The value of failure

Students learn lessons in work on tiny satellite

BY TONY FITZPATRICK

Failure at a university is a word with bad connotations, unless you are involved in building experimental satellites that the U.S. Air Force and NASA find interesting.

A University aerospace engineer who works with students building experimental spacecraft says the student-built ones, which he calls “university-class,” have a strong advantage over aerospace-industry-built spacecraft. Thus, the Vandegrift is to fail.

“Experimental failure is a basic element of university life, and from the university perspective a failed spacecraft is not necessarily a failed mission,” said Michael A. Swartwout, Ph.D., assistant professor of mechanical and aerospace engineering. “Students still learn from the mistakes, and no one is hurt by the failure.

“What universities can do for science and engineering is tackle new or risky concepts — whether new technologies or different ways of operating spacecraft — and demonstrate a concept that might be used for a bigger spacecraft some day. This puts the risk on the student side as opposed to Boeing, for instance, sinking millions of dollars into a dubious program.”

Swartwout said there has been a boom in spacecraft production at universities worldwide, with 30 university-built spacecraft launched over the past decade. Enabling this trend has been the electronics revolution of the late ’90s, which made possible the opportunity for universities to make much smaller vehicles with much cheaper price tags.

Reason to be proud
Teammates: Kara Liefer, Ishi Baker, Sage Smith and Colleen Winter

The day before, the Bears bumped No. 3 University of La Verne to reach the finals. WUSTL finished the season 32-7 overall, 12-0 in the University Athletic Association. For more on the volleyball, see Sports, Page 2.

Students learn lessons in work on tiny satellite

BY DOUG MAIN

A university chemist has found surprisingly tough enzymes in a bacterium that “just say no to acid.”

Acid resistance is a valued trait for both pills and human pathogens. The bacterium Acetobacter aceti makes unusually acid-resistant enzymes in spades, which could make the organism a source for new enzyme products and new directions in protein chemistry.

A. aceti has been used for millennia to make vinegar, at least since an indirect reference in the Old Testament Book of Numbers to “vinegar made from wine.” But not until recently did anyone study this weird growth habit of making acid.

Kappock

“Acetic acid is this enzyme different?” Dr. T. Joseph Kappock, Ph.D., assistant professor of chemistry in Arts & Sciences, couldn’t overlook this very promising bacterium.

“The thing that piqued our interest was that this organism has this weird growth habit of making vinegar from ethanol (alcohol), which means it’s highly resistant to ethanol, which very few things grow in, and resistant to acetic acid (vinegar), which even fewer things grow in,” Kappock said.

“Important enzymes in this bug resist acid in a way almost all organisms cannot, and we’re trying to answer the question, ‘How is this enzyme different?’”

See Enzymes, Page 5

WUSTL-associated startup

Apath is model of success

BY GWEN ERICSON

Originating in University research laboratories, St. Louis-based biotechnology company Apath has generated enough proof-of-concept to attract $1 million in royalty payments back to the St. Louis area.

Apath is the first University-associated startup to hit the $1 million payback milestone.

The company identifies antiviral drugs to combat viruses of the organism that allow it to “vinegar made from wine.” But a more direct reference in the late ’90s, which made possible the opportunity for universities to make much smaller vehicles with much cheaper price tags.

BY JESSICA MARTIN

Seligman to become Rochester president

BY JESSICA MARTIN

Joel Seligman, J.D., dean of the School of Law and the Ethan A.H. Shepley Shelpy University Professor, has announced his intention to step down effective June 30, according to Chancellor Mark S. Wrighton.

Seligman, who came to Washington University in 1999 in 1999 to serve as dean, will become president of the University of Rochester.

“Joel Seligman is an accomplished academic leader and will be a wonderful president for the University of Rochester,” Wrighton said.

“During his tenure as dean of the Washington University School of Law, he has contributed significantly to the progress of the school and has served the University in many ways. His dedication to students and faculty is a genuine strength, and he inspires the entire community he serves. He has the ability to develop a strategic plan and to lead its execution.”

His departure from Washington University in St. Louis is a loss for us, but he is destined to make contributions to American higher education as the president of a major research university, and I welcome the opportunity to work with him in his new capacity as a fellow leader of a member university in the Association of American Universities.”

