. In my convulsing, probably from lack of fluid, he even had to dress me in my second shirt and my San Diego red sweatshirt. Then, in the middle of the night, I had passed out under the truck, curled up in the long spears of brown winter grass. Waking, I jerked my body quickly up, only to slam my head against the rusty tailpipe of Hawthorne's old truck. Passed out cold. Frightening even to me now, I had awakened oblivious. All I had remembered was matching each shot — being one of the guys and loving it. I remembered that feeling of happy grogginess.

My father's mother, Joyce, died in her usual state of inebriation. I never meet this woman. She died before I was born. Only in pictures have I seen this distant, yet so close relative. A brunette with curly shoulder-length hair, she was a diminutive little fairy next to my overweight, towering grandfather. Their life centered around social drinking — Wednesday nights of playing Bridge, parties on Friday nights, and late night toddies before bed. He was a longshoreman after college and it was on the frigid waters of the Eastern seaboard that he came to like the taste of Crown Royal. Actually, it was on one shore visit in a random city that he met and impregnated my grandmother. After receiving a call one August night about his baby on the way, my grandfather decided to go back to Morgantown, West Virginia and marry my grandmother. Theirs was a marriage of moral necessity. In his efforts to provide for his new bride and family, my grandfather became a professor at the University of West Virginia, and my grandmother became a housewife.

One night, in their small home, my grandfather came home from his Friday line of history classes. Untying his brown bow tie, he called through the den into the main part of house for my grandmother. She was in their floral wallpapered kitchen, stumbling from cooking sherry — the only alcohol she could find in

the house. My brother and his sister, Adrian, were at a cousin's house for the night.

"You're drunk again? Joyce, we have a party to go to," he yelled.

One of his colleagues at the university was being promoted. She informed him she wasn't going. Perturbed, my grandfather changed into a navy suit and paisley tie, closing the door in front of his drunk wife. He walked away from their small, brick cottage.

The next events are mere guesses — a piecing together of the scene that you could undoubtedly find in a police report. Turning the crystal knobs of the white, porcelain bathtub, my grandmother let the water fill the tub. No doubt, she tested the water's temperature by placing her small hands in the stream of water from the spout, her single solitaire wedding ring falling slightly to the left. Just right. She poured the Gardenia salts my grandfather bought her for mother's day into the water. Pulling off her black sequined dress, which she originally intended to wear to the party, she placed a wobbly right leg, followed by a staggering left, into the warm, relaxing tub — a tub so relaxing she fell asleep. In her state of unconsciousness, the water entered her nostrils and mouth, slowly trickling into her lungs. Four hours later, my grandfather wobbled into the house with Crown on his breath, and found my grandmother, at the age of forty-nine, dead in the bathtub. Drowned.

Now, I drink beer, Bud Light usually, preferably longneck bottles. Finally of the drinking age, sometimes I come home from a day of work and school, craving that barley taste. A twinge of fear pulses in my head, but I twist off the top of my beer anyway, taking one long smooth swallow, while I throw the top on the floor for my cat to play with. A contented sigh escapes my mouth. I think, this is college, right? Sometimes, I pull another Bud from the cardboard box, my large hands squeezing in my hurried tear from the first beer. On some nights, I even pull three or four, although mostly on weekends. Just like the stories of my family's blunders, I have my own. I've spent many nights buzzed, trashed, wasted, sloshed — however you want to call it.

I remember the weekend I spent up at Purdue with Will, Jeff, and Hawthorne. Killing four cases, a bottle of cheap red wine, and a fifth of Captain Morgan's, we spent our days with weak stomachs and our nights with fearless attitudes. I remember Jose Cuervo night, the christening of my first apartment. My roommates and me licking salt off our hands, throwing back Kentucky shot glasses full of tequila, and frantically sucking the flesh of lime quarters, our minds floated in an intense slow buzz — a euphoria that would leave us grimacing in the morning.

I remember spending an embittered Valentine's Day alone in my apartment. Tugging at the edges of the label of the third and final Bud Light in the house, I decided to uncork the Asti sparkling wine. Pouring the bubbly tan liquid into the lead crystal goblets my mother gave me, I made a sarcastic toast to my best guy friend who will never date me. I drank the whole bottle. I remember taking shots with my brother this summer in the purple glow of a San Diego sunset. I remember bonging beers from my friend, Morgan's, bong made from putty and Lowe's materials. I can remember feeling the force of gravity pushing liquid to the back of my throat, requiring of me to swallow harder and faster. I can still feel the sting of my eyes and hear my loud belch. Of course, I can also remember not being able to remember.

I used to think that my grandmother drank rotten orange juice. Sitting at her kitchen table, she would watch "The Price is Right" and occasionally look down at her crossword puzzle, checking the word with a quick snap of her pencil and drawing a line through the appropriate letters. She was about seventy then. Gray-haired and wearing red lipstick, she was still getting dressed in normal clothes at that point. Smoking her Parliament 100s, she always drank orange juice in the morning. One day, sitting next to her, I reached for her tan, plastic cup of O.J. Taking a sip, I was startled by a taste that I couldn't describe — the taste of vodka. My grandmother had spiked her juice.

"Uck, Gram, why does your orange juice taste so gross?" I asked her.

Not realizing I had sampled her morning pick-me-up, her blue eyes widened. Nonchalantly, she put the cup to her creviced lips and said, "Let me test it." Making the face of a baby who's just tasted grapefruit for the first time, she then took the cup to the sink, pouring its contents down the drain. "What would I do without you, Jess?"

Later, I found her orange juice cups in odd places around the house: the sewing room cabinets, the spice cabinet in the kitchen, the hall's anything-and-everything cabinet. Then, as I got even older, I found bottles of Smirnoff vodka in the pantry and the linen closets. I still remember the day my mom searched through each cabinet in Grandma's house. Pulling bottles from places like the metal bread box and her cream, silk-lined hope chest in the master bedroom, empty and full, she took the bottles to the green and blue wallpapered kitchen and poured the clear liquid down the drain. She forced my grandma to watch.

My mom never liked that I drank Squirt soda as a child. As we walked down the pop aisle in the Safeway grocery story, she would always push for Sprite or Coke.

"Don't you want something different, Jess," she would ask, holding the alternative twelve-pack over the cart, ready to drop it in. I suppose she had too many bad memories of her own father. She says his drink was Old Crow, a straight whiskey, and Squirt soda. Sitting in his red and orange chair on the orange linoleum porch after a day of assembling electronic boards, he would sip his drink with bloodshot eyes glaring at his children behind black rimmed glasses. Bald and stoic, he looked like a strict Nazi — a nose and forehead passed down from German ancestors.

He was the most functional of the drunks in our family. Despite his nightly drinking, he was successful, always providing a life of comfort for his family. In fact, some of his electronic boards made it into the first American space shuttle. Wearing his self-made watch (the face open so you could see all the technical electronic work), he was featured in *Who's Who* for his accomplishments. Who he was during the day and who he was at night, though, were two different people. After a few small glasses, he'd grow argumentative about the cleanliness of the house or the noise level of the children — anything to escape the Krueger household. In fact, he escaped a lot and for long periods of time. He would drink one night and be away for five or six days at a time, visiting places like Las Vegas and Los Angeles, always toting gifts in his brown leather suitcase as consolation for his behavior. My mom always remembers one thing about him. She would try to make him deals.

"Daddy, if you don't ever drink again, I will never forget to clean my room."

"Daddy, if you don't ever drink again, I will never fight with Steve again."

"Daddy, if you don't ever drink again . . ."

Two years ago in November, my mother and I sat down together with a dark blue bottle of a German Riesling. Carefully taking two crystal glasses with green gems on the stems from the cabinet, she poured a glass for herself and then one for me. I remember looking at the little bubbles trickling up to the surface of the wine from the bottom of the glass. My mom's green eyes stared at me. Rubbing the dress pants on my right knee, I questioned her motives. With my every swallow, she watched. Seeming to calculate the speed at which I picked up the glass for another sip, she plotted her inquisition.

"Do you drink, Jessica," she asked.

"Well," I stuttered. "Well . . . yeah, yes, I do."

"Oh God, Jessica! You know you can't do that. Haven't you ever listened to me? Look at our family. How can you be so stupid?" She spread guilt over me like butter on bread. I shrugged, silent. No answer would suffice anyway.

She checks my fridge when she comes over to my apartment. Opening the door, she'll usually see a sixer in the back behind the milk and eggs. Shaking her head in disapproval, she'll close the door. She's stopped asking a lot of questions lately. You could say that we've come to a silent recognition of the facts. She affords me the measure of adulthood. However, there is one very pertinent condition. If I become an alcoholic, she will disown me. No questions. No second chances. "I've had all the drunks and hurt in my life already. No more," she once told me.

Toward the end of his life, my grandfather drank gin and vodka; he heard somewhere that you could smell the alcohol less on your breath. The truth is that he could never keep his promises with his sweet little girl. Refusing to give up his gin on the rocks, he died an active alcoholic with liver cirrhosis at the age of fifty-six. Five months ago, my uncle, Steve, died a Budweiser drinker with liver cirrhosis at the age of fifty-four. The only thing I remember of him is the time I visited my cousin at his house to play Legos. Eating Cheese Puffs and piecing together the helicopter Lego layout, my Uncle Steve collapsed to the kitchen floor. Our six year old legs ran to the kitchen, only to see red on the creme Corian counter and the tan tiled floor. Blood soaked his red and blue checkered shirt that reeked of pig manure from the family pork farm he occasionally worked at. This was one of his first liver failures — the first sign being uncontrollable nosebleeds that look like a pig at slaughter. He stuffed paper towels up his nose and grabbed his beer that waited on the counter.

I know that I have a weakness: a too quickly convinced hand into the refrigerator. I also know that the end result of my decision will inevitably be death. I think about my family every time I drink. Whether through naiveté or stupidity, I choose to live on a very small ledge — a plateau of normal college drinking and the vertical drop of alcoholism. It's a serious gamble with death as the high stakes and poker chips of years to lose as the determinant. I'm a high roller, like my grandfather on his sudden trips to Las Vegas. Rolling the dice and throwing a few chips into the game, I take my chances and tip my bottled beer up.

AUTHOR

Finn Green

Mears Green

I am a non-traditional student, an English major, and a Gaines Fellow. I expect to graduate in December, 2002, and hope to attend law school. This is an excerpt from my Gaines Seminar in the Humanities Senior Thesis. Some of you who read my thesis, which portrays some part of my life's story and a great deal of my daughter Mears' life story, may question why a father would compose a document of this nature. After careful consideration, Mears and I determined two points. One: this is our story. And, two: we believe that by telling our story we might provide some hope, guidance, and light to kids and their families who travel the same path.

Mentor:
John Greenway,
Associate Professor,
Department of English

The narratives of Finn and Mears Green, when juxtaposed with that of Jessica Couch, give voices to the statistics and realities of alcohol addiction. Readers can find the academic research in the full, online version of Finn's Gaines Thesis, which I helped advise. In this condensation, we have distilled from the formal research one voice of despair as it evolved into hope. My wife and I went with Finn to Kids Helping Kids one Friday evening and heard other voices, not just those of the young, but — as you read here — the voices of the families trying to regain contact through the chill vapor of addiction.

Having worked for ten years with alcoholics seeking recovery, I know the power of the disease and the fragility of recovery. There are other models for recovery, some without the spiritual basis of Alcoholics Anonymous, some existing on Jessica's individual "very small ledge" without the community you see in Finn's narrative of Mears. Some researchers, perhaps correctly, question the disease concept of addiction; one alcoholic I know, however, drank all the way through her chemotherapy, later saying that alcoholism ran deeper in her than did cancer. Finn's research and narrative end on a note of hope, but this hope does not imply a promise. I can only wish all of them well, one day at a time.

Adolescent Substance Use and Abuse

INTRODUCTION

Many children are walking on thin ice, drowning, sinking, and becoming quiet. Drugs and alcohol can take in our most precious and valuable resource; a subtle foe stalks our children. Children and young adults are not renewable resources. Each child, each life is special and meaningful, yet sometimes children vanish in the icy, dark water. Thin ice easily fools children, leading some to death. Drug and alcohol usage fools children, leading many to early graves. Some people may say that talk of early death and the grave borders on being scare tactics; they are correct. People need to be scared — they need to know that drugs and alcohol kill our children.

Drug addiction and alcoholism are chronic diseases that affect not only the individual sufferer but also the lives of all those they touch. I have a personal involvement with this reality. In the beginning of my freshman year at the University of Kentucky, my daughter Mears, then fifteen years old, broke her three-year partial silence with me: "I can't stop drinking when I start drinking. I need help." Finding the help that Mears requested became my primary focus. We did not seek out this reality; the reality found us and it constantly searches for sufferers. Mears' behavior for the previous two years did not appear normal or healthy. She had changed friends, become silent, distant, non-cooperative, unloving, and apathetic about school and life in general, and acted as if she hated me.

Mears had been harmed by my behavior. As an irresponsible parent, I had given her many reasons not to trust me. Trust is an essential element in relationships. Relationships and lives suffer when the failure of trust is present. Her mother and I had been divorced for almost ten years. At the time when Mears broke her silence, I had been

sober for six and a half years. My network of friends consisted of individuals who had similar life experiences to mine. Ann — a licensed clinical social worker, my counselor, and friend — knew where we could find help for Mears: Kids Helping Kids.

Kids Helping Kids (KHK) saved Mears from impending doom and possibly death, changing our lives forever. KHK is a long-term adolescent alcohol and drug rehabilitation program that also treats the adolescents' family members. The first Friday night that I went to KHK, a man introduced himself to me, looked me in the eyes, and said that "Kids Helping Kids will give your daughter her life back." An hour later, I learned that he and his family had sold their home in Georgia and moved to Ohio so that they could participate with his daughter in the KHK program. Shortly thereafter, I made a decision to do all that I could to help other families who face the same devastating situation. My senior thesis for the Gaines Seminar in the Humanities is an effort to support this decision.

My complete thesis, which can be accessed at < www.uky.edu/OtherOrgs/GainesCenter/ >, contains an extensive review of the relevant literature plus a history of KHK, an expanded version of the narrative, and the transcripts of all of my interviews with Mears. Here, I will present only an abridged version of my narrative of Mears and me. I give a voice to Mears' life story. This voice takes the form of a qualitative narrative in the style of interpretive biography. This mode of expression, though difficult, enables the espousal of essential truths about being human; few matters are more important. I believe that you will find Mears' story worth telling and hearing. "The story tells us in a meaningful way what life itself is about … life has an implicit meaning, which is made explicit in stories" (Josselson and Lieblich, 5, 6). I hold to the hope that our collective voice will both be heard and be helpful.

ADDICTION

> Addiction is an actual illness. When we see somebody with a physical impairment we have compassion and some tolerance for what they have to go through. When we have a person who has a physical abnormality that's hidden away in the brain, we jump to judgement very quickly. People say 'Why can't they control their use of drugs?' They don't realize that there's actually something organically wrong. There's no doubt that addiction is a treatable and preventable illness.
>
> -Dr. Darryl Inaba, *Uppers, Downers, All Arounders*, 2000

The terms "substances" or "drugs" can include alcohol, marijuana, cocaine, heroin, inhalants, and numerous other illicit drugs including prescription drugs improperly obtained or used. Adolescent substance use (ASU) exists as a continuum of behavior. The spectrum of behavior begins with experimentation and sporadic use that may lead to a chronic, severe dependence with life-threatening consequences increasing as the progression continues. The progression of substance abuse from the heightened potential for use to dependence can be described by five stages. Particular behavioral signs and manifestations can be recognized in each stage.

Stage 0: Preabuse or Curiosity Stage

Stage 0 describes the adolescent with an increased potential for substance abuse. This increased potential for substance abuse stems from the combination of genetic susceptibility, personality traits, family influence, and environmental factors.

Stage 1: Experimental Stage (Learning the Euphoria)

Adolescents in stage 1 have already made a decision to "try" drugs and begun learning the drug induced mood swing or euphoria. Drugs most commonly used at this stage are tobacco, alcohol, and marijuana, the so-called gateway drugs. Stage 1 drug use is confined to social situations, on weekends, in the company of others, and when others supply the drugs. There are few behavioral changes other than "avoidance lying" as interest in peer pressure from the drug-using world comes into conflict with the values and beliefs of the nondrug world.(Muramoto & Leshan, 144)

Some systematic research indicates that "the majority of adolescents who use substances do not progress to abuse or dependence" (Weinberg et al., 253). Additional research indicates that "much of the alcohol and other drug use in high schools is experimental, social, or habitual with bouts of abuse" (Cohen & Inaba, 327).

