

art/sci

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A New Era in an Historic Space



COLLEGE OF
ARTS AND SCIENCES
CASE WESTERN RESERVE
UNIVERSITY

EXHIBITING
EXCELLENCE

FROM
SHIPWRECKS
TO SCIENCE
FAIRS

THE GREATEST
ENERGY IN THE
SMALLEST
PACKAGE



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On the cover:
The Temple – Tifereth Israel in University Circle

Photo by Tony Gray



Realizing Our Vision

WHEN I SPEAK TO OUR ALUMNI AND FRIENDS about the college's aspirations, I often refer to a sentence from *Forward Thinking*, the strategic plan to which we committed ourselves in the spring of 2008. "Case Western Reserve University is a comprehensive academic institution," the plan declares, "and will provide the breadth of outstanding programs essential to every great research university." With its diverse offerings in the sciences, arts and humanities, the college has assumed a critical role in enabling the university to realize this vision.

As many of you know, one of our longstanding hopes has been to acquire a facility that would give our superb programs in music, dance and theater the rehearsal and performance spaces they deserve. In this issue of *art/sci* (see page 18), we celebrate a magnificent gift from **Milton and Tamar Maltz** that brings this hope closer to reality than ever before. Their gift marks the beginning of a campaign that will transform The Temple – Tifereth Israel in University Circle into a vibrant performing arts center.

I am convinced that this center will have a profound impact on the university's reputation and its role in the larger community. It will make Case Western Reserve a major venue for artistic and cultural events. It will expand opportunities for our students and enhance our collaborations with other University Circle institutions. And it means that the university's emerging West Campus, anchored by the former Mt. Sinai Medical Center, will be a home to the performing arts as well as to advanced scientific research.

At the March 19 ceremony announcing the university's partnership with The Temple – Tifereth Israel, I thanked Milton and Tamar Maltz personally for their extraordinary generosity. I would also like to thank President Barbara R. Snyder for her leadership of this important initiative. Finally,



VERA TOBIN

Cyrus C. Taylor

I wish to honor the faculty and students who have brought such distinction to our performing arts programs, and whose talent and dedication will find a worthy showcase at long last.

In future issues of *art/sci*, you will be reading about other parts of our strategic plan coming to fruition. Earlier this spring, the provost funded 12 initiatives related to the university's four academic alliance areas: energy and environment; human health; culture, creativity and design; and social justice and ethics. In seven of these initiatives, college faculty members will serve as directors or collaborators. Their participation gives us one more reason to take pride in the comprehensiveness and excellence of the College of Arts and Sciences.

Cyrus C. Taylor
Dean and Albert A. Michelson Professor in Physics

Everything I've Learned Here

Dan Whalen '10 reflects on his college years as a journalism student and star quarterback

By Dan Whalen

Last December, Dan Whalen ended his record-breaking career as a Spartan by being named an All-American for NCAA Division III. Many of his fans did not realize, however, that Whalen was also an English major. Whalen began his studies with Ted Gup, who until recently was the Shirley Wormser Professor of Journalism in the Department of English. As he prepared to graduate this spring, Whalen wrote about the mentors who have guided him on and off the field.



DANIEL MILNER

TED GUP stood in front of the class, looking back at us through his silver-rimmed glasses, which he only put on, it seemed, when he had something especially important to say. A tiny gold hoop earring dangled from his left ear. With his right hand, he waved around a piece of chalk. I sat in the back of the room, my hands in the pockets of my high school varsity jacket, a winter hat on my head with melting ice and snow left over from my walk to the building. I felt unsure of myself in a class full of college students. They all had goals, and plans to reach those goals. I was just a 17-year-old who didn't have a clue. I wasn't sure what I wanted, or even what I should be looking for. Ted Gup fixed all that.

He didn't know it then, and he may not know it today, but he was the main reason I ended up at Case Western Reserve University. Most of the time, I don't expect blessings to come disguised as middle-aged journalism professors, but this blessing was the one that led to everything I would accomplish over the next four years.