Swartwout said there has been a boom in spacecraft production at universities worldwide, with 30 university-built spacecraft launched over the past decade. Enabling this trend has been the electronics revolution of the late ’90s, which made possible the opportunity for universities to make much smaller vehicles with much cheaper price tags.

Reason to be proud: Teammates: Kara Liefer, Ishi Baker, Sage Smith and Colleen Winter

The day before, the Bears bumped No. 3 University of La Verne to reach the finals. WUSTL finished the season 32-7 overall, 12-0 in the University Athletic Association. For more on the volleyball, see Sports, Page 2.
Williams College took the women's meet, among a field of 24 teams. Finished third at the NCAA Division III championships. The Bears finished 32-7. They never get closer in the 30-28 loss. The teams went back and forth, three points of the match before Nov. 27. The Bears scored the first nine points of the match before Juniata added 15 points. The Bears took the lead (58-17) and maintained that lead the rest of the way.

Women's soccer team loses two of three.

The second 21 men's basketball team fell to 3-2 after dropping two of three games last weekend.

The Bears opened the week on a high note as the Bears posted a 94-53 win over Wisconsin Lutheran College. WUSTL opened 22-3 this season. Brandon York led the Bears with 15 points, while Muhammad Al-Shehri added 14 points. Senior Maggie Grabow finished 40th at the WUSTL Thanksgiving Invitational with a time of 23:33.8.

Junior Greg Briand represented the Bears men's squad. He finished 55th in the 8K run, clocking the fastest time of 29:14.2.

Women's soccer team falls to Puget Sound.

The No. 11 women's soccer team fell to No. 8 University of Puget Sound, 5-0, in the NCAA Sectional Finals held at K立tic Field in Tacoma, Wash., Nov. 20.

Puget Sound (21-1) got on the board first with a 92-56 win over Washington U. finished the season on an assist from Gilly Kjar scored her 22nd goal of the season on an assist from Gilly Kjar.

The Bears opened the week with a 92-56 win over No. 2 Illinois Wesleyan University. WUSTL trailed 46-38 at halftime, but the Titans opened the second half with a 17-4 run to post the non-conference victory. Sophomore Brandon York led the Bears with 14 points on 4-of-5 shooting. WUSTL then posted a 1-1 record at the Mike Rokicki Complex, winning the first game by 13 points and John Woock have been named to the UAA All-Academic Team.

Record

In addition to the World Trade Center site in New York City, will read from his new memoir, Breaking Ground: Adventures in Life and Architecture, at 7 p.m. Dec. 6 in Graham Chapel.

The reading — sponsored by Left Bank Books, the Contemporary Art Museum St. Louis and the University's Sam Fox Arts Center and School of Architecture — is free and open to the public, though seating is limited.

Libeskind is one of the world's most influential figures in architecture and urban design. Breaking Ground, written with Sarah Crichton, discusses his iconoclastic approach to public space, but is also about tragedy and hope, and the way in which architecture can commemorate — and sublimate — human experience.

The book also shares Libeskind's vision for the World Trade Center site, including his proposed 1776 Freedom Tower, soaring 1,776-foot tall spire designed to restore New York's "spiritual peak," while creating an icon that speaks of our vitality in the face of danger and our optimism in the aftermath of tragedy.

In 1989, Libeskind won the competition for the Jewish Museum Berlin, and he founded Studio Daniel Libeskind the following year. Even before 2001 opening of the museum, Libeskind had broken the traditionally symmetrical design filled with underground passages and slit windows — something of a legend in architecture.

Many observers suggest Libeskind's most recent work, which is to pay homage to the victims of the Sept. 11 attacks, may be his greatest commission.
**Sickle cell spotlight**

*DeBaun increases national awareness*

**BY GILA Z. REICKER**

In sickle cell disease, red blood cells change to a curved, or sickle shape, instead of the normal, round shape. Sickle cells become stuck in blood vessels, causing damage to tissues and organs, which can be extremely painful. In addition to pain, the most common afflictions associated with sickle cell disease are strokes, kidney and spleen dysfunction, chronic anemia and increased risk of bacterial infection.