Advancement into stage 2 and stage 3 represents

what professionals commonly define as adolescent substance use disorder (ASUD). ASUD "appears more related to biological and psychological processes" than does ASU (Weinberg et al., 254). ASUDs commonly co-occur with multiple diagnostic disorders including psychiatric disorders such as conduct disorder (CD), attention-deficit-hyperactivity disorder (ADHD), affective disorders, and anxiety disorders. The severity of the ASUDs may be impacted by these multiple diagnostic disorders. ASUD commonly applies to "persons consuming five or more drinks on each of five or more occasions in the past thirty days" (Weinberg et al., 254). ASUD can be defined as:

> **Stage 2: Early Regular Use (Seeking the Euphoria)**
> The adolescent now actively seeks the drug-induced mood swing. Use is no longer confined to a social context but is increasingly situational, as the adolescent seeks relief from everyday stress. Use is more frequent and sometimes solitary, regular on weekends, and occasionally weekdays. The stage 2 user no longer relies on drugs offered by others but now has his or her own supply. The range of drugs used expands to include stimulants, sedatives, and inhalants in addition to alcohol, tobacco, and marijuana. . . Signs include changes in dress, decline in personal hygiene, deterioration in school performance, loss of previous interest in extra curricular activities, and less interest in "straight" friends. The stage 2 adolescent exhibits more mood swings, engages in regular lying and "conning" as she or he increasingly leads a dual life between the mores and values of family, society, and the drug world.
>
> **Stage 3: Late Regular Use (Preoccupation With the Euphoria)**
> "Getting high" becomes the main goal of the stage 3 adolescent's life, and daily activities are planned around opportunities to use. The user experiences "down times," with marked dysphoria or withdrawal symptoms when not using. The adolescent may begin to question his or her control over drugs, experiences depression, and may even contemplate suicide. With the increasing frequency of use, the irritability, apathy, guilt, shame, and anxiety worsen, leading to more drug use, often with more powerful agents, to control these unpleasant feelings. The "harder" drugs are used daily, frequently alone as well as with others. Behavioral problems and family conflicts worsen as the adolescent lies, fails in school, or has legal problems resulting from the cost of maintaining a drug habit. There is growing retreat into the drug-using world, drug-seeking behavior is obvious, and self-destructive and risk-taking behaviors, including overdosing increase. (Muramoto & Leshan, 144-146)

Progressing from stage 3, heightened ASUD, into stage 4, dependence, oftentimes can be identified by patterns of use; in contrast, many studies designed for adult diagnosis rely on symptoms of withdrawal to identify dependence.

> **Stage 4: End Stage or "Burn Out"**
> The stage 4 adolescent now needs drugs just to feel normal and to avoid the profound and nearly constant dysphoria. Depression, guilt, shame, and other remorse may be overwhelming, and suicidal ideation becomes more common. The user turns to more potent agents, using them in larger amounts. Drug use is nearly constant, as the user becomes less selective, using any and all drugs available, and obtaining them by whatever means necessary. Increasing physical and mental deterioration becomes obvious. The user often drops out of school and engages in more risk-taking and self-destructive behaviors. Family relations are severely disrupted, and the user may have been expelled from the home. Paranoia, angry outbursts, and aggression are common. Overdosing occurs more regularly, in addition to blackouts, amnesia, and flashbacks. Physical symptoms such as cough, fatigue, malaise, and problems related to malnutrition become chronic. (Muramoto & Leshan, 144-146)

During the past thirty years unlawful drug use by American adolescents has changed from an "extremely deviant phenomenon to an epidemic situation" (Segal et al., 194). Unfortunately, ASU can lead to disastrous consequences, critical accidents, disability, and even death. In fact, drug and alcohol related accidents are the leading cause of disability in adolescents (Muramoto & Leshan, 141). For example, the County Coroner reported that over seventy children and young adults, under twenty-one years of age, died in Fayette County during the 1990s due to drug and alcohol usage.

The annual national negative economic impact attributable to ASU and ASUD is estimated at more than 58 billion dollars (including $36 billion in violent crime and $18 billion in traffic accidents) (Cohen & Inaba, 328).

Many professionals consider alcoholism to be a family disease. **"**Familial predisposition to alcoholism has been firmly established. Children of alcoholics run a four times higher risk of alcohol abuse than children of non-alcoholic parents" (Segal & Stewart, 199). These children still have a higher likelihood of becoming substance dependent even when adopted by non-alcoholic parents. Although genetic disposition is postulated, so far no single gene has been identified or is thought to account for the tendencies toward ASUD.

KIDS HELPING KIDS

> … like their motto, 'If your kid is lost, then one of our kids will find them.' That's what they say and that's what happens. That's Kids Helping Kids. It's not like diplomas helping kids, or some clinical woman. I mean they play a big part, like Michelle played a big part in my program and in my treatment but if she would've been the only person I would have dealt with, I wouldn't have been sober still — I wouldn't have made it.
>
> -Mears Green, March 2002

Kids Helping Kids (KHK), located in Milford, Ohio, is a unique, long-term, day treatment, multi-modality, adolescent drug and alcohol rehabilitation program. Several factors contribute to KHK's uniqueness. It's not called Kids Helping Kids by accident. New adolescent clients, or "newcomers," are immediately placed under the guidance of program peers who have progressed to a point of earning the responsibility of helping others. KHK also employs their own program graduates, or "seventh-steppers," as Staff Counselors whose responsibility is to help current KHK clients through rehabilitation. KHK administers a hybrid treatment that synthesizes the family-based and multisystemic, behavioral therapy, cognitive-behavioral therapy, and twelve-step intervention modalities. Parents and families are involved in many aspects of treatment, including the provision of nighttime housing for the adolescent clients.

KHK is for kids between the ages of thirteen and twenty-one. KHK's philosophy supports a belief that

> chemical dependency is a disease with genetic, psychosocial, and environmental factors influencing its development and manifestations. We further believe that, with adolescents, chemical abuse is characterized by developmental arrest or deterioration which may be viewed in stages with characteristic physical, psychological, and social symptoms. As a result of chemical abuse, the adolescent may experience inadequacies of personality, impairment of cognitive functioning, diminished motivation, interpersonal and social conflicts, emotional blocking and regression, and causal disregard for behavior consequences. (www.kidshelpingkids.com)

KHK helps adolescents to learn how to apply a set of principles that will better enable them to manage their behavioral and emotional responses to life's situations. A KHK goal is to return the adolescent client "to a healthy productive lifestyle."

I doubt that many kids, if any, wake up, or come to, one morning and say, "I want to go to a long-term drug rehab." For example, in our situation, that's not what Mears did. She only asked for help ("only" implies no shortcoming on her part, whatsoever). Furthermore, she told me later that if she had known that "KHK was the kind of help you were going to get me, I wouldn't have asked." The pattern of Mears' sad and destructive behavior had been increasing in both regularity and severity for some time. Making the decision to send Mears to KHK did not come easy. My first visit to KHK had occurred eighteen months prior to the time when her mother Cere and I took Mears there in February 1999.

In the fall of 1997, the KHK Program and Admissions Directors personally interviewed me to discuss the nature of the problem. Although they did briefly describe KHK's program, they focused on the problem, not on treatment. I began both to see and to accept certain things while I verbalized my perception of the problem to them. I accepted then that Mears, who was not quite fourteen, had definitely been using alcohol and drugs. I also accepted that my previous behavior had been an example for Mears, not a good or responsible example either. For several years, Mears had watched me either trying to force solutions to problems or to altogether avoid life situations by drinking alcohol. I accepted that I needed help being a responsible parent. They helped me to ascertain the nature of the problem and to realize that potentially I could be a part of both the problem and the solution. Mears, her mother, and I were floating in ice-laden water. As I left, the Director said, "I'll see you later." He could not have been more correct, thankfully.

The next time I contacted KHK, I spoke to the Admissions Director on the telephone and we made arrangements for Mears' admission to KHK. She remembered my previous visit to KHK and said we could bring Mears there anytime. Cere and I planned to take her to KHK the next morning, unbeknownst to

Mears. Although I knew that we were being loving, responsible parents, I experienced a great deal of emotional pain and mental confusion with this decision and admissions process. When we arrived at KHK, two kids took Mears off to our right behind a set of doors and the Admissions Director led Cere and me into a nearby room. She explained that

> Mears is on the other side of this wall with four kids from the program and she, by now, has probably figured out a few things. The other kids will have told her that they have been here for ten months, seven months, fourteen months, and eleven months and are here because of drug and alcohol abuse. Mears will be given the choice of telling you good-bye with the condition of being cordial, or not telling you good-bye.

I understood what she told us earlier about it being Mears' choice to tell us good-bye only when one of the kids on the other side of the wall came into the room and said, "Mears wants to say good-bye." I had never been glad to say good-bye to Mears; in an odd way, a sense of relief engulfed me. She remained seated when her mother and I walked into the room. Cere told her "I love you Sweet-Pea" and Mears responded, "I know that." The three of us were crying. Glancing at me, Mears said, "Toodles" and I leaned over and held her face in my hands and kissed the top of her head. After a moment, Mears slightly recoiled. I let her go and left the room. By leaving Mears there, her mother and I had become parents of a KHK first-phase newcomer client.

There are six phases that KHK adolescent clients and family members participate in, if that client completes the program. Kids must satisfy specific requirements of each phase prior to advancing to a subsequent phase. KHK also requires that the adolescent client spend a minimum number of days in each phase.

First phase newcomer clients have few, if any privileges. Some privileges that are immediately removed are speaking without being spoken to, independently moving about, speaking to family members, wearing certain clothes, going home, going to school, talking on the telephone, listening to music, and watching television. KHK also teaches that being responsible is a privilege; for example, first-phase kids must *earn* the privilege of helping to clean the facility. These privileges are bestowed or restored based on the individual's behavior, compliance with KHK rules, and consequent advancement through the phases. First phase kids spend ten and one-half hours per day focused on and participating in their treatment program.

Kids continually introspectively examine and discuss their history of alcohol and substance use with clinicians, peer counselors, and oldcomers prior to earning privileges like talk-time. "Talk-time," a first-phase privilege, is a fifteen-minute monitored conversation with their parents or guardians that takes place after open meetings on Friday nights. Kids generally experience two or three talk-times, at a minimum, prior to advancing to the second phase. Second phase clients have earned the privilege of going home on the weekends with their family. Third phase clients return to school, taking classes at schools in Milford, and may work part-time for businesses in Milford. Fourth phase clients may talk on the phone, listen to music, watch television, and are gradually re-integrated into their home communities. Fifth phase clients have all privileges restored, even driving and visiting friends without being in the presence of parents or guardians. If a kid fails to comply with certain KHK guidelines, he or she may be either not allowed to advance through the phases or may in fact be "set-back" to first phase.

Parents, guardians, and family members attend two separate meetings held on Friday nights. Group meetings last ninety minutes and are held prior to the Open Meetings that may last several hours. Monday night meetings are offered for siblings.

I have both a clear memory of and notes about our first KHK Open Meeting on February 26, 1999. The kids were in place as the parents filed into the room and found their seats. That night there were fewer than twenty girl and close to thirty boy clients. KHK personnel introduced themselves, then monitored and led the meeting. Next, each newcomer kid stood and introduced him or herself. When someone handed Mears the microphone she stood and said,

> I'm Mears Green and I'm sixteen years old. I've been here for three days. My drug list is alcohol, marijuana, cocaine, and mushrooms. I've used for three years. I've learned the first five steps, and my goal is to learn them all. A time from my past is Christmas and I went to my Grandmother's high on cocaine and had been drinking … just so I could be with my family. I was in the bathroom that night swallowing down pills with alcohol. I'm really ashamed of that.

Mears sat and wept. I wept also, knowing we had done the right thing. I lived this couplet numerous times. After all of the newcomer kids and one boy and one girl oldcomer finished their introductions, the monitor asked if there were any phase changes. Kids who had phase changes shouted them out, one by one, "Third Phase," "Third Phase," "Fifth Phase" and so on. At that time, I didn't realize what those announcements meant.

KHK stresses that parents should verbally express their feelings and avoid lecturing their child at all. After the kids announced their phase changes, the parents and family members spoke beginning that night, as every Friday, with the parents of first phase kids. Mears stood when Cere and I stood. Mears wept. We all wept. Mears said, "I love you Mom, I love you Dad." We all sat down and the kids chorused, "We love you Mears." We continued to weep. We didn't spend any time alone that night with Mears. At the end of the meeting, Mears and the other newcomers were led out of the room by oldcomers who held onto the belt-loop of the newcomer.

ONE GIRL'S STORY

> I've lost a lot of friends to drugs and alcohol. Two friends of mine shot themselves. One friend of mine died in a drunk driving accident and the driver was his best friend, and he's sitting in jail right now for manslaughter. And I don't, I don't want to be in the newspapers for something like that. I don't want to be remembered for that. Even if I'm not remembered for anything spectacular, I definitely don't want it to be because of that.
>
> -Mears Green, February 2002

Mears descended rapidly through the five stages of ASU over a period of about four years. In the complete version of my thesis, I describe her descent in some of its horrible detail. Here, I will tell of her treatment and the changes it has wrought.

Mears' first epiphany, as it relates to alcohol and drugs in her life, occurred when she instinctually realized that alcohol could fill her inner emptiness, the hole inside of her, only temporarily. Her second epiphany may well have been her acute awareness of what cocaine did to her. If not then, Mears definitely experienced another epiphany just after her sixteenth birthday. Until that moment, she did not know that drugs and alcohol were slowly and surely taking her life from her.

Mears had a party at her Mom's house for Valentine's Day and drank so much that she passed out in the bathtub. When Cere came back to a wrecked home she went to bed, woke up the next morning, and waited for Mears to wake up. When approached by her Mom, Mears denied everything — even the undeniable evidence. Her Mom told her that she "couldn't stand to look" at her anymore and left the house. People had been leaving throughout Mears' life. To begin with, during her fifth year, Mears' nuclear family life ended in divorce, then I left, then her boyfriends left, then her best friend left, and now her Mom left. The combination of the loneliness, fear of abandonment, need for drugs to feel normal and to avoid dysphoria, and the severity of problems continuing to increase combined to push Mears to the jumping off place. She remembers

> sitting in the living room trying to clean the carpet and I just started crying. And I, I threw my arms out in the air and said, 'I can't do this anymore. I don't want to do this anymore.'

This cry for help proved to be the action that turned Mears life. She reached out through her painful dread and asked for help.

Mears wrote her Mom a letter, telling her everything.

> I hate the person that I am. I can't stand to look at myself in the mirror anymore because I've become the person that I hate. I've become … I am a monster. I've become something that I never, ever wanted to be.

Mears might have seen what she had become or may well have seen her parents in the mirror. Thankfully, she avoided physical death, although, a self-destructive part of Mears died that day. Her pain carried her to a new life.

Ten days later we admitted Mears into Kids Helping Kids. Initially, she felt mainly fear and anger while being without alcohol, without drugs, without boyfriends, without friends, and without a home. Mears' fear motivated her, she recalls,

> I was scared. I was scared that if I didn't, if I didn't get better, that my parents wouldn't want me anymore. I was mad at my parents because they put me in here. I felt that this place was too much. I was scared what would happen if I didn't follow the rules here. So, I did everything that they told me to do.

It breaks my heart to think that Mears felt and or believed that we wouldn't want her anymore. The thought crushes me and reminds me of how I felt during parts of my life, particularly how I felt unwanted

by my Dad. Drugs and alcohol helped me to suppress those feelings and thoughts. I learned how not to feel. After I started getting sober I told a friend of mine that "I couldn't get in touch with my feelings." He replied, "You keep not drinking and your feelings will get in touch with you." He could not have been more correct. Mears' feelings wasted no time in getting in touch with her, either. She had been without drugs and alcohol for ten days when she arrived at KHK. For the first three days in treatment, she cried constantly.

It is natural for children to love their parents. It is also natural for children to be deeply hurt by either one of their parent's behaviors, especially if the parent continually fails to properly love his or her child. As I have said, during a vital time of Mears' life I failed to provide her with the assuredness that can only come from a loving, responsible parent. Mears remembers that she "hadn't wanted to see or talk to my Dad in like five years and, uh, he was the only person that I wanted to see or talk to for the first night" at KHK. The absence of alcohol and drugs allowed Mears to feel the pain and anger that she did not want to experience. Children do not want to feel the pain that springs from the absence of a parent. Some people live their entire lives trying to avoid this pain.

Although Mears hated me, she had realized only during the year before KHK that she could rely on me. KHK requires that Second Phase Kids write letters to their parents. In her letter to me dated May 1st 1999, Mears wrote that she didn't

> understand how or why you continued to show me the care and support you did despite the way I was treating you and everyone else. Oftentimes I feel undeserving of that love. Its hard for me to believe that I acted the way I did and you were still there for me, though I obviously did not want you there.
>
> It is now clear to me that you saved my life by putting me in here, and I am forever grateful for that. I know that I would have never been able to say these things to you had you not cared enough to get me help.