His lecture that day was about an article which I believe was part of an investigative series in *The Washington Post*. The story described a young black boy who was being used by inner-city drug dealers as a runner, effectively reducing the risk that they'd be caught in the act. The debate in class that day was about whether the paper should release the boy's name or withhold it. Ted spoke about the responsibility of journalists to be true to their calling and report the facts, but also to know when to exercise discretion and protect the innocent.



Dan Whalen led the Spartans to 31 consecutive regular season wins, three straight perfect seasons and three straight National Collegiate Athletic Association postseasons.

CWRU SPORTS INFORMATION

His charisma and eloquence captured me from that first college visit. As I witnessed Ted's mastery of and passion for his craft, I was positive that I could succeed as a writer under his tutelage. If football could take me

no further than my senior year of college, the lessons I'd learn from Ted would stick with me as long as my journalism career lasted.

That August, two days after my 18th birthday, I trotted onto the practice field with 32 other freshmen. Honestly, not one of us had the slightest idea what kind of legacy we'd leave behind four years later. We had no reason to think we'd do anything special; it had been more than two decades since a Case Western Reserve football team had done anything remotely noteworthy. In fact, most people around campus led us to believe that even though we could succeed in the classroom, we'd fail on the field. My freshman year would come and go as another mediocre year for a football program that some people around town didn't even know existed.



I remember sitting around the locker room one Sunday morning during my sophomore year, after our team had won six or seven games in a row. We had left the weight room and swung by the McDonald's at the top of 115th Street for our usual supply of bacon, egg and cheese biscuits. Now we were waiting for our coaches to get the film ready to review.

Suddenly, senior linebacker Tom Brew, his mouth full of food, let out a muffled, "We're gonna do this thing." We all froze for a second, stopped chewing and looked around at each other.

I catch plenty of grief from my teammates, who say that being an English major is a pushover. But writing is something I'm passionate about.

We knew exactly what he meant. The "thing" he was talking about was an undefeated season and the first playoff berth in the school's history.

"D-Train! Get your butt over here and take your grade sheet!" Coach DiCarlo interrupted. That was a nickname he had given me after I had gotten my ears pierced a few weeks earlier. One of LeBron James's many nicknames is "The L-Train," and Coach D joked that I had officially made it big time now that I had fresh "bling."

Most people who know Coach Dave DiCarlo know that he doesn't have an unkind bone in his body. Just before my sophomore year, his wife of 49 years died after a long battle with cancer. When Coach Greg Debeljak asked him to come on as our quarterback coach, he went back and forth on his decision for a few long months. He wasn't sure he could give his full effort; his wife's passing had exhausted him both mentally and physically. But he took on the assignment as a form of therapy, as

a way to pass the time and maybe get back into a healthy frame of mind.

From there, we didn't just begin a relationship between a coach and player; we started a friendship. He needed the game just as much as I did. He'd been coaching football at one level or another for the past 40-plus years, and I'd been playing since I was old enough to buckle a chinstrap. We knew that together we would build a strong bond. He'd help me become a better quarterback; I'd help him get through the toughest time of his life. And we'd both be better people in the end.

I took my grade sheet, which was broken down into two categories: technique and assignment. I could get two points per play in each category. As I did every week, I flipped directly to the back page and checked my composite average. I can't remember the grade, but I know it was below 90 percent, because it took me 30 starts before I cracked that ceiling. Coach D graded me tough in order to make me reach my full potential.

After I read over my grades each week, we would watch the game film together and then rewind it, over and over and over. Typically, we would stop every few minutes and get sidetracked talking about God, or politics, or women, anything that would chop up the

two-hour film review. Mostly, though, we just talked like friends, or like a grandfather and grandson. Today, after all the passing records Coach D has helped me attain, all the victories we've shared together, and all the nicknames he has given me, the kind of person he's helped me become trumps them all.



