



Universitas



August 1, 2015

"...ONLINE NEWSLETTER FROM THE PITTSBURG STATE UNIVERSITY COLLEGE OF ARTS & SCIENCES"

IN THIS ISSUE

From the Dean



By Karl Kunkel

The Spring 2015 edition of Universitas includes several articles describing student research. Pittsburg State University's historical motto, "By Doing Learn," clearly is exemplified by graduate and undergraduate students involved in original research mentored by a faculty member.

Colleges and universities have primary responsibilities to transmit knowledge through teaching, provide expertise for service contributions to the campus as

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The Sociology of Kidneys

While most people don't necessarily see the connection between sociology and kidneys, Kathryn Potter, a junior Sociology Major from Mindenmines, Missouri does. She is conducting research to be examine the social factors related to non-directed motivation for kidney donations among social workers and other healthcare professionals.

"We will be traveling to Dallas, Texas," says Potter, "to administer surveys to healthcare professionals and social workers in attendance at the National Kidney Foundation's 2015 Clinical Meeting."

It is challenging to find ways to measure social factors that come into the decision to donate a kidney, but Potter is prepared in that area.

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well as local and professional communities, and participate in the creation of new knowledge through conducting research. If students truly are going to learn and deeply understand their disciplines, they must engage in hearing and reading content complimented with participation in established research practices. Engaged student research involves asking relevant questions, grounding the questions in a body of established knowledge in the academic area, collecting information to answer those questions, and analyzing data to reach conclusions.

The College of Arts and Sciences is a leader in student research on the Pittsburg State campus. The priority of this activity is reflected by a College strategic objective: "Promote student research... including collaborative work with faculty, by supporting student presentations, conference attendance, and submissions to scholarly journals."

In Calendar Year 2014, 48 Arts and Sciences graduate students and 263 undergraduates engaged in research projects resulting in either a presentation at a local event or regional, and sometimes national, academic conference. In some cases, students co-authored published manuscripts with a faculty mentor.

There are many examples of Arts and Sciences students presenting their research at academic conferences, such as the Biology and

Chemistry departments involvement with K-INBRE (Kansas IDEa Network of Biological Research Excellence). This federal funding is administered through Kansas to support faculty mentorship of student research in the biomedical sciences. Our students have the opportunity to present their work at the annual K-INBRE conference. At the recent January 2015 symposium, 17 projects involving Pittsburg State Arts and Sciences student/faculty collaborations were presented with 18 undergraduates, six graduate students, and eleven faculty participating. Since 2010, 22 PSU Biology and Chemistry students received competitive K-INBRE Summer Scholar awards for research and four others were awarded the prestigious Star Trainee Award.

This past month Arts and Sciences students in Chemistry, English, and Nursing received the University's "Distinguished Thesis Award." Earlier this semester, a student in Polymer Chemistry was selected as the Best Graduate Poster, and another student in Biology/Chemistry as the Best Undergraduate Poster, at the state-wide Capital Research Summit held in the State Capitol Rotunda. Students in Art, Biology, Chemistry, Communication, English, and Polymer Chemistry also took first and second place in most categories at the annual PSU Research Colloquium competition held in April 2015. Further, Arts and Sciences faculty received the University's "Outstanding Undergraduate Research Mentor Award" each of the past three years.

While student research is relevant to several Arts and Sciences disciplines and the focus of articles in the current Universitas, there are many other students who collaborate with and receive mentorship from faculty for public performances, competitions, or presentation of creative works in Art, Advertising/Public Relations, Broadcasting, Creative Writing, Music, Poetry, and Theatre, to name just a few.

I trust it is obvious the College values hands-on activities as central elements in the student learning process. Having the opportunity for direct faculty mentorship of student research and creative activity differentiates the Pittsburg State experience from many other colleges and universities in our region.

I am very proud of the talented and dedicated Arts and Sciences faculty working with committed, capable, and curious graduate students and undergraduates toward deep engagement in their disciplines through conducting original research and creative activity. These efforts demonstrate the importance of generating knowledge as a method for transmitting knowledge.

"By Doing Learn" is demonstrated by the good work of faculty and students in the College of Arts and Sciences. I know you will enjoy reading details of

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student research examples in this edition of our newsletter.