Let me make it clear, I did nothing more than a loving parent should do. At the time, my actions only appeared to mean so much to Mears because she has known me as an unreliable person. Her feeling "undeserving" of love stemmed from my inability to provide love and security. I needed help in becoming the father that Mears deserves.

Mears knows that she needed help too. She needed help sorting out her life. She needed help from someone who really understood. She needed help from someone who had been where she recently came from. She needed help from someone who had escaped the hell that she had been living in. She needed help from someone in rehab. According to Mears, without a doubt, the most beneficial help for her came from other kids. The other kids encouraged and helped her to live in reality.

After being at KHK for eighteen days, Mears earned talk-time with Cere and me after Open Meeting. She and her peer counselor, or old-comer, Bethany, peeked around the corner at Cere and me. Mears looked like the child that I remember from years past — excited, bright-eyed, and with a huge smile. Mears and Cere hugged. Then Mears and I hugged each other for the first time in five years. Bethany kept a loving hand on Mears while we hugged. We all cried. We sat in a tight circle and Mears made amends to Cere and me for the wrongs that she had committed before treatment. She cried "those big hiccup cries when you can't really breathe." Bethany kept notes as Mears poured herself out. Mears told me that her pride had blocked her love for me and that she had made a decision to hate me four years ago. The fifteen minutes passed like a second. We hugged and cried more. Bethany held Mears' belt-loop as they left the room. Mears completed her amends to Cere and me the next Friday night. Bethany never left Mears' side.

The next time the four of us sat down, Mears explained that for the last two weeks she had been making amends, but now she would tell us what her resentments towards us are, beginning with, "I'm mad and really hurt." She looked directly into my eyes, never missing a beat, and described my previous behavior and actions. With tears moving down her cheeks, she explained that I had left her, and she did not know what to do. I agreed with every word she spoke. I told Mears that I made a choice in early sobriety, a terrible mistake, and that I had wronged her. We held each other and cried. Bethany lovingly kept her hand on Mears. Mears continued this healing process with Cere. Although, these visits were only fifteen minutes in length, Mears' desire and ability to honestly express her thoughts and feelings began to heal her past, changing her life and ours.

Mears worked extremely hard to prepare for these visits. She wrote moral inventories (MIs) every day during treatment. While a first-phase newcomer, Mears shared her daily MIs every night with an old-comer. This process resulted in at least two general benefits. First, Mears and the old-comer related to each other establishing a bond of trust, and second, Mears began to look directly at some realities in

her life. Mears recalls that

> there were some Moral Inventories where I did really get a lot out of what I wrote about because I had to look at what I did. You have to put 'em through the steps. Like you look at your defects and you look at who you hurt and you look at how you felt when all this happened. It puts you back in time.

Mears learned the skill of introspection by continually working KHK's adaptation for kids of the 12 steps. Mears realizes that her sober perspective of past events provides a different view.

On her 52nd day of treatment Mears went home.

> I was allowed to go home on the weekends. I was supposed to build a relationship with my parents. At this point the people, the counselors, and the staff at KHK thought that I was ready to go home. They thought that I had worked on my drug problems enough at that point and they were ready to send me home so I could start working on other things. Looking back I don't know if I was ready.

At the time, to me, she seemed ready. Mears makes this statement in hindsight. She continues to evaluate her past. Her introspection continues to bear fruit. Mears explains that at the time she did not feel afraid of anything, "I was just happy to be home." She now realizes that as she progressed through the phases the more she feared that she would be set back to first phase. She never got set back, because she did everything, for the most part, required of her. Mears reflects that,

> A lot of the things I did were out of fear. I was afraid that I was going to get in trouble and not be able to talk to my parents. So, I was afraid that I was going to get into trouble and my parents were going to be disappointed in me . . . I thought that I was getting sober and working the program because I wanted to. Part of that was true, but part of it, I was working it for my parents because I didn't want to disappoint them because I had been disappointing them, I thought, I'd been disappointing them my whole life.

Some of Mears' anxieties were byproducts of a need to please Cere and me. These anxieties did not begin after Mears started KHK. These anxieties had burdened Mears for some time. Our individual expectations, or our combined expectations of Mears added unnecessary stresses to Mears which, in turn, manifested themselves in Mears as anxieties. Mears may well have used alcohol and drugs in an effort to tune out these persistent menaces.

Miraculously, during treatment, Mears realized that her part of these anxieties belongs to her, and that Cere's part belongs to Cere, and that my part belongs to me. I say miraculously; however, these changes occur frequently when, for whatever reasons, individuals give themselves to the KHK program model as Mears did. Ideally, individuals realize, as Mears did, that, in order for treatment to really work, they must want to recover for themselves, not for their boyfriend or girlfriend, not for their parents. Mears states that,

> It didn't start to be about me until I was almost graduated. I remember a couple of times talking in group when I realized that I just can't go back to the way I used to be. I remember one time, just as I was getting ready to graduate, it might be the week that I graduated, and I was up in group and I started crying about how I didn't want to go back to the way that I was. And I couldn't go back to the way that I was. I was afraid that I was going to die. I'll never forget that.

Mears' painful past fortunately helped to produce the willingness to work the KHK program model. Mears looked at her part in desiring to live a new sober life for herself.

> I wanted to be something different. I wanted to be something better. I wanted to be proud of myself. I wanted my parents to be proud of me. I wanted to have friends. I didn't want to feel miserable all the time. I wanted for the first time, you know, since I was like five to be happy. And I thought that the only way I could do that was if I did this program. And so, I did it as best as I could.

That's a blessing of tremendous proportion. Until Mears worked the Kids Helping Kids program model, she had been without the desire for happiness since she was five years old.

Mears recognizes the completion of her six-month aftercare program as a tremendous accomplishment. During her follow-up, she told me that "This is the most important part of my rehab." She realized that,

while she participated in the KHK model as an in-treatment client, her choices were limited. To propose a strong and possibly false dichotomy: you either do the program, or you don't get out. Mears discerned that the aftercare program allowed for more freedom with her personal choices. There were still requirements during follow-up, and Mears could choose not to abide by them and consequently be penalized, but the impetus became what she *wanted* to do — not what she *needed* to do.

Mears' inspirational aftercare performance found its beginnings in her desire to abide by the conditions of the detailed contract that she, her Mom and I drafted during her Fifth Phase. If Mears violated any contract conditions during her aftercare, the violations were benign. Her inspiration derived more from pursuing the contract's positive aspects, not from avoiding the contract's negative consequences. For example, back then, if given the chance, Mears could sleep quite late in the mornings, but she sacrificed that option so that she could be at KHK aftercare on time every Saturday. She went to a Twelve Step meeting every day for six months and she worked closely with a sponsor. A sponsor is an individual who, like an old-comer or peer counselor at KHK, helps other people with working the steps of recovery. Mears remembers that during her follow-up she realized that she "wanted to work at KHK, to be a counselor at KHK."

Mears lived with KHK graduates and their families, in Ohio and Northern Kentucky, the summer of 2000, before her senior year in high school, so that she could work at KHK as a junior staff counselor. KHK graduates may continue escalating through certain conditions and become junior or senior paraprofessionals, or accredited employees. Mears completed the conditions as a KHK junior staff counselor that summer. Her rewards were great. She became cognizant of her love to help other kids. That fall she moved back home to Lexington to begin her senior year at the same high school she attended before going to KHK.

Mears cannot remember, but she thinks that at about the start of that school year

> things started to get a little shaky. My boyfriend and I were having problems. Dad and I started having problems. We couldn't, we weren't talking to each other, or I wasn't talking to him. My Mom was having some problems. She wasn't talking to me. I was starting not to go to school.

Understandably, not unlike many people, including myself, the condition of the relationships with significant others is of vital importance to Mears. However, in recovery, Mears' tendency has changed.

> I'm not in bad relationships anymore. I don't wait around for some guy. Um, I don't … I get lonely, but it's not the same kind of lonely. It's not the do all end all, I'm going to die, kind of lonely.

Problems in relationships are unavoidable, but she no longer allows problems in relationships the power to dictate her entire life.

During this same period, Mears began having doubts as to whether or not she had alcoholism. She recalls that she would go to meetings and say

> I don't know if I'm an alcoholic. I don't know if what I was doing was just normal. And people told me that I needed to go out and try some controlled drinking and that really pissed me off … So I quit going to meetings. I quit listening to them.

It is common for people in recovery to question their condition. Some people may opt for drinking or using drugs in an effort to answer their question. Mears came frightfully close to drinking; but through an effort to help another fellow sufferer she realized that she did not need to drink or want to drink. She realized that many consequences would accompany the drink and one of them would be "not being able to come up and work at KHK, and that's what I really wanted to do." And that's what Mears did.

Two days after graduating from high school (no small feat by the way), Mears and her excitable puppy moved into an apartment, by themselves, in Cincinnati, Ohio. The following Tuesday, she started working at KHK.

> It was good to be working with people and helping people and doing what I loved to do and doing it for the place that saved my life. 'Cause Kids Helping Kids saved my life. If I hadn't gone through that program, I don't know where I would be right now. I don't know if I'd be dead yet. But, uh, at the rate I was going, it wasn't far off.

Mears became a senior paraprofessional at KHK in the summer of 2001. As a peer counselor to kids whose lives have been devastated by alcohol and drugs, Mears reaped a bitter yet abundantly sweet harvest. Mears gave her heart back to the process that both saved and changed her life.

That summer, Mears faced difficult challenges and remained sober and clean. She realized that working full-time at KHK did not allow her sufficient time to care for her puppy. Sadly, she made the tough decision to give her puppy to someone else who had enough time to care for him. Several times before she had experienced the loss of pets and puppies,

but never as a result of her choosing. In addition, Mears noticed that she began losing what eventually amounted to almost twenty percent of her body weight. Fear accompanied Mears during the diagnostic period but it did not cripple her. After extensive tests, over a six-week period, doctors diagnosed Mears with Graves Disease, her second rare, chronic and treatable disease. She struggled to understand, "Why Me?" In the meantime, she continued to perform her work responsibilities and to take care of herself properly. Eventually, Mears realized that, in all likelihood, had she not been sober she might have learned about her Graves Disease only after it had caused irreparable damage. She matched calamity by soberly struggling with reality, and she now accepts the hand dealt to her.

In December 2001, I approached Mears with a request that she consider telling the story of what her life was like, what happened, and what her life is like now. After deliberating for several weeks, she agreed. On February 12th 2002 Mears celebrated her third year of sobriety. On March 27th, after our final interview for this effort, as I left her apartment, she asked,

"Daddy, how high did you use to push me in the swing?"

I remembered the last time I pushed Mears in the swing. That happened in the fall of 1988, during her fifth year, right before her Mom and I separated. After reflecting, I said, "Probably ten maybe twelve feet, Honey."

With a wonderfully bright countenance, she said, "I thought I could touch the sky."

Then we hugged and kissed each other, both saying, "I love you."

Mears has taken full advantage of her opportunity, her chance for a new life. On March 29th 2002, she worked her last day as a senior paraprofessional peer counselor at Kids Helping Kids. Within weeks, she independently secured a job as a bank teller. Mears soberly walks through her life, once again reaching for the sky, but we both know that sobriety is an every-day battle that can be lost in an instant.

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AUTHOR

Allison Perry

I am an Integrated Strategic Communications sophomore at the University of Kentucky. I enjoy reading, writing, and listening to music. I am a member of the Freshman Honor Society, Dean's List, and a staff writer for the *Kentucky Kernel*. One day I hope to develop and design new ad campaigns for companies. I chose an ISC major because I like to brainstorm and be creative — which is also the reason I like to write.

My story involves a crisis that nearly everyone has felt at one time or another — finding the courage to follow your heart. "Chai" tracks a young woman's thoughts and actions as she observes her interest and ultimately makes a decision to rectify the situation. The reader sees the woman's ordeal in two ways, or points of view. In one way, through a 'limited omniscient' third person viewpoint, her thoughts and actions are described, but not interpreted. The story switches back and forth between this and the other point of view — first person. The reader sees exactly what she is thinking through her diary entries, which are alternated with the limited omniscient viewpoint.

I enjoyed writing *Chai*. It started out as just another assignment for my Creative Writing class, but quickly became fun and challenging as I tried to find the perfect way to convey the main character's thoughts to the audience. My faculty mentor, Leatha Kendrick, was a great help to me in this process, always willing to read over drafts and discussing different suggestions for revision. I would also like to thank the members of my English 207 (Creative Writing: Fiction) class for critiquing the story and offering their suggestions.

Mentor:
Leatha Kendrick,
Instructor,
Creative Writing,
English Department

Novelist John Gardner describes fiction as an extended dream. Readers take up fiction to be transported: to enter unfamiliar (or familiar) mental states and experience them more fully, from the safety of a position outside the story. Writers, on the other hand, must re-experience the often difficult emotions of their characters while maintaining some degree of artistic distance. Allision Perry's short story, "Chai", explores a young woman's romantic preoccupation with an apparently unattainable young man. This is, of course, an old topic, but Allision renders it in a fresh and contemporary way. As I read the story through in several drafts, I watched Allision discover a way to tell this story from both the inside and the outside: using a limited omniscient third person point of view, interleaved with portions of the main character's diary. In the manner of classic short fiction, the action takes place in one room and within the space of an hour. The story's final twist, a move worthy of O. Henry himself, proves that its true subject matter is not obsession, but courage.

Chai

April 16

Dear diary,

He drinks chai.

She stopped writing, re-reading the words printed neatly on the page before her. Her teeth gently gnashed the top of her old black Bic pen, as she was prone to do, the tiny teethmarks running up and down the side as evidence. *He drinks chai*, she thought again to herself. Only three small words, but what a revelation. She removed the pen from between her front teeth and continued.

I thought I was alone in that particular fetish. I don't know anyone else who drinks chai, who likes it, or hell, has even heard of it. Half the coffeehouses in town don't even serve it.

She pondered the last sentence for a moment, before crossing it out lightly and scrawling WHAT COFFEEHOUSES?! in bold ragged capitals in the margin of the notebook. She smiled thinly at her own joke. Ashwood wasn't exactly known for its chic coffee varieties. Actually, apart from the college, it wasn't known for much at all, except for the time the local high school baseball team won the state tournament back in 1984. The people of the town *still* talked about it. Some called it reminiscing; she preferred to call it "stuck in a time warp."

But somehow he's found it. And he's enjoying a steamy foam cup full of it right now, on this hideously dreary Monday morning. Will wonders never cease?

I know all this not because he told me, but because I can smell it. It sits on the left-upper-hand corner of his desk every day, patiently waiting to be consumed. The scent is that of pumpkin pie, laced with cinnamon and whipped cream. I know it's chai. It's a very distinctive scent.

The professor shut the door, startling her out of her daily mid-morning reverie. The one that always revolved around the boy who apparently enjoyed chai, or Gabe, as she had taken to calling him. It wasn't his real name. She found the bland moniker given to him by his parents completely blasphemous in relation to his appearance, and had decided to christen him with an appropriate nickname. Gabe, short for Gabriel. A heavenly name for a heavenly creature.

The professor began his usual monotony-soaked lecture, forcing her to pretend to pay attention for the time being. He turned his back to write something on the board, and she snatched up her pen and scribbled down her thoughts in the few moments she had.

He sits one row across and three seats up from me. I've studied his back and head so arduously that I could draw it from memory, if it weren't for that whole "lack of artistic talent" thing.

She chuckled to herself, thinking how proud her high school English teacher would have been of her for using the word "arduously."

His hair is lovely. I don't know how else to describe it and even that word simply can't do it justice. Blonde and shaggy, it falls just below his chin in layers and rests on the nape of his neck in the back. And you know what else? It always looks just right, no matter what the weather. In a way, I'm insanely jealous. My hair will never come that close to perfection.

She patted her own brown locks self-consciously, cursing the humidity of the room and the stupidity of following her mother's nagging advice to use hairspray. Meanwhile, the professor droned on about World War I.

She set her pen down for a moment and let her calm brown eyes stray one row across and three desks up. Gabe. He sure knew how to dress. Most of her journals consisted of her description of whatever outlandish ensemble he'd chosen to wear on that particular day. Today's entry would be no exception.

Today he's wearing a simple black t-shirt with the words "Hysteria, Bloody Hysteria" printed in bold silver English script across the chest. It doesn't make much sense out of context, but really, what does? The shirt is faded and slightly wrinkled. I bet he does his own laundry. His jeans are washed out and worn, the dark denim color having been chased away by years of laundering. A coal-black leather belt littered with silver studs keeps them hanging precariously on his hips. They cling to his skinny frame the way a child clings to a mother's hand — yearning to let go but knowing it's safer to hold on. His shoes are plain black and white ADIDAS, the laces stained with years of dirt and frayed at the ends.

