Scientists grow norovirus in lab

**Is common cause of food poisoning**

**BY MICHAEL C. PURDY**

School of Medicine scientists have become the first to successfully grow a norovirus in the lab. In humans, noroviruses are a highly contagious source of diarrhea, vomiting and other stomach ailments that made headlines two years ago after a series of repeated outbreaks on cruise ships. These viruses are a major cause of human disease worldwide.

Researchers showed that the mouse norovirus MNV-1 could be grown inside cells found in the lining of the gut, and that it could grow inside cells found in the lining of the gut, and that it could infect cells infected with a human norovirus strain. The researchers say the findings make it much easier to find a way to produce forms of the viruses that are useful for studying the disease.

Mental-health center earns advanced designation

**BY JESSICA MARTIN**

The Center for Mental Health and Social Work has received support for this designation and expanded research agenda during an opening ceremony and reception from 1-2:30 p.m. Jan. 11 in the Brown Hall Lounge.

"We are proud and excited to come the nation's first Advanced Center for Mental Health and Social Work," said Enola K. Proc, director of the center.

"This advanced center designates and expanded research agenda during an opening ceremony and reception from 1:30-2:30 p.m. Jan. 11 in the Brown Hall Lounge. Visitors can hear about the center's current and future research from CMHSR leaders.

"We are pleased with the opportunity to receive the recognition for this next, more ambitious phase of our research," said Paula J. Proctor, chair of the center's board, and the Frank J. Bruno Professor of Social Work Research.

"This advanced center provides critical core support to our faculty as they test new ways to meet the mental health needs of our community and the needs of our community members of our community. -- those served by CMHSR leaders.

MetroLink project moves toward 2006 completion

**BY ANDY CLENDENNEN**

MetroLink project moves toward 2006 completion

As viewed looking north, at Forest Park Parkway just east of Big Bend Boulevard, construction crews work on a new MetroLink station. Metro is anticipating that the cross-county expansion project will be finished in mid-2006.

Mother Nature’s nuclear reactor described by WUSTL researchers

**BY TONY FITZPATRICK**

To operate a nuclear power plant like Three Mile Island, hundreds of highly trained employees must work in concert to generate power from safe fusion, all by containing dangerous nuclear waste.

On the other hand, it’s been known for 30 years that Mother Nature once did nuclear chain reactions by her lonesome. Scientists grow norovirus in lab

In a study published in November in the online journal Public Library of Science-Biology, scientists who developed the new technique reported it may already have led them to a new target for vaccine development.

"By looking at the mouse virus we’d grown in the lab, we were able to identify a part of the capsid, the viral protein shell, that is essential to its ability to cause disease," said senior author Herbert W. "Skip" Virgin, M.D., Ph.D., professor of pathology and immunology and of molecular microbiology. "If this part of the capsid has an equivalent in human noroviruses, altering or disabling it may give us a way to produce forms of the viruses that are useful for studying the disease."

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Happy holidays!

The Record will not be published again until Jan. 21. We hope you and your family have a wonderful holiday season.

**Olin Cup entrepreneurship contest winners named; Luminomics is 1st**

In this year’s Olin Cup entrepreneurship competition, the Olin School of Business has awarded a total of $70,000 in seed investment capital to two startup businesses.

The awards were announced Dec. 3 at a reception in Simon Hall.

The Olin Cup for first place, along with $50,000 in seed money, went to Luminomics, a biotechnology company that develops regenerative drug therapies for degenerative diseases. An award of $20,000 went to The Blessing Basket, a for-profit company that imports baskets made by weavers in underdeveloped countries.

An honorable mention was given to Core Devices, maker of a portable anestheia machine. "We've created an open, inclusive environment for team formation," said Kenneth A. Harrington, managing director of the Mandeaux Center for Entrepreneurial Studies, which sponsors the competition. "A business startup idea can be submitted from anywhere in the University or community, and funding will be made available to teams starting only one Olin student or recent alumna on the team.