Talent told the crowd at the stamp unveiling ceremony that two years ago, he visited St. Louis Children’s Hospital and toured the sickle cell disease unit there. Talent has helped us take an important first step to help those at high risk for failure to have independent lives,” said Michael R. DeBaun, M.D., director of the sickle cell disease center and associate professor of pediatrics and of biostatistics.

The grant, which was sponsored by Sen. Jim Talent, will also directly fund clinical trials, Wickline said. “Our ultimate goal is to change the way we deal with sickle cell disease,” DeBaun told the audience. “Sickle cell disease has been under the surface for too long. It’s time to put it under the national spotlight.”

Talent added that several medical centers around the country are pursuing new therapies and treatments for sickle cell disease. “We can no longer do a good job of treating people with sickle cell disease,” DeBaun said. “We need to do a better job of preventing complications.”

The researchers have shown that when they announced that the Sickle Cell Treatment Act is the most significant piece of health-care legislation for this community in 35 years,” said DeBaun, who is professor of pediatrics and of biostatistics.

“With this grant, Senator Talent has helped us take an important first step to help those at high risk for failure to have independent lives,” said Michael R. DeBaun, M.D., director of the sickle cell disease center and associate professor of pediatrics and of biostatistics.

The grant, which was sponsored by Sen. Jim Talent, will also enhance Camp Crescent, an overnight summer camp for kids ages 9-13 who have sickle cell disease.

The free two-day camp program, created and directed by DeBaun and his team, provides fun and educational activities.

Camp Crescent is the only camp in the metropolitan area created to meet the unique medical, physical and emotional needs of children with sickle cell disease.

**Grant boosts sickle cell disease programs**

Children and teenagers with sickle cell disease face many barriers beyond health-care challenges. An estimated 700 children and teenagers in the St. Louis metro area have sickle cell disease.

And fewer than 25 percent of sickle cell disease patients by allowing states to receive a federal 50-50 funding match for treatment and research efforts, expand awareness about the disease and provide counseling about who is at risk for having a child with the disease. The “Sickle Cell Treatment Act” is the most significant piece of health-care legislation for this community in 35 years,” said DeBaun, who is professor of pediatrics and of biostatistics.

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**Nanomedicine research technique advances heart care**

*Wickline's team packed nanoparticles with two component molecules that latch onto small, rapidly growing capillaries, and an imaging agent called gadolinium, which shows up as a bright spot on a magnetic resonance image. Using rabbits, they found that arteries that were developing dangerous capillaries had gadolinium signals twice as bright as normal arteries.**

“The ultimate goal is to change the usual course of atherosclerosis by using imaging techniques to determine who is likely to have a stroke or heart attack, and then targeting drugs to the sites of the very earliest stages of disease,” Wickline said.

Wickline and his colleagues designed a way to use imaging techniques to detect vulnerable plaques. Their technique uses specially engineered nanoparticles that serve as medicines — researchers tell the particles exactly what kind of cell to find and give them a package to deliver when they arrive.

In a study published in 2003, Wickline’s team packed nanoparticles with two component molecules that latch onto small, rapidly growing capillaries, and an imaging agent called gadolinium, which shows up as a bright spot on a magnetic resonance image. Using rabbits, they found that arteries that were developing dangerous capillaries had gadolinium signals twice as bright as normal arteries.

The researchers have shown that this technique can also help distinguish between stable plaques and those that are about to break, detecting the earliest stages of disease. And, because tumors also require new populations of capillaries, the team believes their techniques may also help detect very early cancers at the beginning stages of tumor development.
POISED ON A KNIFE EDGE • THE ROLE OF BUSINESS INTELLIGENCE

**Lectures**

**Friday, Dec. 3**
8:30 a.m.-7:30 p.m. School of Law Center for Professional Development. Lecture Hall, 608 South Euclid Ave. (Continued 8:30 a.m.-12:45 p.m. Dec. 4.) Director: J.E. Taylor. 935-7065.


**Saturday, Dec. 4**
9 a.m.-5 p.m. Conference Division of Business & Economics. "Accelerating Change in the Workplace." Update: Cost $75 until Nov. 30; $95 thereafter. Belleville H. Stimson Auditorium, 608 South Euclid Ave. 935-6891.