She was forced to close her journal and tuck it underneath her history book as the professor began to walk about the room as he lectured. To deter students like her from not paying attention, no doubt. Her fingers itched for freedom as he ambled up the aisle past her desk. Gabe swung sideways in his seat to watch the professor, and her chest thumped slightly as she planned what to write next.

Locking her fingers together, she rested her chin on the tops of her hands and studied him. What would it feel like to run her fingers through that silky blond hair? It was always drifting into his face, a fact that she actually found quite irritating. She *wanted* to see his face, his gently sloping nose and chin. Some days she had to resist the urge to walk up the aisle and tuck the baby-fine strands back behind his ears.

The professor returned to the front of the room, and her pen returned to her hand.

His eyes are the bluest things I've ever seen. They remind me of a blue crayon I used to draw with when I was young, my favorite drawing utensil. The wax from that crayon flowed smoothly onto the page like a light blue waterfall.

She had cried when that crayon broke, but she was only seven at the time and didn't understand the concept of "Your father will buy you a new box tomorrow, dear." She did, however, understand the concept of sentimental value.

So when I see those spring-sky eyes, I can't help but think of that particular crayon, and it attracts me even more to him, if that were possible.

A faint rustling from a diagonal direction caught her attention. She halted her pen and raised her head, watching intently as Gabe stood up gracefully and walked to the other side of the room toward the pencil sharpener. She sought a quick remedy when her view of his frame was blocked. Her old wooden desk, with its unflattering graffiti scratched across the top, squeaked in exasperation as she scooted it over to get a better look.

The way he walks is fascinating, and completely unlike any other male I've seen. It's almost as if he's not even walking, but just gliding, his sneaker-clad feet barely whis-

pering across the tiles. His arms, like his legs, are long and lithe. Even something as mundane as sharpening a pencil seems beautiful and ethereal when he does it.

Gabe gently blew the stray shavings from the tip of his pencil and headed back to his seat. She edged her desk back into place, satisfied now that he was back in her direct line of vision. After he settled back into his usual position, she reluctantly directed her gaze back to her notebook.

He slouches. Not as much as Daniel Blevins, who sits right across from me; Lord knows he must have the spine of a snake to sit like that. No. Gabe leans back in his seat, those long legs spilling carelessly out from under the desk and into the aisle. He sets his elbows on the desk, sometimes resting the side of his face in the palm of his hand. His hands are large, nimble, smooth, with long fingers. I wonder if he plays an instrument. Piano, maybe. Not guitar, that would surely put calluses on his delicate fingertips.

He taps his feet. I don't think it's a conscious thing, I just think he can't help but create rhythm, which feeds my earlier suspicion about the instrument. His taps are light, gentle, and quick, but they shake his desk slightly. I worry that one day the vibrations will scoot the chai right off the edge and into the floor.

She sighed, wishing she had a cup of chai to nurse that moment. *His* cup. But even more than that, wishing she had *him*. But all she had was a mind full of colorful dreams and an empty heart. Some called it obsession; she preferred to call it an "engaging interest." Well, her mother always said she had a way with words.

Every Monday, Wednesday, and Friday she observed and wondered about him in the same way. She planned on what she would say to him at the end of class. It always began with the same scenario.

Maybe today I'll follow through with the plan. I can see it now — Dr. Bowman dismisses us, the class stands up to leave, and I follow him out into the hall, where he will take his cup and throw it into the nearest trash can. I'll ask him about it, we'll talk, and then I'll ask if he'd like to go get a cup together sometime. I've envisioned various conclusions to this fantasy, some are good, some are not so good. Some end with a smile or a "maybe," I'm rather fond of these. Others end with all of my worst nightmares coming into play. What if he laughs, and walks away? What if he has a girlfriend? What if he throws his chai into my face with disgust?

OK, so maybe the latter one is a bit melodramatic. I've come up with a thousand other endings, and only one possibility scares me more than that one. What if he says yes?

She tossed her pen aside disgustedly, shaking out her wrist. It always seemed to ache when she got to this part. The "confession" part of her journal. And it was always the same thing. Every day, she vowed to do it. Every day, she failed grandly. She flipped back several pages in the notebook to view the proof.

March 18

I'm going to do it. I have to. It's the last day before spring break. If I don't do it now, I won't see him for a week. Besides, if he says no, I'll have the whole week to recover.

Logical enough. But had she followed through? No She flipped back some more.

February 15

He can't be from around here. I'm sure he's from New York, or Chicago, or someplace huge and exciting. His clothes are too different, too vintage and casual; his hair too perfectly coiffed, and his manners too polite, to be from around here. I'm dying to know where he's from. I'm dying to hear about the world outside of this campus, and outside of Ashwood.

I'll do it today. If he rejects me, then maybe I can pretend I'm still hung over from Sarah's singles party last night.

She smiled to herself briefly. That certainly would have made for some interesting conversation. More pages fluttered.

January 10

He's here. In this class, in this room, with me. I can see him right now. I can't believe this. I haven't seen him since that day. I was beginning to wonder if he ever really existed, or whether it was all just a figment of my imagination.

She remembered that day well. The start of the spring semester, the day she realized he was in her class.

She continued the backwards journey through her thoughts, searching for the day she'd first caught sight of him.

September 28

I saw an angel today.

Not a real one, of course, at least, I don't think so. I was crossing the street, walking to chemistry. The sky was gray, the ground was gray, and my mood wasn't much better. But when I looked up, my eyes caught a glimpse of light. Tall, blonde, fair, with a light blue backpack that concealed his wings. I nearly tripped over the curb, staring at him. When I regained my balance, he was gone. Out of sight.

September 28. The day her obsession — erm, "engaging interest" — began.

"OK, class. Put your books up, get paper and pencil. Pop quiz," the professor announced.

SHIT.

She tossed her books into her bag haphazardly. Before slamming her journal shut and throwing it in with the rest, she scrawled one more word at the bottom of the page, in stout, declarative letters.

TODAY.

"This quiz is a bit different from the ones I usually give. It's not multiple choice, and it will be worth 100 points, instead of 50." The professor smiled at them as if he expected a warm round of applause. It didn't come. "It consists of one question. Only one. We've been talking about World War I today. When it comes to war, soldiers are often defined as 'courageous.' Not many would argue with that, but, I ask you — what is courage?"

The class sat blankly, waiting for him to continue. She tapped her pen against the desk, Gabe scratched his left shoulder.

"That's your question," the professor said pointedly. "What is courage? Write it up, turn it in. You may go ahead and leave when you're done."

How lame, she thought, staring at the blank sheet of paper that mocked her. Courage was a million things. It was diving into a lake to save a child. It was refusing to sit at the back of a bus because of your color. It was moving out of a small town and out west to pursue your dreams. It was. . .

Finding the guts to ask a boy if he'd like to have coffee sometime.

She chewed on her pen thoughtfully. True, true, but she couldn't very well put that down verbatim. She wondered how to define the word succinctly and sufficiently.

Gabe stood up. He was done. Her heart leaped; he was leaving. This was her chance. She could stop him in the hall, and no one would be around to see her make a complete ass of herself.

It occurred to her that the situation was already looking nothing like the ones she had envisioned in her head for the past few months. She took that as a good sign.

She thought of that one word, written boldly at the bottom of her entry for April 16.

TODAY.

What is courage?' she printed neatly at the top of the paper. Her eyes never left him, and she took a deep breath, knowing that finally, it would be ***TODAY***.

'THIS IS.' She drew the letters large and brash, finishing the 'S' with a flourish and dotting a neat period at the end. Picking up her backpack, she scurried up the aisle, paper in hand, and tossed it face down on the professor's desk, offering him a sweet smile. Adjusting the frayed black straps of her backpack, she walked purposefully out the door.

CLICK HERE TO VIEW MAP ON THE INTERNET

Hold Page number for fold-out

CLICK HERE TO VIEW MAP ON THE INTERNET

Hold Page number for fold-out

AUTHOR **Karla Conn**

NSF Summer Undergraduate Fellowship at the University of Pennsylvania

I am currently a senior in the Department of Electrical and Computer Engineering. In 2001, the University of Pennsylvania accepted me into the SUNFEST (Summer Undergraduate Fellowship in Sensor Technologies) program — a 10-week REU (Research Experience for Undergraduates) program. During the summer, I completed the research described in my paper. The REU program at UPenn, inspired me to think about research as a future career. I plan to finish my B.S. degree in Electrical Engineering in December 2002 and enroll in graduate school for the following fall semester. I have not chosen a specific university, but I would like to find an Electrical Engineering or Biomedical Engineering program focusing on robotics or prosthetics. I am currently working in a biomedical lab at UK with Dr. Ranu Jung. I have been an active member of SWE (the Society of Women Engineers) for four years. In addition, I held the position of chair of the UK student chapter of the IEEE (Institute of Electrical and Electronics Engineers) for the past year. Through IEEE, I presented my research work in a technical paper competition for undergraduate research projects at the 2002 IEEE Southeastern Conference. I won second place out of sixteen entries from universities such as Duke, South Carolina, Virginia Tech, and Georgia Tech. As a non-engineering outlet, I am extremely involved in Alpha Phi Omega, a national co-ed service fraternity. I am now looking forward to graduate school, earning my Ph.D., and becoming a university professor.

Faculty Mentor: Dr. Ranu Jung, Associate Professor of Biomedical/Electrical and Computer Engineering

There is a tremendous need for providing improvement in assisted living to people restricted in their freedom of movement and impaired in communication abilities. In her rehabilitation engineering REU project, conducted under the guidance of Dr. Jim Ostrowski at the University of Pennsylvania in the summer of 2001, Karla developed and implemented a text-to-speech hardware/software attachment for wheelchairs that targets this need. The product is both useful and innovative. Not only can people with speech impairment use it, but also, because it is a system mounted on a wheelchair, it provides "freedom of speech and mobility." Since the completion of this work, Karla has independently written a clear and thorough report describing the development, implementation, and use of the system.

Finger Mouse and Text-To-Speech Application as Additions to the Smart Wheelchair

ABSTRACT

The smart wheelchair project is a unique investigation into the possibilities of helping the impaired navigate in a mobile chair. Many disabled people who need the help of a wheelchair to move about also need help communicating orally. This project allows the "walking" wheelchair to do some "talking." A communication program for the wheelchair was developed, as well as a finger mouse that was implemented into all the programs. The finger mouse is a switch button small enough to wear on one's finger. When the button is pressed, a signal is sent out from the transmitter and picked up by the receiver, which sends a signal through the parallel port of the computer to execute the desired application. The communication program is a speech program that speaks text messages. The finger mouse and speech application are connected through a communication display interface — a page of icons. When the mouse is clicked over an icon linked to a particular phrase, the mouse, the display, and the speech software work together to speak the phrase. Thus, the communication program gives the freedom of speech to anyone using the wheelchair for free range of motion.

INTRODUCTION

This work was completed during the summer of 2001 at the University of Pennsylvania as part of an REU (research experience for undergraduates) program. Dr. Jim Ostrowski, associate professor in the Department of Mechanical Engineering and Applied Mechanics supervised the project as the faculty mentor. Dr. Ostrowski, overseer of many projects in the GRASP (General Robotics, Automation, Sensing, and Perception) lab, along with a

group of Penn graduate students, developed the "smart" wheelchair project during the eight months prior to this work.

A text-to-speech application was designed and implemented as a supplementary application for the mobile wheelchair. A finger mouse was completed that signals to the computer the function the user wants to execute. The speech program uses the computer's default voice to speak certain phrases when the finger mouse selects the appropriate icon on the communication display. The finger mouse can also be integrated into the navigation program for the wheelchair.

BACKGROUND

The smart wheelchair project entails the development of an autonomous wheelchair that interweaves human and computer control for navigation and communication. The wheelchair is equipped with a camera and projector mounted above the chair and a desk surface placed across the arms of the chair. The projector displays the picture of the computer program onto the desk surface so that the camera can relay to the computer where it "sees" the person's hands on the desk surface (see figure 1)(Rao, 2001).

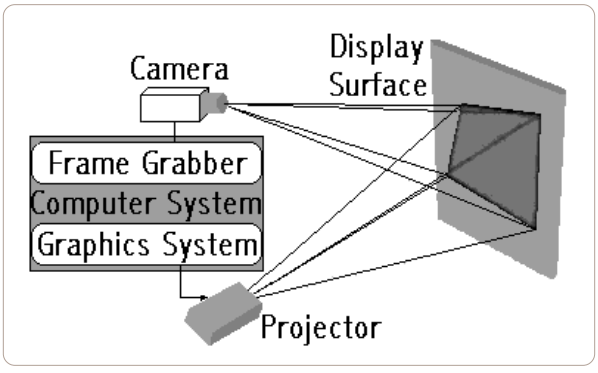


Figure 1. Interactive system for the wheelchair. The camera, the computer program, and the projector work together to display the image of the computer program onto the surface.

Because the camera is sensitive to light and dark images, the mobile chair is operated by having a person cover white squares on a display board with his or her black-gloved hands (see figure 2)(Rao, 2001).

When a black glove covers a white square, the camera and computer can interpret which square is covered. The program is coded to execute an application when more than half of an "application square" is covered along with more than half of the "click" square (comparable to clicking a computer mouse when the cursor is covering the program icon to be executed). The operator first covers the square signifying the function he or she wants to execute and then covers the click square to execute that function. Covering two squares is not the most efficient way to select an operation. Therefore, the first part of the project involved developing a "mouse" small enough to wear on the user's finger, to eliminate the click square and black gloves. The finger mouse is a switch button that signals the computer when it is pressed; it was tested with the speech program.

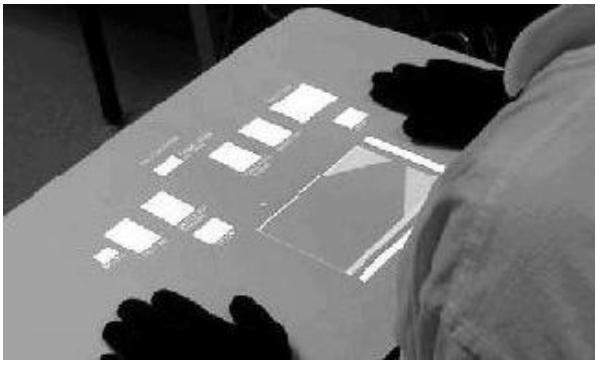


Figure 2.
The navigation display for the mobile wheelchair is shown with a person's black-gloved hands. The black-gloved hands cover white squares on the desk surface to control the computer programs.

OVERVIEW

Using both hands to execute an application is not ideal. Therefore, a small finger mouse is very useful to the entire wheelchair project, because it minimizes the space required to interact between the user and the computer. This mouse takes on the role of the previously used "click" square and the black gloves but uses less space. Instead of using two hands, a person now only needs to use his or her finger. The first mouse was very susceptible to noise from the machinery in the lab and did not work properly. This project redesigned the wireless mouse to make the signal more resilient.

A new program for the wheelchair was also developed that uses functions in the Microsoft Speech software design kit (SDK) 5.0 to "talk." Many disabled people who need the help of a wheelchair to move about also need help communicating orally. This

project adds a second feature to the chair and a new display for interaction, similar to the navigation display (see figure 2) (Rao, 2001). Icons on the new communication display are linked to phrases. The computer code and the SDK allow these phrases to be spoken when the mouse is clicked over the associated icons. This project will open the gateways of communication at the touch of a button.

FINGER MOUSE

For the finger mouse portion of the project, the preliminary finger mouse — designed by Terry Kientz, a lab technician in the MEAM (Mechanical Engineering and Applied Mechanics) Department at the University of Pennsylvania — was studied for guidance toward the next generation.

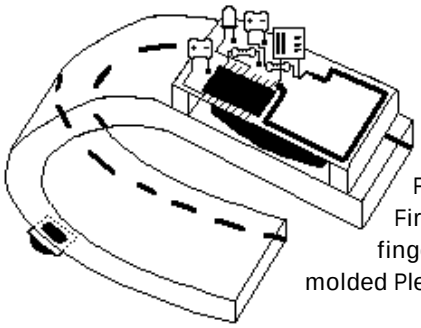


Figure 3. First version of the finger mouse with molded Plexiglas design.

The preliminary version of the finger mouse was crafted out of Plexiglas (see the photo on page 32). A finger fits inside the curved glass and rests on a push button underneath that triggers the transmitted signal. The battery and circuit board with the transmitter sit atop in this design. This first version had little room for adjusting the fit. The new mouse (see figure 4) has a form-fitting design made of brass, Velcro, and Plexiglas. A finger fits inside the curved brass, and the Velcro strap is fitted around the finger to secure the finger comfortably in place. Therefore, the finger mouse adjusts to any size finger.