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Avenue in University City is closed between Union Boulevard and Wes-ley Avenue. The pedestrian underpass at Wel-ford Boulevard in Clayton. The overpass is scheduled to reopen in the few months, including the selec-tion of Germanic Languages and Literatures, and the Barbara Thomas Professor in the Human-istic Studies. ...in 1998 he received the ...of the University of Roch-es. The trustees received standing ...law school's national council and sen-ior partner with Milbank, Tweed, Hadley & Cicely LLP. The University has hired a con-stant to assist in the search process; he is Kerry L. Baker-Parker, Inc. in Atlanta.

MetroLink

MetroLink: Some alleys closed during construction — from Page 1

Campus Watch

The following incidents were reported to University Police Dec. 2-8. Readers with informa-tion that might assist in investigating these incidents are urged to call 935-5555. This infor-mation is provided as a public service to promote safety awareness and is available on the University Police Web site at police.wustl.edu.

Beaumont Street — Residential Technol-ogy Services reported a comput-er incident in progress near the Beaumont Street entrance to Gregg House. A resident was con-tacted to establish the originator of the computer action. It was believed that this resident wasn't the perpetrator, but that the com-puter connection was being used by another. Further facts about the actual perpetrator. An investigation is continuing.

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Heart responds to fasting by remodelling mitochondria

By Gwyn Ericon

School of Medicine researchers have identified a previously unsuspected response by mouse heart muscle cells to fasting conditions: the cells' power generators, the mitochondria, appear to remodel and consume extra internal walls and membranes in an effort to supply energy to the rest of the cell.

"It is likely that the changes in the mitochondria make the mitochondria more energy efficient and serve as an adaptation to nutritional conditions," said Richard Gross, M.D., Ph.D., senior author and professor of medicine and director of the Division of Bioorganic Chemistry and Molecular Pharmacology in the Department of Medicine.

The findings, scheduled to be reported in an upcoming issue of the journal Biochemistry and now available through advance online publication, might have implications for human cardiovascular health.

In studies of mouse heart muscle, the research team found levels of two members of a class of molecules (fatty molecules) called phospholipids fell dramatically in four hours of fasting; and for the other, levels dropped a remarkable 40 percent after 12 hours of fasting.

The changes in phospholipids occurred mainly in the mitochondria, which are highly abundant in heart muscle cells and account for most of the phospholipid content of the cells. Mitochondria serve to break down many types of fats to produce the high-energy fuel that drives the continuous operation of many cellular processes, including the regular contraction of heart muscle cells.

"What we measured was a massive decrease in levels of phospholipids," Gross said. "In part, it confirms what some scientists have come to recognize — mitochondria are quite dynamic and change shape in response to nutritional and hormon- al cues. But we are the first to report that mitochondria essentially remodeled their own membranes, and thereby their physical properties, by dynamically altering their use of phospholipids.

A decrease of the magnitude reported is all the more surprising because phospholipids comprise essential components of all cellular membranes and have previously been thought to be preserved except in cases of extreme starvation.

The researchers' data also re- veals that after feeding resumes, the phospholipid levels in heart muscle cells rise back to normal levels, indicating that mitochondria readily rebuild their mem- branes.

During this recovery period, another class of lipid, triglyceride, a common source of energy for the cell, shot up above its normal level in heart muscle cells.

"The rise of triglyceride isn't easily explained by nutritional conditions, because after feeding resumes, the heart muscle cells need to increase its levels of fat," Gross said. "It's as if the heart retains a memory of deprivation and does not want to get caught unprepared again."

The next step for the research team will be to study the changes in shape and structure of the mito- chondria and to relate these to changes in lipid metabolism.

The response by heart mito- chondria might lend a partial explanation to a pattern discovered in studies of ischemic heart pa- tients, who have restricted blood flow to the heart.

"While we are having to be careful in drawing definitive parallels between mouse lipid dynamics and human lipid dynamics, it is interesting to note that the majority of sudden death in ischemic heart disease patients occurs in the early morn- ing — hours when people who typically have a long fast and are sub- ject to a vast array of hormonal influences during the sleep-wake cycle," Gross said.

"The alterations in heart muscle cell energy utilization during fasting may set up a deleterious situa- tion in the hearts of ischemic heart patients."

The research team uncovered the fluctuations in cellular lipids through an innovative new tech- nology it developed called "shot- gun lipidomics." As the name sug- gests, in comparison to other techniques, shotgun lipidomics allows us to see the speed and coverage of shotgun fat. From a simple one- shot measurement of lipids in the cell, the team can obtain in minutes highly accurate measurements of the various cellular lipids, which previously have been notoriously hard to analyze, time-consuming to analyze and hard to quantify.