**Monday, Dec. 6**
4 p.m. Center for the Applied Innovation of Technology and Entrepreneurship. "The Virtual Professor:壮大: K Department of Educational Technology. Co-sponsored by the University of Missouri-Kansas City, 5 N. Jackson Ave. 935-4444.

**Tuesday, Dec. 7**

**Wednesday, Dec. 8**
7:30 a.m.-6:30 p.m. Center for the Applied Innovation of Technology and Entrepreneurship. "Developing IT Professionals: Beyond Technical Skills." Dr. Eric P. Newman, educa- tion director. CAIT, 5 N. Jackson Ave. 935-4444.

**Thursday, Dec. 9**

**Friday, Dec. 10**
8 p.m. Performing Arts Department. "Destined Satire 1660-1702." Modern literature, Love is the key. The literature of Antony Tudor (1908-1987), worked with 11 dancers designed to perform excerpts from Tudor's classic ballet "Dark Elegies" (1957), a manifestation on the theme of grieving. The piece will be performed Dec. 3-5 in Edison Theatre as part of Chesapeake's 2004 Washington University Dance Theatre concert.

**Music**

**Friday, Dec. 3**
7:30 p.m. Concert. Washington University Jazz Band, Chris Becker, dir., Stidham Hall

**Sunday, Dec. 5**

**Friday, 10**
8 p.m. Concert. Convocation Choir of Washington University. John Stewart, dir., 608 South Euclid Ave. 935-9130.

**Monday, Dec. 13**
8 p.m. Concert. Third Floor Jazz Club. Jean Smith, dir., Stidham Hall. 935-6891.

**On Stage**

**Friday, Dec. 3**
8 p.m. Performing Arts Department. "Dark Elegies." From the 2004 Washington University Dance Theatre's Dance Series. "Destined Satire 1660-1702" (2004); Australian Opera: W.S. Lyster and H. Bertram, dir. For more information, call 935-7130.

**Saturday, Dec. 4**
7:30 p.m. Concert. Third Floor Jazz Club. Jean Smith, dir., Stidham Hall. 935-6891.

**And more...**

**Wednesday, Dec. 8**

**Thursday, Dec. 9**
7:30 p.m. "Tango/Swing" Dance Event. Concert Hall Lounge. 935-6958.

**Saturday, Dec. 11**

**Literary historian love to speak Dec. 9**

**By EMMA OTEN**

Jeriary historian Harold Love, retired faculty of the Creative Literature in the Department of English in Arts & Sciences, will speak on "Reading Restoration Lamppoons" at 8 p.m. open to the public and will take place in Hurst Lounge, Danviller Hall, Room 301. A book-signing and reception will follow and copies of Love's book, "Reading Restoration Lamppoons," will be available for purchase. A prominent critic of early modern literature, Love is the author of numerous scholarly works, including "English Clas- sical Satire 1600-1702" (2004); Australian Opera: W.S. Lyster and H. Bertram, dir. For more information, call 935-7130.

**Vehicle inspections offered to holiday travelers**

On Dec. 4, University Police and the Department of Parking and Transportation, in partnership with Hartmann's Towing, will sponsor a free vehicle inspection that will check your vehicles to the parking lot outside the police/parking office on the South 40 between noon-3 p.m. for an inspection. The work of Austin's law enforcement is to help ensure they have a safe trip and that they have a safe trip. For more information, call 935-1050.
Enzymes

Acetobacter bacterium is relatively little-studied

From Page 1

The hope, Swartwout said, is that someday an innovation developed by students at a university will become a "disruptive" technology — one that is implemented and alter the status quo of spaceflight design. He might have research, as was the case with a team from Utah State University. A satellite, not much bigger than a couple of tennis balls, was developed.

Satellite

Bandit has roots in Project Aria

— From Page 1

This is yet in turn led to Swartwout developing the modus operandi of spacecraft design. He might have research, as was the case with a team from Utah State University. A satellite, not much bigger than a couple of tennis balls, was developed.

Swartwout recently presented a paper on the future of university-based spacecraft design. He might have research, as was the case with a team from Utah State University. A satellite, not much bigger than a couple of tennis balls, was developed.