In addition, the switch button is connected to a flexible piece of brass that curves around the tip of the user's finger to adjust to the most comfortable feel. The push button is positioned underneath the brass so that the pad of the user's finger pushes on the button. The battery and the small circuit board with the transmitter are mounted on Plexiglas and incased in a black box as the top of the finger mouse design. This black box interacts with the camera in the same way the black gloves did previously, but

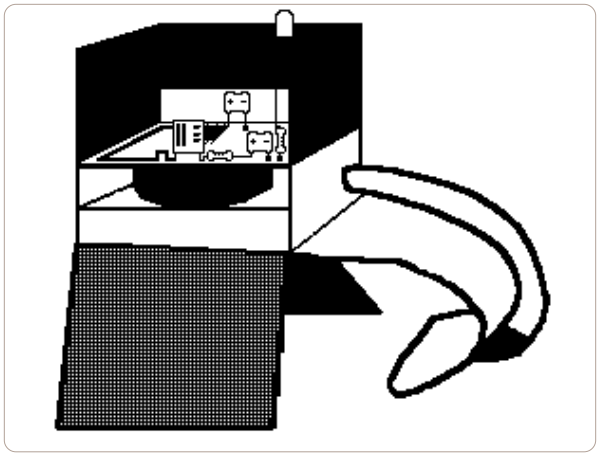


Figure 4. Current version of the finger mouse with brass and Velcro design.

now the area is condensed into a 1" by 2" rectangle. A red LED (Light Emitting Diode) pokes out of the top of the black box and flashes when the button is pressed as a feedback indicator for the user.

When the switch button is pressed, a signal is sent out from the transmitter and picked up by the receiver. A Programmable Intelligent Computer (PIC) microprocessor chip and the transmitter in the circuit are programmed to transmit a unique signal from the finger mouse. The receiver, with the help of another PIC chip, recognizes this signal. When the receiver detects the correct transmission, one bit of data is sent through the parallel port of the computer to execute the desired application. The program code reads this bit, and the application executes. The finger mouse can be used in all the wheelchair applications, including the communication program.

There are several advantages to the size and independence of the wireless finger mouse. First, a person sitting in the wheelchair needs to use only one hand when selecting an icon. This single-handed interaction frees up the other hand for making gestures, such as waving, while the computer says "hello" to a friend. The finger mouse is a compact circuit and takes up minimal space on the desk surface, providing area in the limited space of the desk surface for more icons. In addition, because the finger mouse fits on the end of one hand's index finger with a switch button placed under the pad of the finger it contributes to *true* "point-and-click" actions. When the person wants the computer to speak, he or she needs only to *point* with a finger and *click* the button.

When the switch button is pressed, a signal is sent out from the transmitter within the mouse circuit board. This transmitter is connected to a microprocessor PIC chip, which creates a unique signal from the transmission. A microprocessor is in effect a very simple computer. The PIC chip is programmable and, therefore, adaptable to numerous engineering applications, including computers. Memory addresses in the chip, which can be written to or read from, are used for storage. In addition, the 1/3" square chip has input and output pins that feed data in and extract data out after the bits have been manipulated by program code (Microchip, 1998).

Every microprocessor has its own programming language, called an assembly language, though all are similar. Becoming fluent in the chip's particular language is essential for a given project and the first step toward a finished project. The programmer must first fully understand the language commands, and then he or she can adapt the capabilities of the chip to fit his or her needs.

Criteria for the mouse design involved creating a unique signal that could be recognized by the receiver. A square waveform signal with a 50% duty cycle and 2 kHz frequency was chosen to release four pulses, signaling high (2.5v) for one fourth of a millisecond and then low (0v) for one fourth of a millisecond and then repeated three more times (see figure 5). A larger

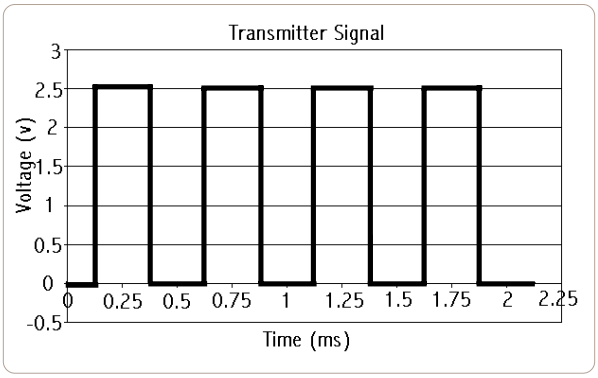


Figure 5. Graph of Transmitter Signal.

number of pulses could have been used, as well as a longer or shorter pulse length, but a manageable frequency and number of pulses were chosen for troubleshooting and preliminary design purposes. If desirable in the future, perhaps to avoid interference, the PIC code can change the parameters of the signal.

In addition to sending a unique signal, the transmitter continuously repeats the signal while the button on the mouse is held down, in order to prevent missing a click. If the string of four pulses were sent out only once when the mouse was clicked, the receiver might not recognize the single transmission correctly, thus missing the click and not executing the desired application. Therefore, the signal is transmitted continuously to ensure that the signal is received each time the mouse button is clicked. The transmitter and PIC chip work together to produce a neat, clean, and stable signal.

Once the PIC chip sends its unique signal through the transmitter, the receiver must identify it. Any signal that is not the finger mouse signal must be disregarded. Therefore, another PIC chip in the receiver circuit is used to recognize this unique finger mouse signal.

The length of the signal's high (2.5v) time and low (0v) time is measured, and the number of pulses is counted.

The measured length of the pulses is compared to high and low limiting bounds, a little above and below one fourth of a millisecond. Any pulse of smaller or larger width is disregarded as noise. After a pulse clears the length tests, the PIC chip begins to count the number of pulses of correct length. Any signal without four pulses of approximately one half of a millisecond each is ignored. Therefore, the receiver ensures that the unique finger mouse signal is properly detected.

When the counter in the PIC chip tallies four accurate pulses, the receiver has interpreted the correct signal from the transmitter, and the counter is reset to zero to await the next set of pulses. At the same time, the receiver sends a one (high) bit of data out to the parallel port on the computer (Walker, 2001). This bit of data is represented by a variable called "Mouse" in the computer program code. Mouse is originally set to zero, and the code is written to look for changes from zero (low) to one (high). The mouse click signal is the first of the two actions that must be performed before the computer speaks. The second half involves covering the squares on the communication display.

COMMUNICATION DISPLAY

The second phase of the project entailed developing the communication board to be displayed on the desk surface. The board has a page of square bitmap images with labels such as "Hello," "How are you?," and "What is your name?" for the finger mouse to select (see figure 6) (Barry 2001). Microsoft Virtual C + + code generates this page with commands from OpenGL to import the images. Currently twelve images can be displayed without cramping the space; this allows icons for several phrases and a few program functions such as "Exit Program." A future goal for the communication board is to complete the code to "flip" to additional pages, but the current page suffices for the mouse and speech applications.

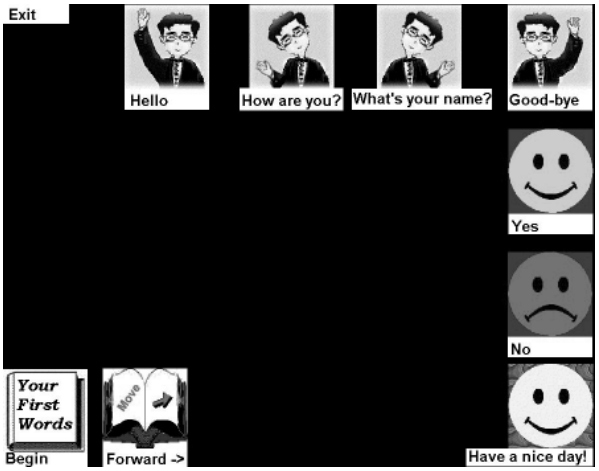


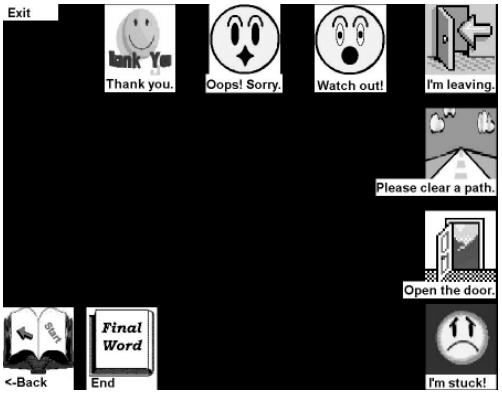
Figure 6. Introduction page of communication display.

Using OpenGL commands, the communication display imports bitmap images onto the rectangles in the display. OpenGL includes a process called texture mapping that pastes images onto specially defined rectangles. Texture mapping allows a user to map a picture to any type of object created in OpenGL. As long as the object is well defined, the picture can be wrapped around it without having to define the picture any further. For example, commands in OpenGL allow a programmer to paste a 360-degree picture of a room onto a goblet created by OpenGL commands. Because the goblet is defined by the OpenGL code, the picture can be pasted so that the goblet perfectly reflects the room as if it were placed on a table in the middle of it. The requirements for the wheelchair displays did not call for such elaborate images. Pasting a flat, square bitmap image onto a flat, square texture rectangle sufficed (Woo, et al., 1997). The code for loading the bitmaps onto the texture rectangles is included in the Web version of this article.

The seven text phrases on the display are linked to code that speaks the words when the user selects them; and the three function rectangles execute individual commands. If the "Exit" rectangle is covered when the finger mouse is clicked, the program closes. The two icons in the bottom left corner are for an extended vocabulary. They compare to the "Back" and "Forward" buttons on a Web browser. Selecting them will flip through the next display pages of icons and phrases.

The code for flipping pages is only in the first stages of development and is not currently implemented in the speech code and display. However, how the extra pages will work with the first page of dialogue has been considered, and a second page of dialogue is finished (see figure 7) (Smiley 2001). This second page consists of phrases a user might say when navigating the wheelchair. Determining how to run the speech and navigation programs simultaneously are future goals of the wheelchair project, but first the two pages of the speech display will be linked.

Figure 7. Navigation page of communication display.



On the first display, the "Begin" rectangle is not linked to any function; it is just a placeholder to indicate that the user is on the first page of phrases (see figure 6) (Barry 2001). The "Begin" rectangle is, therefore, like the grayed-out "Back" button on a browser window. The "Forward - > " rectangle is linked to the next page of phrases, and its icon displays the topic of those phrases. The second page has an active " < -Back" rectangle with the appropriate icon displaying the topic of the previous page. The last page of phrases has an active " < -Back" rectangle and an inactive "End" rectangle (see figure 7) (Smiley 2001). This

"End" rectangle indicates the end of the pages, just as a grayed-out "Forward" button on a Web browser tells the user that there are no following pages to view.

TEXT-TO-SPEECH APPLICATION

The final word on the project comes from a voice synthesizer in the computer. Using the tools in Microsoft Speech SDK 5.0, the computer program commands the computer to speak the phrases on the communication board. The SDK provides a sample text-to-speech (TTS) application — TTSApp — that speaks words and phrases written in text files. Using the TTSApp as an example, the small white rectangles on the display link with text files to develop the "talking" part of the wheelchair. The user clicks the finger mouse to select the desired icon. Then the phrase associated with that icon is "spoken."

Microsoft's software design kit (SDK) works with the computer's voice in a manner similar to how OpenGL works with bitmap images. The kit provides a library of functions that can be implemented in C + + programs for speech applications. There are several possibilities to choose from the SDK. One could develop a speech recognition program that interprets what a user is speaking into a computer's microphone, but this software is limited by the different dialects of users in every city, country, and continent. Another, more reliable application of the kit is the text-to-speech application, used with the communication displays. These commands allow a user to create a program that speaks any text message. The core code for executing a text message is included in the Web version of this article.

CONCLUSION

The finger mouse, communication display, and speech program tested successfully and functioned fully. The new mouse design is not affected by any of the first generation's noise interference problems. The finger mouse consists of a compact design with a clear signal and fits our needs perfectly. The communication display is completely interactive and adjustable. Expansions can be made for flipping between pages of phrases, but the two individual pages are an excellent freedom of speech to anyone using the wheelchair for free range of motion.

ACKNOWLEDGMENTS

Thanks to Dr. Jim Ostrowski for being a very supportive and encouraging advisor as each part of this project was completed. Terry Kientz was the essential key for finishing the second generation of the finger mouse. Many thanks to all the great students and faculty in the GRASP lab for their fellowship, direction, and expertise – Rahul Rao, Bill Sacks, Sarangi Patel, Ray McKendall, Dan Walker, and C. J. Taylor. The National Science Foundation and Microsoft supported this work.

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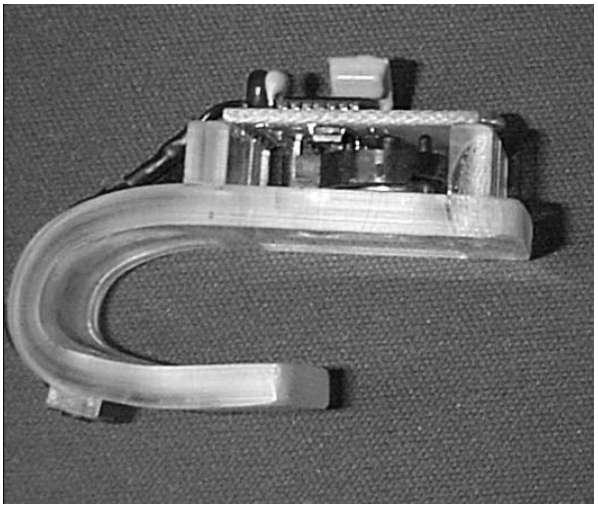


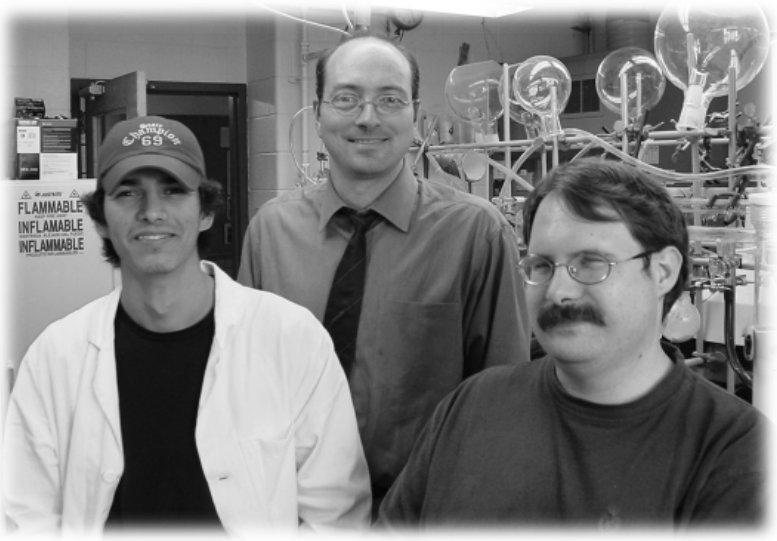
Preliminary finger mouse

AUTHORS

David Atwood
Professor, Department of Chemistry

Aaron Hutchison
Graduate Student
(Expects to graduate with his Ph.D. in December, 2002)

Full Integration of Undergraduates into Laboratory Research



Mexican undergraduate visitor Eduardo Jimenez in the laboratory with Professor Atwood (Center) and Aaron Hutchison (right).

Undergraduate research has always been a high priority in my research group. There are many interrelated reasons for this. Perhaps the simplest is the fact that I myself began my chemistry career by conducting research as an undergraduate at the University of Alabama. After two years of work I had authored two publications and, more importantly, I had experienced first-hand the enjoyment and importance of scientific research. Of course, I had also experienced the many difficulties associated with conducting research but learned that devoted effort, with timely help from others, was all that is needed to move past any obstacles.

Aaron and I and, indeed, my entire research group, now firmly believe that undergraduates should be an integral component of any modern research laboratory and as important as graduate students and postdoctoral associates. Spending time teaching these students allows us to fulfill our mission as an educational institution. Whether or not the students choose to continue their scientific careers, their research efforts will give them the experience to make an informed decision when the time comes. The knowledge they gain from hands-on research cements the concepts they learned during their coursework. Furthermore, their graduate and postdoctoral mentors are a constant resource to help with homework discussions or explanations of difficult concepts. Thus, undergraduate research is a complement, rather than a detriment, to the students' classroom performance.

In turn, the graduate students and postdoctoral associates benefit by learning how to train and work with others. This is something they will have to do well in both industry and

academia to be successful. Also, they gain a deeper knowledge of the concepts they are using because they are forced to teach, rather than simply apply them.