"Through the efforts of people in our division like Xianlin Fan, who has worked hard to perfect the technology, we have been able to open up fresh avenues of inves- tigations using shotgun lipidom- ics," Gross said.

Research finds differences in gene usage dramatically change bacteria's lifestyles

By Michael C. Purdy

What and where a bacteri- um uses its DNA can be as important as what's in the DNA. School of Medicine researchers have identified a previously focused on how differ- ent bacteria or 'pathogenicity islands' — clus- ters of genes that are unique to Salmonella. This could create more problems and serve as an adaptation to nu- tritional and hormon- al cues. But we are the first to report that mitochondria essentially remodeled their own membranes, and thereby their physical properties, by dynamically altering their use of phospholipids.

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Callaway, Graze to bring evening of cabaret Jan. 15

By LITTMAN

Between them, singing stars Liz Callaway and Jason Graae bring a wealth of Broadway knowledge and dozens of film and television appearances.

They also boast a friendship that has survived more than 20 years of showbiz. (They first met as cast-mates in a 1980 off-Broadway production of Godspell; Callaway was paid $18 per week. St. Louis native Scott Graae started as Jesus.)

4 p.m. Jan. 15, Edison Theatre's OVATIONS! Series will present these "mature" pals in "Stage: The Broadway Baddies," an intimate cabaret featuring jazz standards and stories, solo duets and gossip and sentiment.

Callaway, who performed at Edison Theatre in 2002 with Godspell composer Stephen Schwartz, is a Chicago native and daughter of journalist John Callaway. She made her Broadway debut in 1982 and has appeared in the national tours of The Spitfire Grill, for which she received both a Drama Desk Award for Outstanding Performance and a Drama League Award nomination.

Sibling Beverly, a cabaret show she created with sister Anne, Amber and Callaway was recorded live for BLC Records and won both a Back Stage Bistro Award and a MAC Award from the Manhattan Association of Cabaret Artists.

Callaway can be heard on more than 30 recordings, including three solo albums: "The Boat Goes On" (featuring music of the '60s), "The Story Goes On" Liz Callaway On and Off Broadway and "I'd Rather Be Lonely: The Music of Frank Loesser."

She performed the title character's singing voice in the animated feature Anastasia, and her song "Journey to the Past" was nominated for a 1998 Academy Award.

Other film work includes the singing voice of Princess Jasmine in Disney's The Return of Jafar and Aladdin and the King of Thieves as well as vocals for The Swan Princess, Lion King 2: Simba's Pride, Beauty and the Beast and The Brave Little Toaster Goes to Mars.

Callaway has also appeared in "Res-"...
Galumph, a New York-based dance trio that combines physical comedy, acrobatic choreography and striking visual effects, will present its premier performance as part of the OVATIONS! for young people series.

The trio's performing and choreographic credits include Service Fun at Lincoln Center in New York; just for Laughs in Montreal; the Staat Schouwburg in Amsterdam; Man-Made at New York's Joyce Theatre; Ireland's Galway Arts Festival; and Spoleto USA in Charleston, S.C., among many others.

Other projects range from "Ecotany," an MTV video with the band Rusty Root, to a Japanese television commercial, the British game show "The Generation Game" and more than 12,000 workshops and lecture demonstrations for children around the world.

As Galumph, Horowitz, O'Brien and Jette have toured widely performing at venues all over the world and earning a national following. The performance, presented as part of the Edison Theatre OVATIONS! for young people series, will be at 8 p.m. Jan. 15 at 8 p.m. at Edison Theatre, as part of the OVATIONS! for young people series.

Funds raised by the Edison Theatre programs are directed to provide unrestricted support for nationally and internationally renowned professional printshop, will host its second-annual holiday sale from 11 a.m.-4 p.m. Dec. 19 in Blumberg Hall. The event will feature works by dozens of Internationally renowned artists — including James Barnes, Brian King, Matthew Boettger, don't ask me why the laws of physics? This is a horror movie or a comic book.