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Tango legend Winkler to present dance, workshops Dec. 10-12

Tango legend Brigitta Winkler will host a weekend of dances and workshops Dec. 10-12 for the University's Tango Group. Winkler, a native of Berlin, is one of the world's foremost teachers and performers of tango.

On Dec. 10, Winkler will host a free tango/salsa dance from 7 p.m. to 1 a.m. The event will begin with a half-hour introduction to tango and salsa dancing and also will include, at 9:15 p.m., an introduction to two authentic Argentine-style tango.

The event is free and open to the public and will take place in Umstead Hall Lounge.

In addition, Winkler will lead a series of tango workshops at 1, 2:45 and 4 p.m. Dec. 11 and at 2 and 4:25 p.m. Dec. 12. The cost for each class is $20, and a discount is available for the series.

Beginners are welcome. Workshops will take place in the Mudd House Multipurpose Room.

Winkler is known for her exquisite creativity, class and understanding of the dance and music.

In 1987, Winkler co-founded the highly respected Tanzarte studio in Berlin as well as the internationally acclaimed Tango Muir, a pioneering dance company exploring the boundaries between tango and contemporary dance.

In her classes, Winkler integrates more than 20 years of experience teaching and performing tango with techniques adopted from Body Mind Centering, an experimental approach to movement re-education.

For more information, call Sharon Settles at 935-6998 or go online to cec.wustl.edu/~hs3.

Seligman — from Page 1

"Friederike (his wife) and I will always consider ourselves part of the School of Law and keep the friendships that began here long endure."

While at the University, Seligman has served as a reporter for the National Conference of Commissioners on Uniform State Laws, the chair of the Securities and Exchange Commission Advisory Committee on Market Information and a member of the American Institute of Certified Public Accountants Professional Ethics Executive Committee. Additionally, he sits on the National Association of Securities Dealers Board of Governors. Seligman earned a bachelor's degree from the University of California, Los Angeles, in 1972 and a law degree from Harvard University in 1974.

His teaching career began at Northeastern University where faculty appointments at George Washington University and University of Michigan, Seligman was named dean and the Samuel M. Fedgly Professor of Law at the University of Arizona College of Law.

Campus Watch

Additionally, University Police responded to four reports of property damage, two reports each of lost article, article and bad check, and one report each of disturbance, assault, suspicious person, burglary, fraud and larceny.

Crime alert

On Dec. 1, University Police released the following crime alert: A person reported being approached by a suspect after exiting his car in the 700 block of Independent Avenue Nov. 30. The suspect displayed a handgun and demanded the person's wallet. The person initially delayed in complying with the suspect's demand, and the suspect struck him in the face. The person gave the suspect his wallet, and the suspect fled on foot.

Precaution:

• Avoid walking or jogging alone and never do so after dark.
• Always choose a well-lit path and avoid dark or vacant areas.
• Carry a whistle to summon help.
• Always choose a well-lit path and avoid dark or vacant areas.
• Be alert to your surroundings.
• Be extra cautious if someone approaches your car and asks for information.
• Contact University City Police if you have any information that might assist in this investigation.
• Report suspicious activities/persons immediately to the University City Police.

Apath — from Page 1

St. Louis area.

"In the evening years, Apath has become well-established, branching out from our roots in hepatitis C to tackle several other important viral path-ogens." Paul D. Olivo, M.D., Ph.D., president and chief scientific officer, joined Apath in 1998. He was a member of the Department of Internal Medicine from 1989-1998, conducting research that led to patents on methods for detecting infectious viruses.

He now holds an adjunct faculty position in the Department of Molecular Microbiology. "In choosing Apath's research direction, we decided to work where the greatest need is," Olivo said. "There just aren't enough treatments for viral infections. And because many viruses can be turned into weapons, our antiviral work ideally positions us to address biodefense concerns."

As a result of national defense concerns, the company has obtained more than half of its income from federal grants, supplementing income obtained from numerous patent licenses. "Apath has been in the right place at the right time," Olivo said. "There is an element of luck involved, I suppose. But it's the sort of luck that comes from seeing what's needed and being prepared to take advantage when it comes along."