One additional consideration is the fact that our undergraduates are exceptionally talented. What I have found is that it takes a couple of years to provide them with the experience and background necessary to truly understand the research. When they reach this level, however, they make dramatic contributions to our research program. The graduate students and postdoctorals with whom they work are lucky, privileged individuals. Lauren DePue is one such undergraduate student. She began working with graduate student Timothy Keizer two years ago. Her work with Tim has led to two publications, one a communication in one of our discipline's most prestigious periodicals, the *Journal of the American Chemical Society* (124 (2002) 1864). A great deal of Tim's success in his last year as a graduate student (he is now a postdoctoral associate for the Department of Energy in Los Alamos, NM) can be attributed to Lauren's contributions. Her experience is evident in the fact that she is now responsible for training a new graduate student in our group.

Mary Proffitt is another remarkable success story. She began working two years ago with postdoctoral associate Melanie Harvey (who has recently left for a faculty position at the College of Mary in Kansas), and will have numerous publications, beyond a prestigious *Chemical Communications* already in press ((2001) 2094), by the time she graduates after another year or so. In fact, she is now totally independent as a researcher and finishes projects that would be suitable for a postdoctoral associate.

Two other undergraduates who began with me almost three years ago have been independent for some time. Brock Howerton has been working with Matthew Matlock for over three years on environmental metal binding agents. In addition to having well-over eight publications including one each in the American Chemical Society journals, *Industrial and Engineering Chemical Research* (41 (2002) 1579) and *Environmental Science and Technology* (36 (2002) 1636), he is also a co-author on a patent (co-authoring with Matlock and Atwood). He is a clear example of the scope and volume of research that a talented and well-trained undergraduate can accomplish if given sufficient time.

Brandon Conley also began his research nearly three years ago and is now working on projects of his own choosing, in particular the relationship between inorganic sources of fluoride and biological substrates. He has also been a prolific researcher and has shown a talent for writing. His most recent project is a review chapter for the book series *Structure and Bonding* entitled: "Fluoroaluminate Chemistry" (to be published in the Fall of 2002).

One thing that these four highly successful students have in common is that they began research early in their careers here at UK, before or during their sophomore years. There is growing consensus among chemical educators on the need to expose undergraduate students to research early (N. Craig, *Journal of Chemical Education* 76 (1999) 595). What we have recognized is that, despite the students' ingenuousness at this stage, there is a tremendous advantage to having them trained, in an unhurried fashion, over the course of several years. What the students do not have in textbook knowledge at this point (although their GPAs are generally higher than 3.8), they make up for in creativity and curiosity. In a recent article in the *Journal of Chemical Education* (A. R. Hutchison, D. A. Atwood 79 (2002) 125), we outlined how such an "early start" program works. Key features to the successful integration of undergraduates at such an early age are the commitment of all members of the hosting group, as well as clearly established plans for projects and training.

In the past year, we have begun expanding our undergraduate research approach to include high school students as well as international undergraduates. One such participant is Joe Swisher, a remarkably talented student whose work in our laboratory is facilitated by the Math Science and Technology Center at Paul Laurence Dunbar High School. Joe is working with Matlock and Brock and contributing substantially to a great deal of soon-to-be published research.

International visitors include Eduardo Jimenez (shown in the photograph to the left of the authors) and Miguel Viveros from Mexico, and Maxime Siegler from France. These students are part of a National Science Foundation, Research Experiences for Undergraduates program, with contributed funding from departmental resources and individual grants. The UK-EPSCoR program is also responsible for two students and a faculty member who are visiting for the summer. In all, there are nearly 30 undergraduates in the chemistry department this summer and close to ten on-site year-round.

Oswald Research and Creativity Program

Any current UK undergraduate (full- or part-time, enrolled for either semester) who does not already have a four-year degree is eligible for this competition and may submit papers and other projects in the following categories:

1. *Biological Sciences*
2. *Design (architecture, landscape architecture, interior design, etc.)*
3. *Fine Arts (film, music, painting, sculpture, videotape, etc.)*
4. *Humanities: Creative*
5. *Humanities: Critical Research*
6. *Physical and Engineering Sciences*
7. *Social Sciences*

Entries are judged on originality; clarity of expression; scholarly or artistic contribution; and the validity, scope, and depth of the project or investigation.

First place winners and co-winners in the 2001-2002 Oswald Research and Creativity Program:

CATEGORY 1:
Biological Sciences

TITLE: ***Interaction of the IAP Deterin with Human Caspase-7 and Drosophila Reaper & Grim***

NAME: Casey Wilford
Biological Sciences Major

A new subclass of BIR-containing proteins, Survivins, includes the *Drosophila* protein Deterin. Survivin is a very interesting protein because its expression is among the most tumor-specific of all cancer markers. This new BIR class is structurally distinct from known BIRs that function as inhibitors of apoptosis (IAPs), because the new proteins have only a single baculovirus-type repeat (BIR) and no RING finger motif; in contrast with the multiple BIRs and RING finger of known IAPs. This fact has generated controversy about whether or not the new "surviving" family of proteins are really IAPs. Survivin has been shown to be a passenger protein involved in cell cycle regulation, but its role in apoptosis has been questioned.

Deterin has been shown to rescue cell death induced by overexpression of *Drosophila* reaper and human caspase-7. Here, a more in-depth analysis of the interaction of Deterin with reaper and caspase-7 was accomplished through TUNEL staining, mutant constructs, western blotting, and in vivo data. *In vivo*, Deterin can rescue the eye ablation phenotype seen in flies overexpressing reaper or grim in their eyes. In contrast to its ability to inhibit full-length caspase-7, Deterin could not inhibit the more damaging effects of a truncated form of caspase-7 deleted for the prodomain.

Deterin mutant constructs indicate that different domains of the protein may be important for inhibiting different apoptosis activators. These results confirm that this new class of BIR-containing proteins does indeed have anti-apoptotic function. These results confirm the homology of the insect apoptosis pathway with the human apoptosis pathway, verifying that the *Drosophila* system will prove an integral tool in elucidating the mechanisms of apoptosis in humans. Determining the pathways of human apoptosis is a key step in uncovering the fundamental molecular causes of many forms of human disease involving too much or too little cell survival, including cancer and many types of neurodegenerative diseases.

CATEGORY 2: Design (architecture, landscape architecture, interior design, etc.)

TITLE: *Design for Heritage Museum* (African Cemetery #2) includes model, press boards and construction packet.

NAME: Katie Ritter
Landscape Architecture Major

CATEGORY 3: Fine Arts (film, music, painting, sculpture, videotape, etc.)

TITLE: *The Twin Menaechmi* Twenties Extravaganza!

NAME: Lacresha Berry
Theatre Major

Over a period of three months, Professor Nelson Fields gave our TA365 Costume Design class a four-part final project based on the comedy by Plautus entitled, *The Twin Menaechmi*, written in 454 AD. It's about twin brothers (who are switched at birth) and all those who encounter them along their journey to find each other. We had to render 10 costumes for 10 characters in a five-act play. Rendering consists of coming up with a design concept, research based on your design concept, fabric swatches, putting your design into a set time period, and painting the design with a specific color palette in mind.

Before the rendering process began, we gave a brief analysis of the play to understand it first. With these given circumstances in mind, I designed my final project based on the Roaring Twenties Circus. You will see clown make-up, acrobat, and servants all designed to resemble a 1926 New York Circus. Circuses are bright and colorful, and the humor and farcical nature of *The Twin Menaechmi* gave me a chance to experiment with a myriad of different colors and designs. I chose a highly stylized approach to the twenties, which represents the shapes of the twenties but with a whimsical flair to the period. The characters are fun, energetic and full of zest, so feel free to laugh and enjoy the roaring twenties as I did.

CATEGORY 4: Humanities: Creative

TITLE: *Short Stories*

NAME: Holly Jones
English Major

My father is a factory worker. He works at a plant that makes motors for refrigerators and other household appliances, never for cars. His goings and comings from the plant set the rhythm of my childhood; his kisses goodbye so early in the morning that it was still dark outside (and often missed because I slept through them); his daily lunchtime call to my mother; his arrival home around four o'clock. I'd hear the crunch of gravel in the driveway first, then the slam of the back door, and finally the various clumpings and scrapings as he changed out of his steel-toed work shoes into some casual, unadorned cowboy boots. His Dickies smelled faintly of sweat and grease.

I tell you about my father — about the cycle of factory work that was a given as I grew up — because it has been such an enormous influence on me as a writer, both in the subject matters I choose and my approach to the craft. Two of my three submitted stories feature a factory worker. They are not based on my father; rather, I imagine them to be people my father might work with. Thousands of men and women in my hometown are employed at factories. Over six large industries thrive in a region that can barely boast 10,000 people. It has created a culture, one that I try to recreate in subtle, but meaningful ways.

Factories represent for me stagnation, monotony, helplessness, and imprisonment. These are themes that I explore in my writing. Because of this, my stories are also more driven by language and emotion than action — simplicity in my upbringing that has contributed to simplicity in style. The motors my father builds do not go into cars. In fact, a motor he builds is not something we consciously think about, or spend money to improve. It's just one little part of many that makes the refrigerators and washing machines of this world run. My stories are like that. No flash, no show, but a backbone to the everyday, household appliances we take for granted. I am more concerned with how little events in our lives have wide-reaching consequences.

These stories, along with others I am writing and fine-tuning during an independent study this semester, will be submitted as a portfolio to M.F.A. programs. I will graduate this December and hope to begin graduate studies by fall of 2004. Ultimately, I hope to develop a regimen of writing geared toward improving and increasing by body of work, leading to publication and the opportunity to teach workshops with beginning writers.

CATEGORY 5:
Humanities: Critical Research

TITLE: ***Interpreting Giovanna***

NAME: Benjamin P. Hall
Art Education Major

CATEGORY 6: Physical and Engineering Sciences

TITLE: ***The Effects of Cellulase on the Initial Adherence of Pseudomonas Aeruginosa on Glass Surfaces***

NAME: Brian D. Knox
Biology/Chemistry Major

Biofilm is a pest to industrial processes and health professions alike. Traditional means of eliminating biofilm use microbicides to kill the bacteria that form the biofilm. Microbicides are ineffective because the bacteria are protected by the biofilm, and are costly as well. The use of the materials containing immobilized enzymes that can degrade the excreted materials that form biofilm could provide a better solution. This study examines the effect that cellulase has on the initial attachment of the *Pseudomonas aeruginosa* bacteria. If cellulase can decrease or prevent the attachment of bacteria to a glass surface, than it may be of use when immobilized on a surface. This study examines the effect that cellulase has on the initial adhesion of bacteria to a glass surface. The results support the hypothesis that the enzymatic activity of cellulase is effective in reducing the ability of bacteria to adhere to a glass surface.

CATEGORY 7: Social Sciences

TITLE: ***The Effectiveness of Hedging Strategies as Price-Risk Management Tools for Dairy Farmers***

NAME: Matthew W. Gearhardt
Economics Major

The increasing volatility of milk prices due to the phasing out of government support prices is forcing dairy farmers to face much greater price-risk on a month-to-month basis than they have in the past. To help manage this increased exposure to price-risk, the United States Department of Agriculture has created educational programs to teach producers how to use price-risk management strategies (specifically futures options) in their operations. Skepticism exists as to how effective these hedging strategies will be for producers in lowering price variability. To investigate these claims, statistical analysis was used to compare price- and basis-risk for different milk marketing orders. Market simulation was carried out using past pricing data and a uniform hedging strategy with put options. Statistical results identified that basis-risk was not significantly lower than price-risk to permit effective hedging, and market simulation with hedging did not reduce the variability of the producer's income. Basis levels were found to be more volatile in the Southeast versus the Upper Midwest. However, hedging milk production with put options did produce greater returns to farmers when milk prices were drastically falling, bringing producers higher mailbox prices than if they had not used any risk management strategy.

CATEGORY: 7: Social Sciences

TITLE: ***The Evolution and Diffusion of Knowledge During the Industrial Revolution***

NAME: Lindsay Allen
Economics Major

Despite its initial lead, Britain's growth and development slowed in comparison to that of other European countries during the "Second Industrial Revolution," the period described by such innovations as the telephone and radio, motor vehicles, and the distribution of energy and power via electric current. The success of many other countries during the Second Industrial Revolution has been largely attributed to the effectiveness of formal education in encouraging and teaching technical and scientific subjects. Many of the continental states established these educational institutions during this period and consequently made significant advances in the development and spread of new technologies and industrial processes. Britain, however, did not join her neighbors in creating technical and scientific education centers until much later, a decision that most historians agree resulted in the country losing her industrial lead.

Britain had succeeded during the First Industrial Revolution by exploiting various techniques and methods derived from a given, relatively unchanging knowledge base — the type of knowledge that organizes and describes natural phenomena and regularities: what we would today call "science," including mathematics. However, in order to make significant advances in their techniques and methods it became increasingly necessary to also have new advances in this knowledge base. These advances began to occur at a more productive pace during the Industrial Revolution, widening the epistemic bases of many techniques and leading to sustainable growth in technology. Both the increase in general knowledge and the development of applicable techniques lead to economic growth. The formal institutions for scientific and technical education provided the ideal atmospheres for the development of both types of knowledge.

Theories abound on why Britain delayed so long in adopting technical and scientific education. Economic historians would like to be able to compare Britain's situation with those of the continental states, such as France and Germany, in order to identify possible societal factors that could have caused the different receptivity of each country to technical and scientific education at the time, and to then apply these factors to achieving a better understanding of economic growth, and for possibly manipulating them in the future to encourage healthy innovation and the acceptance of promising ideas and inventions within and across different societies.

While numerous historians have identified particular societal factors, such as risk aversion and capitalism, that have characterized inventive or innovative societies in the past, discrepancies exist in the theories of what particular combination of factors leads to economic growth and development over time and across cultures. All else equal, societies' successes over time should be approximately equivalent because each one experiences uninnovative and innovative periods.

In the end, with the diffusion of ideas, all societies will share their advances: they will adopt the technology and knowledge of others, and likewise the same benefits. Who innovates first in a particular situation depends on numerous societal factors and on their interdependent relationships, but these variances in societal factors, both between societies and within a society over time, cannot be combined in a recipe or definitive relationship that will result in a foreseen outcome over time or in every situation. Rather, these variances may be treated as random variables. Instead, the factors that affect the diffusion of ideas are what may be better controlled and improved in order to advance economic growth and potential.

Britain's failure was in seeing formal technical and scientific education's success and being slow to react. Improved communication and diffusion of ideas could have sped up Britain's adoption of this type of education by combating societal factors more effectively. As long as the diffusion of ideas can occur, a society can innovate and grow even if at any given time it happens to be relatively less innovative than other societies. Societal factors are significant to economists only in that they may interfere with the diffusion and communication of ideas, *not* because they may make a society intermittently "uninnovative."

Undergraduate Awards and Honors

Beckman Scholarship

Recipients of Beckman Scholarships
Robin Petroze Garrett Sparks

Established in 1987, The Beckman Scholars Program is an invited program for accredited universities and four-year colleges in the US. It provides scholarships that contribute significantly in advancing the education, research training, and personal development of select students in chemistry, biochemistry, and the biological and medical sciences. The sustained, in-depth undergraduate research experiences and comprehensive faculty mentoring are unique in terms of program scope, content and level of scholarship awards. ($17,600 for two summers and one academic year)

British Marshall Scholarship

Recipient of a British Marshall Scholarship
Jennifer Kasten

Marshall Scholarships finance young Americans of high ability to study for a degree in the United Kingdom. Jennifer is one of forty recipients nation-wide selected from 190 candidates and 13 states to study either at a graduate or occasionally an undergraduate level of a United Kingdom institution in any field of study. Each scholarship is held for two years.

Goldwater Scholarship

Recipient of a Barry M. Goldwater Scholarship Brandon D. Conley

The Barry M. Goldwater Scholarship and Excellence in Education Program was established by Congress in 1986 to honor Senator Barry M. Goldwater, who served his country for 56 years as a soldier and statesman, including 30 years of service in the U.S. Senate. The purpose of the foundation is to provide a continuing source of highly qualified scientists, mathematicians, and engineers by awarding scholarships to college students who intend to pursue careers in these fields.

Truman Scholarship

Recipients of Truman Scholarships
Julie Murray Conley Chaney

Recognizes college juniors with exceptional leadership potential who are committed to careers in government, the non-profit or advocacy sectors, education, or elsewhere in the public service; and to provide them with financial support for graduate study, leadership training, and fellowship with other students who are committed to making a difference through public service.

COLLEGE OF AGRICULTURE

William S. Sympson, Jr.
Gamma Sigma Delta Outstanding Senior,
Highest National award given to a Senior

Department of Agricultural Economics

Anthony Koch
Elected as an officer of the Student Section of the American Agricultural Economics Association (AAEA)
One of only eight elected out of 120 undergraduates from 22 universities

Department of Agronomy

Michael Hayes
Past 2 years received an Astronaut Foundation Scholarship
One of 17 awarded in the US

Department of Biosystems & Agricultural Engineering

Timothy J. Greis
Frank Woeste Award
Monetary award given to the highest achieving Biosystems & Agricultural Engineering Student

Natural Resource Conservation & Management Program

Jon Freeman
Bioscience technician position at Lassen Volcanic National Park
Competitively selected

Diane Harrington
Oswald Research & Creativity Grant
To purchase native plants for the Mathews Garden Restoration. Non-native plants were removed & replaced by native species.