We galumph when we hop..." writes Stephen Nachmanovitch in Free Play: A treasury of play-energy one finds in children, puppets, kittens and other3. And more...

1:53.59. For complete sports schedules and results, go to beastports.wustl.edu.

Sports

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Lab

weak enough to serve as vaccine candidates.

According to the U.S. Centers for Disease Control and Prevention, noroviruses are responsible for about half of all food poisoning cases in the United States. The virus is one of about 23 million cases of acute gastrointestinal illness that occur each year. Norovirus disease is characterized by frequent vomiting and diarrhea, and symptoms last about 1-2 days. The most infamous norovirus outbreak occurred in 1968 at a school in Norwalk, Ohio. The Norwalk virus also caused a severe epidemic in the United States during the Cold War, but rarely to serious or life-threatening illness in the United States and other Western countries, they spread rapidly, are difficult to prevent from spreading and can cause considerable discomfort. Dehydration from the diarrhea and vomiting induced by the virus sometimes leads to hospitalization, even in young or those with weakened immune systems.

In the developing world, these viruses are the leading cause of child illness. Attempting to culture human noroviruses in tissue culture has been unsuccessful.

As a group, noroviruses have defined characteristics for decades because they just haven't been easy to get the virus to grow outside of a human host, Virgin explained. In 1991, Virgin's group showed that the natural nuclear reactor—light MNV-1—relied heavily on the innate immune system, the branch of the immune system that attacks invaders soon after they enter the body.

In the newly published study, Virgin's group revealed that MNV-1 looks like cells of the innate immune system. In tests in mice, the nuclear reactor virus thrived in macrophages, immune system cells that engulf and destroy pathogens, and in B cells, which are the cells that pick up and display proteins from pathogens. In tests, it didn't seem to be dendritic cells just beneath the lining of the gut—so, bypassing the gut the virus really needs to cause disease, Virgin said.

"The virus grew beautifully," Virgin said. "It's very a facile and robust system.

Comparisons of MNV-1 and human noroviruses have revealed interesting gene families in gene sequence, structure and overall arrangement of proteins and how it might work. But Virgin acknowledged that differences between mouse and human don't necessarily mean significantly after MNV-1's interactions with the host.

For example, mice do appear to be a good host for MNV-1 genetically, researcher aren't sure yet whether MNV-1 can make mice ill and may need to look at how the capsid protein enables infection, viral replication processes and the receptors on host cells that enable the virus to infect specific cell types.

Olin

The company is aggressively marketing the technology for licensing while pursuing drug discovery. In a conference call discussing the new Olin Capital partnership, the company’s top three priorities are to expand the infectious disease market, pursue a new business strategy and merge two UCs that are more than 25% times revenue in the next five years.

The Blessing Basket Project was founded by Andrew Wiles, whose team includes Olinda School President and CEO, Kariel Lee, and Stephanie Karst, Ph.D., and John Ignacio, Ph.D., a clinical standpoint.

The Blessing Basket Project was founded in 1987 as part of an outreach to rural communities. Revenues above expenses are reinvested into additional product and economic/community development projects.

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An article from the University of St. Louis's newspaper.

**Zwerling Wrighton honored by YWCA**

By ANDY CLENDENNING

As Zwerling Wrighton was honored at the YWCA's annual Leadership Luncheon and Induction into the Academy of Leaders, she was also appointed to the 2004-05 Board of Directors. Each year, the YWCA selects a "future leader" (a student from a local high school) and a "social justice" honoree. This year, Wrighton was selected as the "social justice" honoree.

"I was thrilled to learn that I received the award, especially because I was nominated by the senior management of (Magellan Health Sciences)," said Zwerling Wrighton, wife of University Chancellor Mark S. Wrighton. "It was a revelation to know that my co-workers recognized that I not only work hard for the company, but also was involved in the community."

At Magellan, the largest provider of employee assistance programs and managed behavioral health services in the country, Zwerling Wrighton manages a group responsible for acquisition, development, implementation of programs to assist employees in maintaining the well-being and productivity of their work force. A strong believer in keeping a work-life balance, Zwerling Wrighton shares the same commitment of students at Washington University. She created the Home Plate program, which puts students in contact with local families to help recapture the experiences they miss as students away from home.