Michael G. Douglas, director of the University of Technology Management, said: "We congratulate the owners and employees of Apath on their suc- cess. We're pleased to see a startup with beginnings at Washington University grow to generate such impressive value."
Olin School names Beirne associate dean, director

James J. Beirne has joined the Olin School of Business as an associate dean and director of the Western Career Resources Center effective Dec. 7. Beirne replaces Gregory Huffman, who last year took leave to pursue other opportunities.

"The Western career center is a resource, a disposition and a professional intelligence that qualifies him to take our clients to the pinnacle of achievement and success," said Olin School Dean Stuart L. Greenbaum, Ph.D.

Beirne graduated from Washington University at the Pennsylvania from 1985-1994, serving most of that time as a director of career development and placement. Most recently, he managed the American Recruiting Program (ARP) and Human Resources Packaged. From 1994-2002, Beirne worked in corporate recruiting at General Mills, Inc. and was the company's director of recruiting for two years.

"His experience includes product management and marketing with international multi-foods, based in Canada, New Zealand and Brazil. He holds a master's degree from the American School of International Management, and a bachelor's degree in food marketing from St. Joseph's University. Beirne is fluent in Spanish and Portuguese.

Mark S. Connolly, Ph.D., professor of physics in Arts & Sciences, received a three-year, $560,000 grant from the National Science Foundation for research titled "NSM Studies: THE Hydrate Cathodres and Large Band-Gap Amorphous Semiconductors." Connolly's work will focus on High-Sensitivity NMR..."

"Alfred C. Rice, Ph.D., professor of mechanical and aerospace engineering, received a one-year, $112,000 grant from the National Science Foundation for research titled "Non-NEES User Requirements Assessment Through Design of MINI-MOST (Multi-Site Online Simulation Test) Experiments." The purpose of this research is to support the nation-wide basic infrastructure project for earthquake engineering..."

"David N. Himelman, Ph.D., the Stift and Quiesson Professor of Environmental Engineering Science, received a five-year, $517,953 grant from the Department of Defense to study the Multidisciplinary University Research Initiative for research titled, "Relationship Between Physico-Chemical Characteristics and Macromolecular Properties of Nanomaterials."..."

"Da-Ren Chen, Ph.D., assistant professor of mechanical and aerospace engineering, is co-principal investigator for the study..."

"Michael J. Welch, Ph.D., professor of radiology and co-director of the Division of Radiological Sciences, has been named an honorary fellow of the American College of Radiology. Welch was one of only three radiologists to receive the honor this year the thaw the group's annual meeting..."

Kris A. Kirolt, M.D., assistant professor of medicine, has received a two-year, $70,000 grant from the American Gastroenterology Association Foundation for research titled "Metabolic Abnormalities in Obese Subjects with Non-Alcoholic Fatty Liver Disease..."

"Lawrence N. Elman, M.D., associate professor of medicine, has received a five-year, $797,164 grant from the National Institute of Neurological and Stroke for research titled "Preventive and奋斗目标 Sulfate Inhibition of GABA Currents..."

"Antoniel J. Mueller, M.D., assistant professor of medicine, has received a one-year, $130,000 grant from the Veterans Administration-Charles E. Fairman System for research titled "Acute Renal Failure Trial Network (ATN) Study..."

"W. Christopher Price, M.D., instructor of psychiatry, has received a four-year, $765,500 grant from the National Institute of Mental Health for research titled "Metabolic Effects of Valproate and Antipsychotic Therapy..."

"John F. Pollock, Ph.D., assistant professor of psychology, has received a five-year, $619,430 grant from the National Institute of Mental Health for a "Collaborative Depression Study..."

"Olin School names Beirne associate dean, director..."
Dora E. Angelaki, Ph.D., graduate student Kim McArthur (left) and research associate Yong Gu, Ph.D., discuss data analyses for a project studying motion perception using a newly developed virtual reality apparatus that combines real motion and visual stimuli.

Washington People

By Gila Z. Reiches

Dora E. Angelaki’s research bridges neuroscience and biomedical engineering

Washington University

The allure of academia

Though always enchanted by the allure of research-based higher education, Angelaki appeared her parents by agreeing to pursue a more-applied undergraduate degree. Their hope was that intellectual and natural scientific talents and curiosity while preparing her for a more practical career than academia — and one that wouldn’t take her too far from home. The plan was finite. Rather than squelch her academic yearnings, college fueled them.