COLLEGE OF ARTS & SCIENCES

Department of Chemistry

Jessica Call
Publication - "Application for a Liquid Crystal Tunable Filter to Near-Infrared Spectral Searches," *Proc.SECTICon02*, 18-22, 2002

Karen Dumstorf
Publication - "A Planetary Probe with Hyperspectral Vision for Detection of Blue-Grass Algae," Proc. *SECTICon02*, 57-61, 2002
Conference Presentation - "Using a Roving Robot with UV/Visible - Near IR/IR Imager for monitoring growth of Cyanobacteria Colonies," PittCon 2002 (New Orleans, LA), March 2002

Sarah Hamilton
Publication - (Peer Reviewed) "Hyperspectral Techniques in Analysis of Oral Dosage Forms," *Journal of Biomedical Optics*, in press, 2002
Publication - (Non-Peer Reviewed) "Hyperspectral Imaging Technology for Pharmaceutical Analysis," *Proc. SPIE Symp. BiOS.*, 2002
Conference Presentation - "Analysis of Lysine Crosslinks in a single Gelatin Capsule at a Distance of One Mile," PittCon 2002 (New Orleans, LA), March 2002
Conference Presentation - "Hyperspectral Imaging Technology for Pharmaceutical Analysis," invited paper at the SPIE International Symposium on BiOS, Photonics West (San Jose, CA), January 2002
Conference Presentation - "Remote Hyperspectral Imaging in Pharmaceutical & Biological Applications," invited paper at the International Federation of Process Analytical Chemistry annual meeting - IFPAC (San Diego, CA) January 2002

Karmen Hennigan
Conference Presentation - "Imaging Spectrometry and Foam Fractionation in Purification of Proteins," PittCon 2002 (New Orleans, LA), March 2002

Antonia P. Stoyanova
Merck Index Award
Recipient receives a copy of the Merck Index, an Encyclopedia of Chemicals,

Drugs & Biologicals, with his/her name engraved on it.

Department of Classics

Eileen M. Broomall
Thomas Johnston
Awarded Gaines Fellowships
The Gaines Center for the Humanities is an academic unit created to offer exceptional opportunities to undergraduates for study of the humanities and for advanced research in them.

Laura J. Marschner
Awarded a Graduate Fellowship by the Columbia University Law School

Robert S. Wagnor
Awarded a Singletary Fellowship for graduate study in the department of Classics at UK
The Board of Directors of the University of Kentucky Athletics Association has established quasi-endowment funds in memory of W. L. Matthews, Jr. and in honor of Otis A. Singletary. The funds provide annually for $12,000 fellowships to be awarded to UK graduating seniors who plan to continue their post-baccalaureate education in one of the University's graduate or professional programs. The fellowships are awarded for a first year of graduate or professional study at UK and are not renewable for subsequent years.

Department of English

Amanda Sue Brower
O.J. & Ruby Wilson Scholarship for Outstanding Senior English Major

Department of Geology

Sarah J. Hawkins
Published Abstract & Oral Presentation - "Pyrie framboid size and size distribution in marine black shales: A case study from the Devonian-Mississippian of central KY," *Geological Society of America Abstracts with programs*, v. 34, p. A-38.

Taniporn Sakulpitakphon
Published Abstract & Oral Presentation -"Studies of the Relationship between coal petrology & grinding properties," *Geological Society of America Abstracts with Programs*, v. 34, p. A-120

Department of Philosophy

Robert Wagoner
Selected as the College of A&S Student of the Year

Department of Sociology

Carol D. Ackerman
A. Lee Coleman Award for the Outstanding Graduating Senior in Sociology
This award honors professor A. Lee Coleman (1913-1995), a long-time faculty member in Sociology at the University of Kentucky, who was particularly concerned with instructional activities. As a faculty member, he consistently championed the importance of undergraduate education while conducting ground-breaking research on the diffusion of agricultural technology and promoting the cause of civil rights in Kentucky and the South.

COLLEGE OF BUSINESS & ECONOMICS

Department of Economics

Joseph Bernard Miller
Recipient of the James W. Martin Award for Outstanding Graduating Senior in Economics
Annual award serves to enrich teaching traditions in Economics by looking for achievements that serve as special reminders of Dr. Martin's ideas.

COLLEGE OF COMMUNICATIONS & INFORMATION STUDIES

Department of Communication

Tracy Kershaw
Awarded $10,000 Scripps Howard Foundation's Top Ten Scholarship
The top 10 winners from around the country were selected based on academic achievement and a demonstrated interest in a career in journalism. Tracy was the only student from Kentucky.

Cynthia Ledford
Received the "Top Paper" Award at the Southern States Communications Conference in Winston-Salem, NC.
Title: "Thin is In: A Content Analysis of *Friends*"
First time award won by a UK Student. Paper can be read online at www.uky.edu/drlanae/ssca02/

Three finalists honored for submitting a paper at the Southern States Communications Conference in Winston-Salem, NC.
Papers can be read online at www.uky.edu/drlanae/ssca02/:

Kevin Kurzendoerfer
Title: "The Effects of Computer Mediated Communications on Types of Messages"

Anupa Arya
Title: "The Reinforcement of Gender Roles on Television: A Content Analysis of *Sex and the City*."

Kelley Shields
Title: "The Masculine Female: Characterizations of the Action Heroine"

COLLEGE OF ENGINEERING

Department of Mechanical Engineering

Jennifer A. Dowell
Outstanding Student Leader Award, Region VI American Society of Mechanical Engineers, Regional Student Conference

Jennifer L. Suitor
Received 3rd Place Award in the Southern Regional American Institute of Chemical Engineers Regional Student Conference, San Juan, Puerto Rico

Summer Research and Creativity Grants

One of the special benefits of a large research university is the opportunity it provides undergraduates to study in a wide variety of disciplines and to work under the personal supervision of nationally recognized scholars. As a means of promoting such educational experiences for students, the Office of Undergraduate Studies offers Research and Creativity Grants each semester and during the summer term. The grants are intended to take advantage of the rich resources available through the libraries, the laboratories and, most especially, the academic personnel at the University of Kentucky. Undergraduates in all areas of intellectual inquiry are eligible, and students at many different levels of matriculation have received support. Both individual projects and joint ventures have been endorsed by the selection committee, which is particularly interested in funding interdisciplinary efforts. During the summer of 2002, a total of twenty awards were made. Of these awardees, the following students had progressed far enough to be able to supply a description of their research in time for publication in this issue of *Kaleidoscope*:

Chris Barbee

Department: School of Music
Mentor: Prof. Peter Simpson

Music in the Making

My Research and Creativity Grant project is a composition written for a jazz saxophone quartet with rhythm section that is heavily influenced by different world music genres.

I attended the Kentucky Institute for International Studies program in Salzburg, Austria from May 28th to July 1st 2002, to study "Classical and Romantic Styles," "Music of the World's Cultures," saxophone, and composition. I am using the knowledge I gained from that experience as a resource for composing a piece that will draw upon music from cultures not often considered in the creation of jazz music. My research in Salzburg contributed toward the addition of African, Middle Eastern, and Asian instruments in the rhythm section and as substitutes, or doubles, for the saxophones. From the saxophone ensemble I will also demand many different sounds and tonal concepts, some of which will have a non-western influence. I have had the assistance of Richard Burchard of Bellermine College (the teacher of "Music of the World's Cultures"), and Peter Simpson (my Faculty Sponsor, who also taught courses with the program) in constructing a logical piece that shines a new light on the realm of possibility for the standard jazz saxophone ensemble.

Richard Burchard's "World Music" course provided me with the opportunity to hear many world musicians speak and perform on their various instruments. The most inspirational of these to me was an Austrian Didgeridoo player named Klaus Wintersteller. Klaus spoke about and performed on this aboriginal Australian instrument and I was so taken by the sound that I have based my work around this instrument's fundamental sound. Professor Burchard's class also provided an opportunity for everyone to get hands-on experience with the djembe, an African drum, under the instruction on Jamike, a native South African djembe virtuoso. This experience taught me about standard playing styles for African percussion instruments. The knowledge I gained in the world music class and the opportunity I had to explore instruments in a Salzburg "world instruments" shop also opened my eyes to numerous possibilities for inclusion of various wind instruments in my composition. I have since tried different combinations of Armenian, Persian, and Indian flute instruments in conjunction with our standard western saxophone sound in my writing.

Outside of the class and the world music store, I was often enamored by many different veins of world music being performed on the streets and in the clubs of the European cities. I heard examples ranging from Bali throat singing to Italian traditional instrumental music to Turkish stringed instruments ensembles, but the most relevant performance I heard was a world music "crossover" ensemble featuring Klaus Winterstellar, called Didgegroove. The ensemble was able to put a world music twist on contemporary Western-style grooves using various African and Asian percussion instruments, a guitar, and the droning sound of the didgeridoo. This sound has become the greatest influence in the style that I am creating.

This project will be performed by the University of Kentucky Mega-Sax quartet this fall, and could potentially be recorded on the next "UK Mega-Sax" release, directed by Professor Miles Osland. The previous two recordings by this ensemble have received Four Stars in the *Downbeat* jazz magazine, and this summer's release "Profound like Gumbo" has already received a Four Star review from allmusic.com.

Alex Brooks

Department of English
Mentor: Prof. Jane Vance

Florence, Italy, July 8th 2002

I am here in Florence, Italy, to write a book. Or more precisely, I am here to imagine the book I need to write and then attempt to get it down on paper. You could say that I am living with this book. Even when I am not physically writing I am thinking about scenes or characters or sentences or words. I do not choose to do this; it just comes naturally to me. When I read a book I compare it to what I am working on. When something happens to me here I ask myself how it fits into my book. I joke with myself by saying that I am not traveling alone because my characters come with me. I am always asking myself how they would react to a situation, what would they think or do.

To write about traveling, you must travel, in one way or another. To write about adventures you must have had adventures, and to write about dreams you must dream. So that is what I am doing. Traveling, adventuring, dreaming, and then writing about it all.

My work here is very simple. First of all I write in a journal. I record things that happen every day, people I meet, conversations, things I see and do. I write about the books I am reading, about how I am feeling and about my emotions — all of this a mishmash of confused writing with no direction at all. Together with this I write down many memories and all kinds of dreams.

But I have a definite goal in mind, a definite book with a definite set of characters and a story. I work writing these stories and characters, trying to figure out how I can make a book out of them and make sense of it all together.

Besides this, I write about the problems I am having with writing. I write about my confusions and clarities, my difficulties and successes.

My second major occupation here is reading. I read other traveling authors like Melville, St. Exuperey, and Moitessier. I read the mystic poetry of Rumi. These books take me traveling with them. I feel as if the writer were sitting next to me and telling me the story. I try to think about how they wrote, what they were doing and thinking about as they made their books.

Thirdly, I do lots of living, perhaps the most important of all. I examine myself in my new surroundings and situations, examine my dreams. I stare a lot at the ocean or at mountains. I watch people, listen to them, and speak with them. I ride trains, catch buses, walk for hours through the different cities. Once, in Hungary, I was walking down a back street when I came upon a fenced in yard where a few men were sculpting huge pieces of rock. The yard was littered with large heads and arms, just scattered around randomly, and I just watched them for a while. I drink tea. I think about home and what I will do when I get home. These are not really adventures I am having; Melville would agree with me that most adventures are really nine parts hardship and unhappiness. It is just life. I will decide later which part of my life, real, dreamed, imagined, or made up, needs to be in a book.

Charles Max Brown

Department of Physics
Mentor: Prof. Suketu Bhavsar

The Void Distribution: A Study of Nothing

The Universe is rich in structure. In fact, the galaxies are arranged in a string-like, filamentary structure that can be statistically measured. Because galaxies form by drawing together all the mass in the surrounding space, there are large empty regions, voids, that should also have structure. We computationally defined voids as polygons whose vertices are galaxies and are applying this two dimensional construct to the Las Campanus Redshift Survey to determine the voids' distribution, their maximum size, and their eccentricity. This information is vital in the study of both the current and primordial Universe.

Christina Colby
Department of Psychology
Mentor: Prof. Elizabeth Lorch

The Development of Story Recall and Attention in Children with Attention-Deficit Hyperactivity Disorder (ADHD) and Comparison Children

The current study investigated how salient distracters, such as toys, affect attention to televised stories. Furthermore, this study examined how differences in attention related to story comprehension in younger and older children with ADHD as compared to nonreferred children. Each child watched two "RUGRATS" episodes with two viewing conditions, toys and no toys. After each episode an experimenter asked the child to answer 35-38 questions about the show. Children with ADHD showed a significantly greater decrease in visual attention in the toys condition compared to the nonreferred children. Children with ADHD comprehended discrete factual events as well as comparison children in the absence of toys. However, in the presence of toys, older but not younger children with ADHD decreased performance on factual questions. Although both older groups answered more causal questions than younger children, older comparison children did better at understanding causal relations than older children with ADHD. By knowing more about how the attention of children with ADHD affects their ability to encode cohesive stories, the more we will understand about the development of difficulties faced by these children. With such knowledge, programs can be implemented to help alleviate the social and academic problems that affect children with ADHD.

Bruno deHarak
Department of Physics
Mentor: Prof. Dan Dale

Optical Properties of Lead Tungstate Crystals

The PrimEx collaboration has the goal of performing a high precision measurement of the lifetime of the neutral pion (p^0). The hybrid calorimeter (HYCAL) will perform the essential function for this experiment of detecting the two photons emitted when the pion decays. The HYCAL, will utilize lead tungstate scintillating crystals (manufactured by the Shanghai Institute of Ceramics) and lead glass Cherenkov shower counters. A study of the optical properties of each of the individual lead tungstate crystals to be used in the HYCAL has been performed. The results of this study as well as the details of the techniques used will be presented in this paper.

In order to perform an analysis of the optical properties (primarily transmittance and reflectance for wavelengths of approximately 300 to 800 nm) of all of the lead tungstate crystals for use in the HYCAL, a single crystal was first studied. This was done to develop and proof the equipment and techniques being used. This initial analysis has been performed and some of the specific results are as follows:

- The index of refraction for the crystal was measured using two techniques, the first by using a laser to directly measure the angles of incidence, reflection, and refraction; the second by polarizing a laser and determining Brewster's angle. The index of refraction differs somewhat from those values published in various journal articles. The index of refraction is needed to determine the reflectance and transmittance of the crystal.
- The CCD detector being used provides a linear response, which is necessary to perform the planned transmittance measurement.
- Filtering of the light source is necessary to eliminate contamination by higher as well as lower order wavelengths while measuring the flux of a particular wavelength.

The initial study of a single crystal has been completed and the project is now in the design phase. Equipment and software is being designed to automate the measurement of all the lead tungstate crystals for the HYCAL. The equipment will consist of a translation platform with a small elevator and associated circuitry, a light source with collimator, a spectrophotometer with a CCD detector, and a computer acting as a control station for the spectrophotometer and CCD. Once a set (approximately 20) of crystals has been installed on the platform, no further manual intervention will be required.

Once the design is complete it is expected that construction and troubleshooting will take an additional 1 to 2 weeks. Data acquisition and analysis will follow immediately. The timeframe for this final phase of the project is largely dependent on the variations found in the crystals as they are studied.

Ryan Gabbard
Department of Computer Science
Mentor: Prof. Jerzy Jaromczyk

Multiple Views of XML Documents

Extensible Markup Language (XML) is the standard format for the interchange of structured data by computers. This project explores data structures and algorithms for provid-

ing multiple ways of looking at XML documents. It focuses on two approaches: presenting a document in multiple forms and layering documents.

The project is motivated by the fact that often one way of viewing a document may be more useful than others for a particular purpose. These views may be different renderings of the same data or may be renderings of entirely different aspects or versions of the document (layering).

Possible forms of display include XSL-rendered views, tree views, or even visual or audio presentations of data. In our prototype, a tree view simply mimics the organization of the data in the XML file and allows the viewer to examine the hierarchical and structural relationships between nodes. An XSL-rendered view uses the flexible Extensible Stylesheet Language to represent data in HTML in a user-specified way. An image view associates regions of an image with nodes in the XML file.

Layered XML has many possible applications: the entire historical development of a document could be stored within it, versions of the same document prepared or revised by multiple people could be stored together, or the same document could contain layers with differing levels of complexity (useful for software users' manuals, reference works, or even, applied to formats like the Mozilla XUL, entire user interfaces).

We designed and implemented prototypical tools to experiment with the above tasks. The tools seek to be as generic as possible and are configured through user-editable XML and XSL files, allowing them to be easily customized for specific applications.