It indeed is special to be a Gorilla!

Karl R. Kunkel, Ph.D.

Dean, College of Arts and Sciences



Nostalgia, Skepticism, and Convenience

Tar-Creek Superfund Site in northeast Oklahoma was deemed hazardous by the EPA due to elevated levels of lead and zinc in the groundwater.

Being from Galena, Kansas, Jordan Adams knew this much, but in working with Dr. Gary Wilson and Dr. Kirstin Lawson, both from the Department of History, Philosophy, and Social Sciences, he learned more.

Dr. Wilson hypothesized that nostalgia and rootedness played a major role in the decision making process of twenty families who were offered buy-outs of their property.

“Borrowing from Dr. Wilson's research,” says Adams, “I am completing a short documentary film that examines not only nostalgia, but also skepticism of authority when dealing with issues of one's home town.”

Adams also worked with Dr. Lawson, who provided historical expertise concerning the Tri-State Mining

District and evidence of the Picher area residents' skepticism of outside authority since the early twentieth century.

According to Adams, during the years of increasing production in Picher, many miners contracted silicosis, a disease that develops after a miner spends extended periods in an enclosed space inhaling silicate dust. The silicate then scars the lungs and makes miners more susceptible to contracting other diseases, such as tuberculosis.

With rates of tuberculosis that were higher than in other areas of the country, much of the outside medical help came with a stern rebuke that the residents must “improve their lives.” Adams.

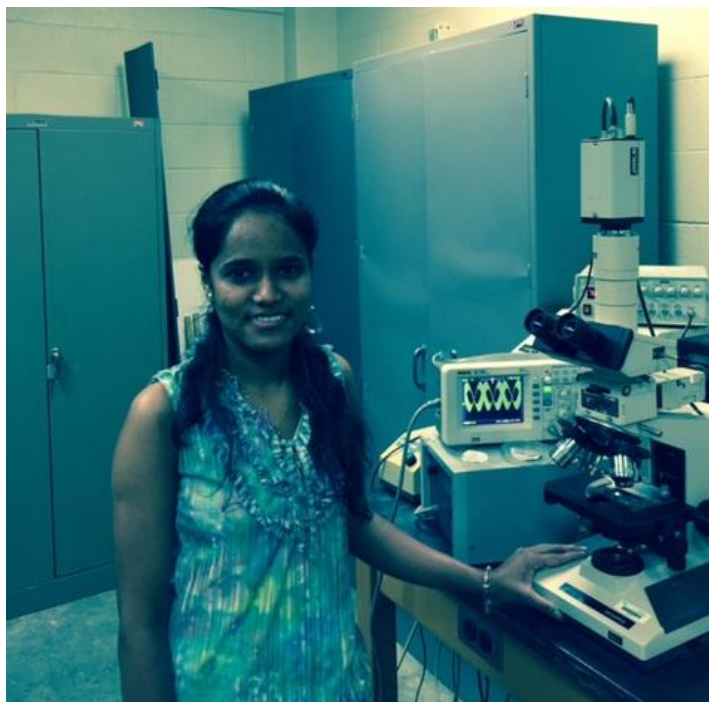
“While many outsiders saw the large tailing piles of mine waste as a source of illness,” Adams says, “the miners saw them as monuments to the hard work and achievement of the town.”

Adams, who is working on his MA, continues: “Through this research, it has become abundantly clear that nostalgia, skepticism, and convenience all play a role in family decision-making and public perception of the Tar Creek Superfund Site.”

Even though Picher has been designated dangerous for many reasons: water quality, air quality, and the passivity of cave-ins, many people in the area surrounding Picher still remember the town fondly as their home.

“While some experts suggest that the air in Picher is toxic, businesses still operate in the area,” says Adams. “Regarding convenience, comfort, and safety falls under what a person or family is willing to endure. Very simply, is the toxic air in Picher any more or less hazardous than the air pollution at street level in New York City?”

The research continues.



Peeling Graphene

Chathuri Silva is a graduate student in Physics at Pittsburg State from Rathnapura, Sri Lanka. Her research project is mainly focused in the area of liquid phase exfoliation of two-dimensional materials such as graphene in different solutions.

“Graphene, a single layer of carbon atoms arranged in hexagonal lattice,” says MS Silva. “This makes it the thinnest material ever isolated.”