It was through Coach DiCarlo that I met one of the smartest, most well-respected men in the National Football League. It is unfortunate that Sam Rutigliano is best remembered for the 1980 AFC Championship game, where he chose to go for the touchdown instead of kicking the field goal to win. Everyone from Cleveland remembers that play: "Red Right 88." Pass intercepted, game over. Another almost Super Bowl. "I'd call the same play again," Sam told me. "Just with a different outcome."

Now here I am in the final months of my college experience, four years of football have come and gone faster than I'd ever imagined, and the 1980 NFL Coach of the Year is telling me that I have a legitimate chance to play in that league.

I am sitting in an Arabica coffee shop in my hometown of Willoughby, Ohio, when Sam comes walking in with a folder full of newspaper clippings and things he wants to talk to me about.



CWRU SPORTS INFORMATION

Before being named an All-American by the American Football Coaches Association, Whalen was a three-time University Athletic Association Player of the Year and a two-time finalist for NCAA Division III's Gagliardi Trophy.

Sam's Brooklyn accent is wise, and it is also deeply Italian. After 30 years of coaching at the NFL level, he knows a thing or two about what they want out of a quarterback. At nearly 80 years old, he is still as sharp as he was in his 20s, and because of his active life in the Catholic Church, his word is as good as gold across his countless relationships. Our usual meeting place is in the Little Italy neighborhood just off campus, but on this day, we are getting together on my turf to discuss what exactly I need to do to make the jump to the highest level of professional football.

He asks me if I want something to eat. I politely decline. A few minutes later, he comes back with a softball-sized chocolate cupcake and says, "Here, bulk up." Hospitality and generosity are just in his nature, and the one-liners never stop. But when Sam talks, people listen. He's one of those people whose presence captures a room. "If I had 10 minutes with Braylon Edwards," he says, referring to the ex-Browns

receiver, "I'd take him into a phone booth and straighten him out. He doesn't know whether the ball is filled with air or stuffed." Sam tells me he'd be willing to help out with anything I need over the next few months, football related or not. He accepts phone calls about me, he makes phone calls for me, and he still takes time out each week to meet for a few hours to make sure everything is going ok.



If not for that visit to Ted Gup's class in January 2006, it is likely that I would have ended up joining Ohio University's football team and trying to get into journalism school there. I would never have experienced what I have during the last four years—leading a football program to 31 straight regular season wins and three playoff berths, and capping it all off by being named a first team All-American. Coach DiCarlo would never have entered my life, and Sam Rutigliano would have had no reason to help me reach my goal of playing in the NFL.

I catch plenty of grief from my teammates, who say that being an English major is a pushover. Many of them are majoring in organic chemistry and biomedical engineering. But writing is something I like to do—something I'm passionate about. When I graduate with my degree in English this May, either I'll be heading to an NFL training camp with a whole new journey in store, or, at the very worst, I'll have the chance to put everything I've learned here to work as a sports journalist. Not a bad plan B, if you ask me. ■

Exhibiting Excellence

Two young alumnae launch their careers at the Metropolitan Museum of Art



ELIZABETH ABBARNO



EVERYONE KNOWS THE OLD JOKE about how to get to Carnegie Hall: “Practice, practice, practice.” But how do you get to the Metropolitan Museum of Art?

Patricia Edmonson '06 and **Katie Lynn Steiner '06** found the answer to that question. Two years after graduating with honors in art history from Case Western Reserve, they were both hired by the country’s premier art museum. Edmonson, who began as an intern in American decorative arts, is now a research assistant at the Met’s Costume Institute. Steiner has been a research assistant in the department of American paintings and sculpture since joining the museum in 2008.

“It’s really extraordinary to have the two of them there,” says **Jenifer Neils**, Ruth Coulter Heede Professor of Art History, who taught them both and was Steiner’s thesis advisor. While the department has long known that its

best students can compete with their counterparts from any other university, no one expected two graduates from the same class to land their first jobs at the Met.