She spends most evenings at Harbison House, where she hosts dinners honoring distinguished faculty and visitors, dignitaries, as well as events with students, civic groups and WUSTL supporters.

"There were times in my life when I was working and raising my two daughters as a single parent, and all I could do was keep our own lives going," she said. "Later, after 1987, when my children were older, it was great to discover that I had the psychological energy, experience and opportunity to make a bigger difference in this world — to help others beyond my own family."

"That is a wonderful place to be in life — when you can see beyond your own need."

**Decades of leadership**

**December degrees**

Philip Needelman, Ph.D., University trustee and science partner for Prospect Ventures, delivers an address during the December Degree Candidate Recognition Ceremony Dec. 5 in Graham Chapel. A reception for the more than 130 degree candidates attended along with their families and friends, and faculty and administrators, followed in Mallinckrodt Student Center. Needelman chaired the School of Medicine’s Department of Pharmacology from 1976-1989 and was senior executive vice president, chief scientific officer and chairman of research and development at Pharmacia Corp. (formerly Monsanto/Searle) from 1989-2003. In addition to Needelman's address, Mark S. Wrighton gave the Chancellor’s Message to the degree candidates.

**Obituaries**

**Van Duyan, V:** poet; laurate, former instructor in English

**By SUSAN KILENBERG MCCGINN**

Mona Van Duyan, a former instructor in the Department of English in Arts & Sciences, was an accomplished scholar and a Pu- blisher’s first female poet laureate. She served as poet laureate for the University of St. Louis’ campus from 1991 to 1993. In April 1991, she was named a fellow of the National Book Foundation and was elected to the American Academy of Arts and Letters, she was elected to the American Academy of Arts and Sciences in 1998.

A plaque in recognition of Mona Van Duyan was hung, by coincidence, on Dec. 1, the day she died. The plaque hangs outside Quacker Hall, home of the Department of English, next to one honoring the University’s other U.S. poet laureate, Howard Nemerov.

"That is a wonderful place to be in life — when you can see beyond your own need."

**Townsend, 82; professor emeritus in physics, alum**

By SUSAN KILENBERG MCCGINN

Jonathan (Jack) Townsend, Ph.D., professor emeritus of physics in Arts & Sciences and a University alumna, died Monday, Nov. 29, 2004. He was 82.

Townsend earned a bachelor’s degree in physics in 1945 from the University of Denver and a master’s in 1948 and a doctorate in physics in 1951, both from WUSTL. His doctoral dissertation was on positronium.

He was named an assistant professor in 1951 and promoted to associate professor in 1955. He retired as professor emeritus in 1987.

Richard E. Pertobello, Ph.D., professor of physics in Arts & Sciences, knew Townsend for more than 50 years, referred to him as “an electronics wizard.”

According to Norberg, Townsend designed electronic instrumentation to meet other people’s research needs around campus, not just in physics.

“His work was so clever and patient, he was always a polished and articulate scientist,” Norberg said. “He was a very hard worker and a valued associate. He is often credited in grade and faculty work’s papers for his contributions to their research.”

He played a major role in the design of electronic instrumentation for the University’s early x-ray “clear magnetic resonance (NMR) and electron spin resonance (ESR)” research in the 1950s. Interdepartmental research on NMR and ESR between George E. Pake, Ph.D., a former professor and chair of physics, and Nierberg, with Arts & Sciences’ Samuel L. Weissman, Ph.D., professor emeritus of chemistry and Barry Commoner, Ph.D., former professor of biology, drove heavily on Townsend’s skills.

“His real genius was in who he was,” Norberg said. “He knew Townsend for more than 50 years, referred to him as “an electronics wizard.”

According to Norberg, Townsend was awarded a Bachelor’s degree in physics in 1945 from the University of Denver and a Master’s in 1948 and a doctorate in 1951, both from WUSTL. His doctoral dissertation was on positronium.

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"What he really loved was making things work," Norberg said.

"He was the guy who made things work — electronic devices, mechanical devices. He built the apparatus not only for research but also for teaching purposes."

After retiring, Townsend continued to work with students in the freshman laboratory.

He was preceded in death by his wife, Patricia Bassford Townsend, and electron spin resonance (ESR) research in the 1950s.