According to Silva, it can be produced by separating the one single layer of graphite which is a naturally available form of carbon. Graphite is a stack of layers of carbon atoms packed together in a hexagonal lattice. Peeling off one of these single layers produces graphene.

“Graphene is the most amazing material,” says Silva. “It could change the field of electronics, optoelectronics and nanotechnology because of its excellent electronic, mechanical, and optical properties.”

Silva has been working with Dr. Serif Uran, Associate Professor of Physics. Together, they have a characterization of graphene based on various spectroscopic and microscopic methods.

“[We’ve used] scanning electron microscope imaging, transmission electron microscope imaging, UV Vis spectroscopy and optical imaging.”

Under the guidance of Uran, Silva started to work with graphite powder and graphite oxide with the different individual solvents such as acetone, methanol, acetonitrile, H₂O₂, Ethanol, and three different solvent mixtures of several chemicals. The mixtures were “sonicated” to peel off flakes of graphene and centrifuged to separate unresolved large chunks and to disperse graphene as layers. All of this is done in order to try to find the best

Directing Student Research

While the standard classroom lecture model of teaching is alive and well, and online education is taking deeper root with every passing year, there is another model of education that, while having been around for a very long time, is growing now on the PSU campus. While teachers have been doing this for many years without actually labeling it, it has now been given a name: student research or undergraduate research.

This method of teaching dovetails quite nicely with Pitt State's historic motto: "By doing, learn." Those students who are of a scholarly mindset get the opportunity to put what they have learned into practice.

"Allowing undergraduate students to engage in sociological research allows [students] to totally engage in what we, as scientists, do for a living," says Dr. Harry Humphries, Associate Professor of Sociology at Pittsburg State University.

Most people understand the sort of preparation required to teach a class. Preparation of lectures, creation of assignments, writing tests, and grading, but what does doing this kind of teaching require of a teacher?

"First," says Dr. Kirstin Lawson, Assistant Professor of History, "it takes a lot of time. Research involves developing new ideas, which is not something that just happens."

According to Lawson, undergraduate researchers need to train their brains to think creatively, as well as critically and analytically. That requires a lot of individual instructor attention.

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Writing in The Dust

In the fall semester of 2014, Keith Demm, an English major with a Communications minor, enrolled in Professor Leo Hudson's screenwriting class. From that class Demm emerged with a play, *The Dust*.

According to Demm, The entire focus of Hudson's class is to complete a first draft of a full-length screenplay.

"We spent a lot of time in the planning and research phase," says Dem, "And I chose to set my film in Great Depression-era Kansas. I established a fictional version of my maternal grandmother as the protagonist, Alice, and set to work on my screenplay."

By the end of the semester Demm had completed his draft which Professor Hudson helped to edit and then submit it to the Broadcast Education Association's (BEA) screenwriting competition. The screenplay subsequently received first-place in the BEA's national competition for student feature-length screenplays. The awards ceremony was held in Las Vegas on the night of April 12th, 2015.

The Dust centers on Alice's struggle to survive with her young daughter after her husband and many others are killed in a mine explosion. The owner of the mine, Mr. Shannon, serves as the antagonist of the film, and he hounds Alice at every step. Mr. Shannon had been the youthful love interest of Alice's mother, and he has never recovered from her rejection of his marital advances.

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Music with the Mobius Band



Srividhya “Sri” Balaji is a talented person with many interests. She came to Pittsburg State from India having already earned bachelor’s degrees in Music and Mathematics.

“I hail from Chennai, Tamil Nadu, India,” says Sri. “I did my schooling in New Delhi.”

She is from south Indian but was mostly brought up in North India. Her music degree is in South India Classical Music/Carnatic Music from Kalakshetra Foundation while her mathematics degree is from the University of Madras. Both institutions are located in Chennai.

The main focus of Sri’s research is in drawing connections between the branch of mathematics called topology and Indian classical music.

“Topology can be intuitively described as rubber-sheet geometry,” says Sri. This is because it considers properties of an object that remain unchanged when bending or stretching the object.