“These are the most highly sought-after positions in the museum world,” Neils says. “Katie and Patty are being trained under top curators, and they will have an incredible credential.” But that isn’t the only reason she is delighted for them.

“The Met is a universal museum; it collects in all areas,” she explains. “And because it’s so huge and has so many departments, the staff can focus on their particular areas of interest. In a smaller museum, you have to be a jack-of-all-trades. The beautiful thing for Katie and Patty is that they can use their expertise in their chosen fields—in the case of Katie, in American art; in the case of Patty, in fashion and decorative arts.”

In the Metropolitan Museum’s Charles Engelhard Court, Katie Steiner (left) and Patricia Edmonson are surrounded by 19th-century American sculptures. Behind them is a four-columned loggia that Louis Comfort Tiffany designed for Laurelton Hall, his country estate in Oyster Bay on Long Island.



Patricia Edmonson first joined the Met as the Tiffany & Co. Foundation Curatorial Intern in American Decorative Arts. Behind her is the Tiffany window Magnolias and Irises (circa 1908).

Transported by Interiors

A native Clevelander, Edmonson says that museums have always been a family preoccupation. Her father, **James M. Edmonson**, is chief curator of the Dittrick Medical History Center and Museum

at CWRU. Her mother, Christine Edmonson, is a reference librarian at the CMA. As a child, Edmonson used to wander through the Dittrick on evenings when her parents worked late. Her favorite displays were the period rooms showing how a doctor's office or a pharmacy looked in the late 19th or early 20th century. To her, these rooms had a theatrical quality. "I loved the whole atmosphere, the otherworldliness," she says. "I felt transported by interiors."

Early in her undergraduate career, Edmonson decided to focus on American material culture, which encompasses everything from fashion to furniture to the apothecary bottles in her father's museum. She pursued her interests through two internships with University Circle institutions.

At the CMA, she helped **William Robinson, Ph.D. '88**, curator of modern European art, edit the catalogue for

Barcelona and Modernity, a loan exhibition that included decorative arts from the Catalan region of Spain. At the Western Reserve Historical Society, she worked on costume displays for *Millionaires' Row: The Legacy of Euclid Avenue*, an exhibition devoted to Cleveland industrialists and philanthropists from the Gilded Age until the Great Depression. The show included dresses by the Spanish designer Mariano Fortuny, who became the subject of Edmonson's honors thesis.

Edmonson pays tribute to her advisor, associate professor **Anne Helmreich**, for allowing her to bypass more conventional topics and write about 20th-century fashion instead. But Helmreich remembers being genuinely fascinated by Edmonson's project. Fortuny's dresses, she points out, were "very radical in their day. Patty looked at his inventiveness as a designer, but she also showed how modern he was in terms of technology and his business sense."

Helmreich adds, "It was the perfect project for her, because it came out of the internship she had done at the historical society. She had gotten to handle the dresses, to see them for herself. And because she was so familiar with the objects, she was able to ask really interesting questions."

After completing her bachelor's degree, Edmonson went on to the Winterthur Program in American Material Culture at the University of Delaware. One of only 10 students

Through its joint program with the Cleveland Museum of Art (CMA), Case Western Reserve's art history department gave Edmonson and Steiner an insider's view of the museum profession while they were still undergraduates. They took classes with CMA curators and studied objects from the collection. And with this background, they were accepted to two of the nation's most selective master's programs, both of which are also affiliated with distinguished museums.

As a result, Neils says, Edmonson and Steiner became familiar with "the whole process of acquiring, displaying and elucidating works of art." Such experience is attractive to institutions like the Met. It is also increasingly rare, since "the trend in art history is very theoretical, and not so object oriented." For these alumnae, then, earning a degree from Case Western Reserve turned out to be the ideal preparation for their surprising journey.