During her studies, Angelaki, now the Alumni Endowed Professor of Neurobiology, was inspired by several articles she read that mentioned a newly emerging field called biomedical engineering.

She decided it was the ideal opportunity for her to apply her engineering background to a more theoretical research-oriented field. Though she had no formal training in any of the biological sciences, she moved away from her beloved family and country to attend the engineering graduate program at the University of Minnesota.

“I didn’t even know what a red blood cell was,” she recalls. “I had to start from scratch, and every day I had to go back and study the basic information my classmates already knew just so I could understand what was being taught.”

These challenges were overshadowed by her passion for the material and unquenchable thirst for knowledge. By her second year of graduate school, she had discovered her niche in an area of science she had never heard of before.

Unlike the more well-known senses of vision and hearing, few people notice their sense of balance, let alone know what it’s called. But the system of fluid-filled passages in the inner ear, collectively called the vestibular system, is critical for orienting ourselves in space and maintaining posture and equilibrium. Damage or disruption to the system can be devastating, resulting in dizziness, unsteadiness, and even falls.

Angelaki’s scientific potential has been realized as she continuously adapts to lessons learned through collaborative experiences such as research on eye movements and the visual system. One of her most renowned accomplishments is that she pioneered the analysis of how the brain integrates information like the head’s rotation, linear movement, and response to gravity. “She’s put the question of how we use the vestibular system to guide eye movements into a broad and interesting perspective that relates to the larger concepts of neurovisuomotor,” says Stephen G. Lisberger, Ph.D., director of the W.M. Keck Foundation Center for Integrative Neuroscience and professor of physiology at the University of California, San Francisco. In 1996, just a few years after starting her first faculty appointment at the University of Mississippi, Angelaki’s scientific potential was recognized with the Presidential Early Career Award for Scientists and Engineers. She came to Washington University as an associate professor of biomedical engineering in the School of Engineering & Applied Science in 1999. Her accomplishments have continued to garner respect and accolades, which have allowed her to take on more leadership roles such as editorial and scientific computing positions — a charge that helps sustain her constant craving for incorporating new research perspectives into her own work.

Her recognition and responsibility also have enabled her to fulfill another goal: encouraging aspiring scientists to study the underappreciated vestibular system. For example, she participated in the development of a new subproject within the University’s Neuroscience program, called Systems and Cognitive Computational Neuroscience, dedicated to providing graduate students training on the brain’s interconnected systems.

“She’s a scientific dynamo, and her boundless energy and enthusiasm are infectious for students and faculty alike,” says David Van Essen, Ph.D., the Edward E. Broad Professor of Neurobiology and head of the department. “Dora is a scientific dynamo, and her boundless energy and enthusiasm are infectious for students and faculty alike.”

Dora E. Angelaki, Ph.D., graduate student Kim McArthur (left) and research associate Yong Gu, Ph.D., discussing the role of the vestibular system in spatial orientation and the brain's role in maintaining posture and equilibrium. Unlike the more well-known senses of vision and hearing, few people notice their sense of balance, let alone know what it's called. But the system of fluid-filled passages in the inner ear, collectively called the vestibular system, is critical for orienting ourselves in space and maintaining posture and equilibrium. Damage or disruption to the system can be devastating, resulting in dizziness, unsteadiness, and even falls. Angelaki's research bridges neuroscience and biomedical engineering. She decided it was the ideal opportunity for her to apply her engineering background to a more theoretical research-oriented field. Though she had no formal training in any of the biological sciences, she moved away from her beloved family and country to attend the engineering graduate program at the University of Minnesota.

“Ever since I first learned about the vestibular system, I have been fascinated by all the diverse functions it has and by its complexities,” she explains. “It’s a multimodality system, integrating information from and to all the other senses; it’s a challenge to study and requires an understanding of a lot of different subjects.”

An eye for research

The allure of academia and biomedical engineering

Balancing act

Dora E. Angelaki with her daughters, Kristina (left) and Natalie.