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He was preceded in death by his wife, Patricia Bassford Townsend, and a grandson, Michael Robert Behrens. The interment was private.

**Virgil Loeb memorial scheduled for Dec. 11**

A memorial service for Virgil Loeb Jr., M.D., will be at 11 a.m. Dec. 11 in Graham Chapel.

Loeb was a hematologist and medical oncologist and former national president of the American Cancer Society. He also was a founding member of the community advisory board for the St. Louis Cancer Center.
Seeing it through to completion

Barton Hamilton delights in helping students make business ideas reality

By Eileen P. Duggan

In-hand, Hamilton says, "I think what makes a university great—and certainly what I think makes a school of business—is we have really high-level research. We're research-focused, and that's part of the reason I wanted to come here and why I like it here so much." Hamilton came to the Olin School from McGeorge School of Law, the leading English-language institution in Montreal, where he taught economics and conducted economic research for five years. When a referendum for secession of the Quebec province from Canada failed by a slim margin, Hamilton decided it was time to leave the issue-a-rivens. "I figured I didn't want to be in a place that didn't value some of its institutions," he says.

Besides, the Canadian chill was a lot of a shock to the Santa Barbara, Calif., native. Hamilton majored in economics at the University of California, Berkeley, after writing in his entrance-exam essay that he wanted to be an economics professor. "How a 16-year-old got ever the idea that he wanted to be an economics professor, I have no idea," Hamilton says. He suspects his interest in statistics and econometrics—applying statistical tools to economic data—grew out of his childhood passion for baseball statistics.

After graduating from Berkeley in 1985, Hamilton went straight into a graduate program at Stanford University, from which he earned a doctorate in economics in 1993. In addition to a preoccupation with R&B and E&O, Hamilton gained a youthful adoration for his grandparents, both successful entrepreneurs.

His paternal grandfather was an early aviation pioneer who later sold his aircraft business to what became Hamilton Sundstrand. Hamilton's maternal grandfather had a catering business that catered the building of the Hoover Dam and the movie business in the 1930s.

That gold rush-like period between the two worlds were offered many opportunities for people in Hamilton's generation. "What's interesting to me about entrepreneurship on a large scale was that we were able to take advantage of that and be successful," Hamilton says. "It's kind of like what we had in the '90s with the Internet bubble." As a professor of entrepreneurship, Hamilton guides undergraduate and master of business administration students through their business plans as part of the Hatchery entrepreneurship class and now the Olin Cup competition. "There's nothing more exciting than seeing somebody pick a dream and, through a little bit of interacting with them in and out-the-classroom, forming that idea into something they're actually going to start," Hamilton says. "And what's exciting is seeing people actually take the plunge and start their business. It's risky.

"Your friends who have their M.B.A.s and other Whisls' understand under-graduate degrees are going out working for consulting firms or investment banks, and you're starting a winemaking business or a宠物business."

Former Hamilton student Lori Coulter, M.B.A. '03, was recently named to Crain's Connecticut Business Journal's 40 under 40. "He has a great ability to use data and statistical insight in an interesting way to present a coherent and strong analysis of economic issues."

On the personal side, "Bart is a very warm and generous guy," McMaster says. "He has a lot of friends; he is very well-known and well-liked, and he's great at entertaining. He's a great connector and one of the reasons that I enjoy being at Washington University."

Outside of work, Hamilton and his wife, Ursula, are big St. Louis Rams fans and enjoy going to games and training camp—at least, they did before the twins were born. But he hasn't given up his life-long offbeat hobby of keeping pet reptiles, including several red-footed tortoises that live in the family's backyard during the warmer months. "Some people like to go fishing," he says. "I like to go lizard-catching."

Barton Hamilton
Title: Robert Brookings Smith Distinguished Professor of Entrepreneurship
Family: Wife, Ursula Kopij; twins, Bogdan and Nina
Education: Bachelor's degree in economics, University of California, Berkeley, 1985; doctorate in economics, Stanford University, 1993

Bart Hamilton, Ph.D., talks business with students Nicole Brown (left) and Erica Greenberg. Kenneth A. Harrington, managing director of the Skandalaris Center for Entrepreneurial Studies, says Hamilton "is a great colleague and one of the reasons that I enjoy being at Washington University."