As if to present a lesson in contrasting styles, Katie Steiner visits John Singer Sargent's Madame X (1883-84) at the Met's Henry R. Luce Center for the Study of American Art.



ELIZABETH ABBARNO

admitted to the program that year, she continued to explore the relationship between material culture and commerce in the early 20th century. For her master's thesis, she retraced the history of the furnishings trade in New York in the 1920s. Her project blended archival research with the study of objects in the Henry Francis du Pont Winterthur Museum.

In the spring of 2008, as she was finishing her thesis, Edmonson was chosen as the Tiffany & Co. Foundation Curatorial Intern in American Decorative Arts at the Metropolitan Museum. A few weeks later, Steiner called to tell her that she, too, had just accepted a position at the Met.

A Series of Mentors

Compared to Edmonson, Steiner had a more conventional introduction to museums. She grew up in South Euclid and remembers taking field trips to University Circle. But then, as a high school senior, she became a CMA intern and went to work for **Henry Adams**, then the museum's curator of American art. Like many of his colleagues, Adams also taught at CWRU, where he's now a faculty member, and he invited Steiner to audit a graduate seminar he was leading that spring. "I couldn't really participate; I didn't have the background," she recalls. "But it was so interesting to meet the graduate students and to hear from other curators and museum administrators who spoke to the class."

The next fall, when Steiner enrolled at Case Western Reserve, she took Adams's introductory course in American art and decided to major in art history. (Later, she added English and became a double major.) While American painting remained one of her primary areas of interest, Steiner also studied African art with CMA curator **Constantine Petrides** and northern Renaissance art with associate professor **Catherine Scallen**. As a recipient of an Experiential Learning Fellowship, she traveled to the French city of Colmar for an independent research project on the influence of religious drama on Renaissance prints, manuscripts and paintings. Finally, in her honors thesis, she wrote about the CMA's acquisition of a life-size bronze figure, *Apollo the Lizard-Slayer*, that some scholars have attributed to the ancient Greek sculptor Praxiteles.

When Steiner was just starting to think about graduate school, Scallen recommended the master's program at Williams College, which she had attended before earning her Ph.D. at Princeton. To Steiner, Williams looked like an intimidating place; she sensed that it was a program for Ivy League types. But with Scallen's

encouragement, she applied and was accepted.

As a graduate student, Steiner worked at the Sterling and Francine Clark Art Institute, where her faculty advisor was curator of prints, drawings and photographs. The Clark had just been given an important collection of 18th- and 19th-century British paintings and works on paper, including sketches of Salisbury Cathedral by the landscape artist John Constable. Steiner wrote about these sketches for her master's thesis.

Then one day, the associate director of Steiner's graduate program called her in and said, "My colleague Barbara Weinberg, the curator of American paintings and sculpture at the Met, is looking for a research assistant." Was this something she would be interested in?

Unlike some of her fellow students, Steiner didn't have her heart set on

finding a job in New York, let alone at the Metropolitan Museum. “Honestly,” she says, “I would have been just as happy to come back to Cleveland, if a position had been available at the Cleveland Museum of Art. But this is where the opening was. And yes, I feel lucky that it turned out the way it did.”

From Face Jugs to Stemware

For both Edmonson and Steiner, the timing of their arrival at the Met could not have been better. The museum was in the midst of a four-year, \$100 million renovation of its American Wing. For the first time in 30 years, curators were rethinking how they exhibited the permanent collections of American paintings, sculpture and decorative arts.

Edmonson quickly became involved in the planning for reopening the Charles Engelhard Court, an immense glass pavilion whose balcony-level galleries are filled with American ceramics, glass, silver, pewter and jewelry. In one of her favorite projects, she was asked to research a brown stoneware jug, origins

unknown, “bearing a lively, modeled face.” She had read about jugs like this before. Hunting through back issues of *Ceramics in America*, she found the article she remembered and wrote to the author. He confirmed that the Met’s face jug had come from the John Miles Pottery in Edgefield, South Carolina, a firm that, beginning in the 1860s, employed some of the first African-American craftsmen to produce such objects. “The staring eyes and gaping mouth are typical features of face jugs made in the second half of the 19th century,” Edmonson eventually wrote in her exhibition label. “This example is

missing its teeth and lips—a common loss, sometimes occurring as early as the firing stage.”