“You may have heard the joke that a topologist is someone who can’t tell the difference between a doughnut and a coffee cup. The reason that is we can stretch a doughnut into the coffee cup (assuming the doughnut is made of a sufficiently pliable substance). The “hole” of the doughnut ends up making the

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Triple Sport



George Sweatt was a triple sport athlete at Pittsburg State University from 1919-1922. He lettered in football, basketball, and track. He was an African American.

This was discovered by Chandler Wilson, a PSU major in History and government, as she worked on a research project for Dr. Kirstin Lawson, Associate Professor of History at Pittsburg State University.

“Professor Lawson gave us the task to research a topic pertaining to Pittsburg State University from the 1900s to approximately 1960s,” said Wilson who comes to PSU from Trenton, Missouri. “We needed to find a topic that we found interesting, but also something that would interest someone not even associated with Pitt State.”

Wilson decided to do something that hit close to home: athletics. She is on the track team here at Pitt.

“We have a rich history within our program,” says Wilson, “and I knew that this was true for the athletic program in general here. I began digging around and happened upon George Sweatt,”

The fact that George Sweatt was African American provided Wilson with a research question: How did George Sweatt's trials and triumphs as an athlete help illuminate race relations within Pitt State athletics?

“But I plan on taking this a step farther,” says Wilson. “[I want to show] how it affects athletics still today, not just Pitt State. My hope is to bring light to what George went through, not only being

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Searching for Airplanes

Minh Bui is a senior in Mathematics at Pittsburg State University who is from Nha Trang, Vietnam. He is doing research with Professor Ananda Jayawardhana of the Department of Mathematics.

“Last year, I did a research with Dr. Jayawardhana over using Time Series Analysis techniques in predicting future values of American air passengers,” says Minh.

According to Minh, recent events like the disappearance of Malaysia Air Flight 370 have negatively impacted the Malaysian airline in many ways. One of the impacts, of course, is the decrease in the number of air passengers using the Malaysian airline. Minh’s paper discusses different techniques in time series analysis, along with showing the relationship with economic cycles, natural disasters, wars, accidents, and man-made disasters in American air passenger numbers.

According to Ananda Jayawardhana, Professor of Mathematics at Pittsburg State University, Minh is a very intelligent student and he is extremely good with mathematics, statistics, and computer science.

“Time series data in business has a long term trends, seasonal variations, and economic cycles,” says Jayawardhana. “These factors can be used to predict near future values for the unknown variable. Natural and manmade disasters can change these patterns. Some such examples are wars, terrorist acts, nuclear disasters, rapid economic downturns, and rapidly spreading infectious diseases. Random fluctuations provide us the opportunity to fit statistical models.”

According to Jayawardhan, Minh fit the number of air passengers data over a period which included September 11, 2001 on which terrorists attacked USA and 2008 during which US stock market turned downward rapidly and he discussed different ways to fit models and compared respective error estimates.

“There are many forecasting methodologies,” says Minh, “such as Moving Average, Exponential Smoothing Average, [and other methods including] Fourier Analysis.”

Each method tries to build mathematical model and takes input from the data and produces the predictive values.

“Since the data has wave-like pattern as well as seasonal factor, models [there are certain methods which] do a better job in forecasting the future values of the number of air passengers,” he says. “Overall, this is a good project where I learn not only about the mathematical content but also how to work with advisor/professor on a research topic, which will help me in my future academic as well as industrial career.”

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Triple Sport

a student-athlete which is hard enough, but facing adversity as an African American. My goal is for someone who may not be interested in athletic-type situations would still find this research topic interesting and one that would stick with them.”

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Peeling Graphene

solvent or solvent mixture.

“I have been working with the solvent mixtures which gave the best results with graphite and graphite oxide,” says Silva. “Currently, [Dr. Uran and I] are fine tuning the solution volume concentration and graphite mixture.”

“Chathuri has been working on this project about a year now,” says Dr. Uran. “She has harnessed a lot of new knowledge and experimental skills and has spent countless hours making samples and characterizing them. This is all done on top of her classes and teaching assistant duties. I am very proud of what she has accomplished.”

Chathuri would like to obtain a Ph.D. degree in physics and has applied to several graduate school across the country.

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The Sociology of Kidneys

“[We will use] Likert Scales and a Bogardus Social Distance Scale to will analyze various factors relating to the attitudes people have toward kidney donation,” she says. These factors include compassion fatigue and social distance and the attitudes include but are not limited to willingness to donate, necessary incentives for donation, and rewards packages for donors.