The implemented prototypes display data in three forms. These views are continually synchronized, allowing the user to switch quickly among them according to which is most useful for the task the user wishes to perform. Information used for linking can be easily added to a suitably formatted XML file. A tool based on our idea of incorporating and storing layers in an XML document was created for both viewing and editing multilayered XML documents. Additionally, a Java class for multilayered XML documents was developed that allows access to their data through normal Java XML procedures.

As a small illustration of potential applications, we encoded in our experimental framework various historical versions of the Pledge of Allegiance and of sections of the Books of Common Prayer of the Anglican Communion. The latter text combines both historical change with the existence of multiple, related versions in many different countries, so it provides a perfect example of a tree of variants that is more than one layer deep. The user can select a desired version of the documents, which is then extracted from one common XML description of all of the versions and rendered to the screen.

Lester Miller

Department of Geography
Mentor: Prof. Susan Roberts

Land Tenure in Rural México from 1910 to the Present

It has often been written that the best indicators of development are not such factors as roads, electricity, or even running water, but rather the ability to fulfill basic human needs such as nourishment and shelter. Certainly, roads, electricity, and running water can make it easier to procure food and likely demonstrate that housing exists, but they are all three culturally specific luxuries that really say little as to a person or family's ability to lead a fulfilling existence. Of much greater worth to any sort of practical analysis of a nation's well being is a basic, yet holistic examination of that nation's food system and its approach to providing shelter to its populace. The goal of my research is to undertake one small portion of that holistic examination and explore the history and present state of rural land tenure in México and how it has been affected by national and international influences.

The turn of the twentieth century found México under the military control of Porfírio Díaz. Under Díaz, the state had privatized roughly ninety percent of once-communal, indigenous lands. With campesino (Méxican peasants) uprisings lead by Emilio Zapata and Pancho Villa, along with the presidential nomination of Francisco Madero, the Mexican Revolution began in 1910 to challenge Díaz's rule. In 1917, a new constitution was drafted. Article 27 of this constitution allowed eminent domain for the government to distribute the land and waters within national borders in the interest of public welfare. This article allowed for seventy-five years of state-facilitated land distribution and returned much of the land taken from the campesinos under Díaz. Many of these concessions took the form of ejidos, a special type of land arrangement wherein the actual property was not returned to the community but rather the community was granted the right to tend the land. Thus, ejidal lands remained under the control of the government and neither the individual communities nor the farmers themselves could officially buy, sell, or rent the right to cultivate the land. Gradually, amendments were made to the constitution to allow individuals and foreign investors to sidestep

article 27, until finally, under the Salinas administration in 1992, land reform ended and a constitutional amendment allowed for ejidal lands to be privatized.

Aside from the historical aspect of this study, my primary research focus has been on the affect of this last constitutional amendment. My studies have taken me to Guelace, a small farming community in the southern state of Oaxaca, where I have been living with an indigenous family. Through participatory observation, conversation, and interviews, I am in the process of gathering data about how privatization and the liberated market atmosphere that has accompanied it have affected the lives of the rural Oaxacan farmers. Soon, I plan to visit the archives of the Secretary of Agriculture in Oaxaca City and in México D.F. to learn exactly how widespread privatization has become. My research will culminate in an undergraduate thesis, to be completed during the upcoming year.

Alyssum Pohl

Department of Biology
Mentor: Prof. Craig Sargent

Social and Temporal Patterns of Vocalization Among Colobus Guereza, The Black-and-White Colobus Monkey

The aim of this study was to glean a deeper understanding of the vocalization patterns of the black-and-white Colobus monkey, or *Colobus guereza*, and to compare the patterns of vocalization between wild and captive troupes. The study took place near Ngare Sero Mountain Lodge in the montane forests of Mt. Meru, Tanzania and at the Primate Rescue Center in Nicholasville, Kentucky. The guereza in each location were monitored for a total of 96 hours over a two-week period, giving 8 full 12-hour days of data (6am-6pm in Tanzania, 7am-7pm in Kentucky). It was found that the vocalizations of the wild guereza peak in the late morning and continue at high levels until midday, and that small peaks in vocalizations also occur in the early morning, and again an hour or so before the troupe settles for the night. Also of interest and possible use for future studies is the result that the croaking roar follows this pattern more closely than any of the other individual vocalizations. Interesting data regarding the nature of the croaking roar were collected; for instance, it was shown that not only territorial males make this call, as previously assumed. Finally, it was noted that vocalization frequency increases with disturbance. The vocalizations of the captive guereza have not yet been fully analyzed, but it can certainly be deduced that they vocalize significantly more frequently than the wild guereza. Also, while the dominant male is almost exclusively the only member of the troupe to make the croaking roar, it was observed that he is not the only member capable of this vocalization.

Robert Prather

Department of Educational and Counseling Psychology
Mentor: Prof. Sharon Rostosky

Psychosocial Correlates of the Execution of Legal Documents by Gays and Lesbians

Same-sex couples and families lack the legal rights intrinsic to heterosexual marriage. Gay, lesbian, bisexual and transgender (GLBT) individuals may form relationships not recognized by their legal (biological) families. Therefore, these individuals and families need to take pro-active steps, such as drafting wills and other legal documentation, to secure rights in their chosen relationships. Without establishing legal rights in same-sex families, the most important relationship in a person's life can be treated as if it never existed in the event of death. Within a same-sex family, a life-long companion inherits none of his or her partner's assets in the absence of a will and often encounters trouble in keeping custody of the couple's children. In short, GLBT individuals and families need to put documents into place to assure legal recognition of their wishes.

Hesitation in taking these legal steps may be exacerbated by intrapersonal and interpersonal characteristics. Intrapersonal characteristics that may deter individuals from securing these legal protections include high levels of internalized homophobia, and lack of disclosure of sexual orientation. Interpersonal characteristics may include perceived relationship quality, the current length of the relationship, and the presence of children. Each of these factors may be significantly related to GLBT individuals' hesitance or motivation to initiate protective documents.

Because previous studies have neither examined the prevalence of documentation nor the factors associated with the execution of documentation among GLBT individuals, we designed a Web-based study that would allow us to explore these questions. Participants were recruited via email lists for various GLBT organizations and issues. Individuals responded to the email and were given access to the survey. We have obtained a sample of approximately 400 gay, lesbian, bisexual, and transgender persons. Participants responded to demographic and disclosure of sexuality items, items about relationships and length, children,

and family relationships. They also filled out scales assessing internalized homophobia (IH) and knowledge about legal documents. Finally, they answered questions about the execution of several different types of legal documents.

Now that the data has been collected, I plan to generate descriptive statistics showing prevalence rates for the different forms of documentation among different demographic groups, and possible causal factors related to the execution of these documents. I plan to present these findings at a national conference in the coming academic year and then submit a manuscript to a peer-reviewed journal for possible publication. With the accomplishment of these goals, I will have completed the research process from inception of the research question, to survey design, participant recruitment and data collection, to analysis and publication.

Phillip Sauerbeck

Department of Classics
Mentor: Prof. Ross Scaife

Translation Research

Translators translate because of their love for the original poem and because of their desire to honor that poem. When a translator engages in that honoring, the act of translating becomes sacred. The translator participates in a miraculous transfer of beauty. What the original poet saw, the translator attempts to see, and he/she does his/her best to transfer that vision from personal experience of the poem through his/her own vernacular.

Of course, when speaking of the translator's experience, the question of the importance of objectivity arises. A translator cannot help but interpret the poem in terms of his or her own experience, and should not be criticized for this. A characteristic of translation is that it also tells the translator's story; it will (hopefully) have the flair of something new. Therefore, translation can broaden the scope of the original, offer another view of the same thing. Translation is not a technical feat only, but also an art form, more than just a re-creation.

A translation is not worse or better than the original. It is an attempt to create an experience that is similar to that of the original poem. It is important, though, to note that a translation is not the original. One does not read the original poet or the translator only, but both at the same time.

Translation is possible because language does not point to itself, but to objects, ideas, emotions, or the Platonic forms. If I write the word *moon,* a reader will think of a moon, perhaps a full moon on a clear sky, whatever is his or her general "moon" picture. If language referred to itself, then comprehension would be impossible. A reader could sound out the word *moon,* but that would be all. If a critic of translation were to say that translation is impossible because of semantic differences in words, he or she would be promoting the idea that language refers *only* to itself, which is impossible.

Plato speaks of the role and function of language in everyday live in *The Cratylus*. When referring to names, he says that the name of a person is not that person. Two people in separate cities have the same name, but they are still completely different from each other.

In translation, some intellectual characteristics of the original poem are inherently lost; whether meter, rhyme, or a whole image. These things are done for the sake of the translation as a whole, done for something greater. One should think of the poet too. Although he or she loses part of what has inspired him or her, the poet does the world a great justice by writing. The poet honors his or her sources of inspiration by writing. In turn, the translator honors the poet's inspiration, and he or she too does the poem and the world a great justice.

Christopher (Matt) Smith

Department of Psychology
Mentor: Prof. Michael Bardo

Individual Differences Predict Novelty-Induced Disruption of Amphetamine Self-Administration in Rats

A potential protective factor for drug abuse might involve exposure to nondrug, alternative reinforcers. Previous research in laboratory animals has shown that drug self-administration is reduced by nondrug alternative reinforcers such as food or sweetened water. Work in our laboratory has also shown that novel-enriching (rewarding) stimuli decrease amphetamine self-administration in rats (Klebaur et al., *Experimental and Clinical Psychopharmacology*, 2001, 9:372-379). Because rats have shown individual differences in their response to novelty (Piazza et al., *Science*, 1989, 245:1511-1513), the present experiment determined if these individual differences would predict the magnitude of novelty-induced disruption of amphetamine self-administration.

Rats (n = 12) were first screened for response to novelty and activity using three different novelty tests (inescapable-induced novelty, novel-object recognition and novelty-induced conditioned place preference) and two ac-

tivity tests (free-choice or no-choice wheel running). Following the initial screening phase, rats were trained in an operant chamber on a fixed-ratio 5 schedule to self-administer amphetamine (0.1 mg/kg/infusion) in 60-min sessions.

When responding stabilized, dose effect curves were established for each rat in the presence and absence of novel stimuli in the operant chamber. In order to conform to a procedure that yielded a novelty-induced disruption of amphetamine self-administration (Klebaur et al., 2001), novelty consisted of the following stimulus combinations: (1) a novel odor (orange, coffee, cinnamon or anise extract); (2) a novel object (one of four different hard plastic "toys"); (3) a novel visual black-and-white pattern (checkerboard pattern, zig-zag pattern, swirling pattern, or dotted pattern); and (4) a novel floor insertion having a distinct tactile texture (hardware cloth, mesh screen, flattened sheet metal, or Plexiglas).

A different set of novel stimuli, randomly determined, was introduced into the chamber on each of four separate sessions. On each of these novelty sessions, a different dose of amphetamine (0.003, 0.01, 0.03 or 0.1 mg/kg/infusion) was available. Responding for these same doses of amphetamine was also determined during separate sessions in which no novelty was presented. The order in which doses were tested in the presence and absence of novelty was determined using a Latin square design. Intervening between each test session, rats were maintained on the training dose of amphetamine (0.1 mg/kg/infusion, with no exposure to novelty) for 2 sessions in order to maintain stable responding.

Although our experiment is still ongoing, preliminary results indicate that novelty during the session disrupts amphetamine self-administration. With regard to the effect of individual differences on the novelty-induced disruption of amphetamine self-administration, we predict that rats with a greater response to the novelty tests will show a greater novelty-induced disruption in responding for amphetamine. This effect should be observed only at the lowest unit dose of amphetamine (0.003 mg/kg/infusion). If the predicted results are substantiated, then such results will provide pre-clinical evidence that exposure to novel environmental stimuli may serve as a protective factor against drug taking among high novelty-seeking individuals.

Tasha L. Smith

Department of Psychology
Mentor: Prof. Thomas Zentall

Social Factors in Imitative Learning by Female Japanese Quail

There is growing evidence that animals can learn from watching others (i.e., they can imitate). We have been studying imitative learning in Japanese quail and in the present experiment we were interested in determining if the social relationship between a male demonstrator and a female observer would influence the observer's choice of a model. Specifically, we asked if the establishment of a sexual pair bond between the two would make it more likely that the observer would imitate that male over another familiar male with which she had not mated. Male quail were trained as demonstrators, with half of the males trained to step on a small platform (treadle) and half being trained to peck at the treadle. Females were only trained to eat from the feeder and had no experience with the treadle. Female quail were then exposed individually to two male demonstrators for equal amounts of time, one male previously trained to peck at the treadle and one to step on the treadle. The female was pair bonded (mated) with one of the demonstrators. The female was then exposed to each of the familiar males as it was operating the treadle (one stepping, the other pecking). The order in which the females were exposed to the male demonstrators was counterbalanced to control for order effects. Following this exposure to each demonstrator, the female was given access to the treadle and she could respond in any manner she chose (i.e., by pecking or stepping). Preliminary results support the notion that females choose to imitate a pair-bonded male rather than a different familiar male with which the female has not mated.

Johannes W. Steyn

Department of Chemistry
(Research performed in the Department of Anesthesiology)
Mentor: Prof. Joseph Holtman

The Effects of Chronic Treatment with Low Doses of Opioid Analgesic Drugs Acting at the Mu/Kappa, and Mu/Kappa Opioid Receptors on Development of Neuropathic Pain in Rats.

Inadequate management of pain remains a significant clinical problem, which is largely ineffectively treated by currently available drugs. This is especially true of neuropathic pain, which results from damage to nerves. In an effort to

better understand the development of, and ultimately treat, neuropathic pain, we have begun a series of basic experiments in a rat model of neuropathic pain. A peripheral mononeuropathy was produced with chronic constriction injury (Bennet & Xie, *Pain*, 87-107, 1988). The sciatic nerve on the left side was ligated while a sham operation was performed on the right side. Drugs acting at mu (fentanyl), kappa (U50 488H), and mu/kappa (morphine) opioid receptors were tested for their ability to affect the development of neuropathic pain. Specifically, rats were treated once daily for 28 days (IP, vol = 1ml/kg) with morphine (0.02 mg/kg), fentanyl (5ng/kg), U50 488H (0.025mg/kg) or saline (control). Analgesia was assessed by applying increasing levels of pressure to the ligated and sham-operated paws of the rats. Paw pressure testing was conducted on days 3, 7, 10, 14, 21, and 28 post surgery. Rats treated with saline developed neuropathy in the left side (ligated) by day 3 and completely recovered by day 21. Rats treated with morphine developed neuropathy to a significantly lesser degree. The time courses of neuropathy development were similar in male and female rats. Ongoing experiments indicate that fentanyl completely blocks the development of neuropathy while U50 488H does not affect neuropathy in female rats. Testing of male rats is in progress. Neuropathy was not observed in the right side (sham) in all groups of rats. The results suggest that chronic treatment with low-dose (sub-analgesic) opioid analgesics acting predominantly at mu opioid receptors inhibit the development of the nerve injury-induced neuropathy. Opioid analgesics acting at kappa receptors do not appear to affect the development of neuropathy.

Laura Walker

Departent of Special Education
Mentor: Prof. Kristine Jolivette

Great Leaps

Great Leaps, a systematic and individualized reading program, focuses on students' phonics, sight phrases, and oral reading skills. This program aims to increase reading fluency by providing achievable goals measured through oral reading accuracy with one minute reading probes. *Great Leaps* was implemented in both school and home environments for a third grade student with learning disabilities and concurrent behavioral problems whose educational goals focused on reading fluency. A multiple probe across academic areas design was used.

Reading passages from the student's science and social studies text were also used. The student's reading fluency was measured in terms of the rate of words read correctly and words read incorrectly in one minute for the *Great Leaps'* passages, science passages, and social studies passages. The data suggest that the *Great Leaps* program improved the student's reading fluency above baseline rates across all three types of passages. Limitations of the study are discussed. Future research is warranted to replicate these data across environments and academic areas. Future directions are provided that outline such research.

In addition, the following students received summer research and creativity awards for summer, 2002:

Ryan Ball
Department of Biology
Mentor: Prof. Robin Cooper

Hutchinson, Mary (Beth)
Department of Landscape Architecture
Mentors: Prof. Karl Raitz, Geography
Prof. Christy Cassady, Horticulture
Prof. Ned Crankshaw, Landscape Architecture

Pey Lian Lim
Department of Computer Science
(Research Performed in the Department of Physics)
Mentor: Prof. Suketu Bhavsar

Jason McClure
Department of Forestry
(Research Performed in the Department of Entomology)
Mentor: Prof. Lynne Rieske-Kinney

Julie Rogers
Department: School of Music
Mentor: Prof. Ron Pen

Seth Vatt
Department: School of Music
Mentor: Prof. Dale Warren