Edmonson also had a part in the reinstallation of the American period rooms, which represent domestic architecture and interior design from the colonial era to the early 20th century. Her research focused on a dining parlor

from a Baltimore row house built around 1810. The room’s architectural elements had been taken directly from

the house, but the curators assembled the furnishings from several 19th-century sources. Edmonson helped select the glassware. It came from Pellatt & Green, the premier London glasshouse of the day; the original buyer commissioned it for his daughter and son-in-law, who lived in Albany, New York. On a computer touch screen in the Baltimore Room, you can see the bill of sale, dated September 5, 1818. Edmonson notes that for a table service from this period, such documentation is extremely rare.

The labels that Edmonson wrote as an intern went on view when the Engelhard Court and the period rooms reopened in May 2009. “I feel lucky to have contributed to the museum in such a tangible way,” she says. She also valued the chance to observe the months of planning and decision making that went into the refashioning of the permanent exhibitions.

“I was included in discussions on label design, the editorial process and the installation of objects in their cases on the balcony,” Edmonson recalls. The experience reminded her that in museum work, there is no such thing as an insignificant detail.

Paintings of Everyday Life

Steiner has helped to convey that same lesson to the Met’s audiences. Last fall, she began giving public talks and tours for visitors to a major loan exhibition, *American Stories: Paintings of Everyday Life, 1765-1915*. Steiner had been



PATRICIA EDMONSON

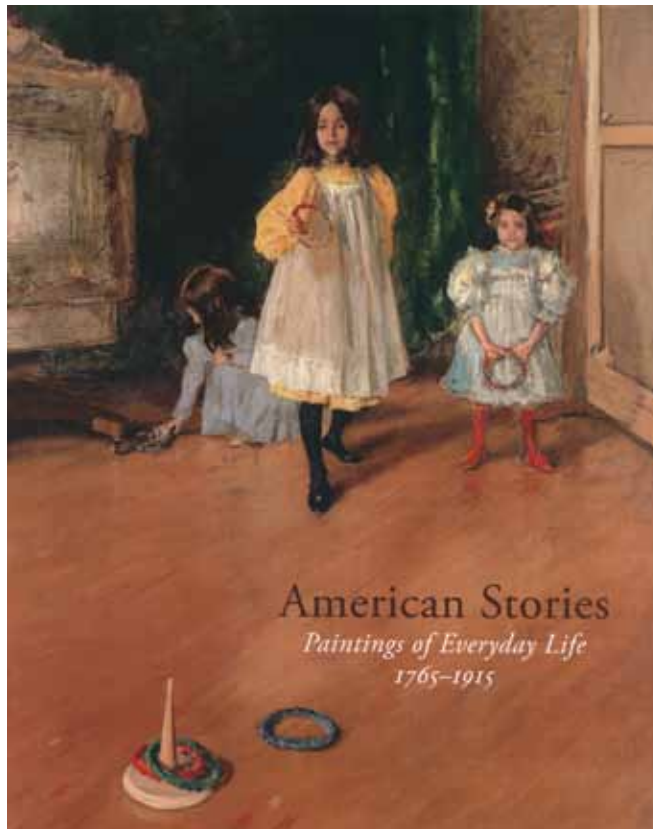
While preparing for the reinstallation of the Met’s permanent exhibition of American decorative arts, Patricia Edmonson filled in the history of this 19th-century face jug.

involved in the final preparations for the show, which featured works from more than 50 public and private collections. She was on hand when each painting arrived and was unpacked from its crate. She took part in deliberations about the arrangement of the paintings and the choice of wall colors. And once the exhibition opened, she drew on those experiences as she led tour groups through the galleries.