"This research is motivated by my personal involvement in my identical twin brother's kidney transplants," says Dr. Harry Humphries, Associate Professor of Sociology. "I wanted to know factors related to why individuals are motivated to donate a live kidney since he went through two transplants; one that failed and the other which is successful."



This is original research utilizing a Bogardus Social Distance Scale to measure altruism. The present study is the third of its kind.

This is an interdisciplinary area and to extend her reach Potter has been working with several professors. These include sociologists (in addition to Dr. Humphries) Dr. Browyn Conrad; Dr. Kristen Humphrey from Social Work; as well as Dr. Cheryl Giefer and Dr. Amy Hite from the Department of Nursing.

This is a continuation of research that has been previously published in the Journal of Nephrology Social Work in 2009 and 2014.

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Music with the Mobius Band

handle of the coffee cup. However, a doughnut with two holes would not be topologically equivalent to a coffee cup--unless the coffee cup had two handles!"

Several researchers have already described connections between topology and Western music. Sri is continuing that. In her work, she makes use of a concept from Indian music called a raaga.

“The term Raaga in Indian music is the equivalent term for mode in Western music,” say’s Sri. “A raaga is a scale which is formed by the different combinations of the seven notes in an octave.” During a composition based on a Raaga, two notes are played simultaneously, one note from the singer, and one note from a musical instrument such as a pitch-pipe. “A 2-chord is two notes played simultaneously. Consequently, at each point in time in the composition, a 2-chord is being played. It turns out that the topological space of two chords can be modeled by the so called Mobius band.”

The Mobius band is a mathematical object obtained from a rectangular strip of paper. “If we glue two ends of the rectangular strip together, we get a cylinder with no top and bottom,” says Sri. “But if we twist one end by 180 degrees before gluing, we obtain a Mobius band.”

The Mobius band has some interesting properties. For example, while you can paint the inside of a cylinder and outside of a cylinder two different colors, a Mobius band can only be painted one color.

“We say the Mobius is one-sided. So every 2-chord corresponds to a point on the Mobius band, and vice versa. Therefore, as a composition is being played, we are moving on a Mobius band! There are many musical concepts in Indian music that can be visualized on the Mobius band, and it is hoped this will give new insight into the rather complex structure of a composition.”

Her research project is called “The Exploration of Quotient Spaces and Group Actions with Application to Visualizing Music.” She is working with Dr. Scott Van Thuong, Assistant Professor of the Department of Mathematics.

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Directing Student Research

“Second,” she continues, “it requires a lot of motivation on the part of the researcher, and motivation is easy to lose. I find that some of my most important input for those researchers happens when I encourage them to continue their work.”

Lawson’s experience here is not unique. Massive amounts of faculty time are required to do this sort of teaching well, even though the uninitiated might think the student is doing all of the work.

“The hardest factor is the time commitment,” echoes Dr. Amy Hite, Associate Professor of Nursing. But she adds that this commitment of time is rewarded. “When working with undergraduate researchers, it is rewarding to see their passion for an area of interest at such an early point in their education.”

Other than a commitment of time, there are other things required of the teacher. Helping to find the right topic is one of those things.

“In my opinion,” says Dr. Scott Thuong, Assistant Professor of Mathematics, “the hardest part is helping the student to find a project that is of appropriate difficulty, is of significance, and, most importantly, is capable of sustaining the student's interest for a semester or more. I feel in mathematics it is especially difficult to find a balance of difficulty and significance.”

This sort of education has been pursued by numerous professors on campus, from a wide variety of fields. Typically, the professors involved do not get any course relief for doing this or any specific remuneration at all. Why do they do it? One motivation for being involved with student research is to prepare the next generation of scholars in their fields.

“Involving students in faculty research or, alternatively, guiding them in the development of their own original projects is one of the best ways to do this,” says Browyn Conrad, Professor of Sociology. According to Conrad, this gives these students a competitive edge when it comes to applying to and succeeding in graduate programs.

Kirstin Lawson agrees with this and amplifies it.

“Studies show that students who engage in their own research become more self-confident, think more deeply, and become lifelong learners,” says Professor Lawson. “Students who research alongside faculty mentors often broaden their horizons, learning that they can make career choices that they had not previously considered. Watching that transformation happen is infinitely rewarding.”

The feeling of satisfaction that professors get from engaging in this form of teaching does seem to be key to why they do it.

Ananda Jayawardhana, Professor of Mathematics agrees with this. “It is extremely rewarding to see students do something mostly on their own and get results. Some results are even publishable at the right level. “

While satisfaction is a large part of the equation, Amy Hite also sees it as a being helpful to her own research agenda.

“While PSU isn’t a research based university,” she says, “there is still a significant amount of research being conducted. While it is important to give students this opportunity, it also is very beneficial for the faculty. The time factor is decreased by having a student who can assist with the work.”

“Students often push faculty to pursue research that they might not have taken on by themselves,” she adds.

Hite is not alone in having her research agenda boosted; Scott Thuong has experienced this as well.

“I find it a boon to my research,” he says. “Explaining the basic concepts of my research area to a beginner often sheds light on different ways to think of these concepts. Also, often research with a student is more interdisciplinary than my own, which can be rather specialized. For example, working with a student opened my mind to

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connections between topology and music, which is something that I had never considered before.”

While in vastly different areas than either Thuong or Hite, Lawson and Jayawardhana have had similar experiences.

“Sometimes I get so involved in my own research that I can no longer develop perspective,” says Lawson. “I’m in the middle of the forest and can only see trees. It takes a fresh perspective to understand that there is indeed a forest.”

Jayawardhana says, “I read more when students are working on research problems and gain a lot of knowledge for myself too. I have published with students.”

One question faculty may ask is if students need a lot of guidance when working on these types of projects. Thong believes that at the beginning of the research process undergraduates may be overwhelmed, and may need extra guidance, especially in finding reference materials, but “...once the student sets sail in the right direction, he or she becomes the captain of the journey! Of course, I am there to provide guidance and help the student steer clear of obstacles.”

With all of its benefits, students can’t simply be dumped into research without making them ready for the experience. Preparation is required.

“Sometimes they aren’t ready to research when I get them,” says Lawson. “That doesn’t mean that I give up. It just means that I need to teach them that research is a valuable activity.”

According to Scott Thuong, while the student might know the standard course work well, he or she will first need a working knowledge of basic concepts in the particular area where the research is taking place:

“Of course, what is basic depends on the research project. Beyond that, I think curiosity is important. When a student is genuinely interested in a research question, he or she will not give up when a dead end in the research is encountered. Instead, the student will persevere until the obstacle is overcome. Curiosity also motivates a student to ask further questions, thus leading to a plethora of future research projects.”

Humphries has a high opinion of the students he works with.

“They are the brightest and the most motivated,” he says. “[In doing their research] they use what they have learned in my Social Research Design course, along with a course in statistics, to analyze the results. They get to see for themselves how to test a hypothesis, develop a research design, do a comprehensive review of the literature, the process of submitting an article for a double blind review, the many rewrites and revisions, the thus the completion of published final product. This gives them a published article for entrance into graduate school or employment.

According to Harry Humphries, “So far there have been no drawbacks.”

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Writing in The Dust

“At the midpoint of the film,” says Demm, “as things are looking really bad for Alice, a massive dust storm envelopes her farm. Out of the storm stumbles a mysterious man named Richie, and he ultimately helps Alice to overcome the tremendous odds stacked against her by the odious Mr. Shannon.”

Demm engaged in a good bit of research while planning and writing *The Dust*. He interviewed his relatives and also recalled the many stories his grandmother told from the Depression. Most importantly, an aunt loaned him one of my grandmother’s old journals which helped to replicate the speech of the time.

“My Grandma, Alice Flanner,” says Demm, “was born in 1917, as opposed to her fictional counterpart, Alice Flannigan, who is about ten years older.”

Demm also researched old mining practices and locations, which lead to the selection of Osage County as the setting.

“At another crucial point in the film, I have the characters attend a church gathering where they listen to one of Franklin Roosevelt’s fireside chats. An actual speech he gave fit precisely into my fictional timeline and I used topical snippets from that speech in my film.”

Keith Demm is from Fort Scott, Kansas.