In addition to giving talks, Steiner wrote an *American Stories* blog for the museum's web site. Her brief essays are remarkable for their genial erudition. While attending carefully to the details of individual canvases, Steiner related the paintings to larger developments in American social and cultural history. And in several posts, she extended her discussion to works that weren't even part of the exhibition.

For an essay on 19th-century printmaking, for instance, Steiner uploaded images of mezzotints and woodcuts that had been engraved after paintings in *American Stories*. Such prints, she noted, circulated in England and France as well as in the United States; they owed much of their popularity to European curiosity about the American way of life.

Steiner's main purpose in writing the blog was to make the exhibition accessible to her readers. She encouraged them to visit the show, or return for a second look, by emphasizing its relevance to their own everyday lives. Steiner



In addition to writing the exhibition blog for American Stories, Katie Steiner helped edit the catalogue.

observed Thanksgiving with a post on depictions of food in *American Stories*; the week before Christmas, she wrote about images of shopping and conspicuous consumption. When PBS broadcast Ken Burns's documentary about the national park system, Steiner responded with an essay on paintings of figures in unspoiled American landscapes.

The Metropolitan Museum has hosted blogs for other special exhibitions, but until now, they were all written by curators. Steiner's blog for *American Stories* was as scholarly as its predecessors, but it also took the genre in a new direction.

Showing the Way

Having left the American Wing for the Costume Institute, Edmonson is busier than ever. In December 2008, the Brooklyn Museum transferred its immense costume collection—23,500 objects in all—to the Met. Edmonson is part of a team integrating these

objects into the institute's exhibitions, publications and educational programs.

When she thinks back to her early months at the museum, Edmonson pauses over a private memory: the music she listened to on her iPod as she walked to work. "It's a little embarrassing to admit," she says, "but when I knew I was getting close, I would put on a happy song. Then the Met would appear in my sight line, and I would remind myself how cool it was to be there." If tourists stopped her and asked how to get to the Metropolitan Museum, she might not have heard them at first. But once she did, she was able to show them the way. ■

Related Links:

Katie Steiner's blog for *American Stories* is still available online at <http://blog.metmuseum.org/americanstories/>.

From Shipwrecks to Science Fairs

The Center for Science and Mathematics Education finds innovative ways to engage students and teachers



MIKE SANDS

During a summer course titled "Walking in Darwin's Footsteps," James Bader (center) and Cleveland-area teachers look for evidence of mutation in bacteria.

OF ALL THE CURRENT REFORM EFFORTS in American education, few have won greater support than the drive to improve instruction in the so-called STEM fields—science, technology, engineering and mathematics. The federal departments of education and labor have launched major initiatives to prepare students for STEM careers. Ohio legislators approved \$200 million in STEM-related spending for 2007-2009. Some of these funds went toward creating small high schools, including two in Cleveland, with science and technology themes.

Advocates believe that such programs are needed to address longstanding deficiencies in STEM education. “Too many of our elementary school students lose interest in science and mathematics by the time they reach the middle grades, and too many of our high school graduates are unprepared for college and the workforce,” according to the Ohio STEM Learning Network, which provides funding and technical assistance to schools throughout the state. Along with other STEM proponents, the network has called for reforms across the “education continuum,” from preschool through college.

James Bader, director of the Center for Science and Mathematics Education (CSME), shares this agenda. Since 1998, he and his colleagues in the College of Arts and Sciences have worked to enhance instruction and generate student interest in the STEM fields. They have helped high school teachers incorporate lab experiments into the curriculum and engaged middle school students in authentic research. And each spring, during family days on the Case Western Reserve campus, they invite younger children and their parents to discover that “Science is Fun.”

For Bader and assistant director **Kathryn Kwiatkowski**, the recent burst of interest in STEM education couldn’t be more welcome. It validates the work they were already doing, and it opens up additional opportunities for support and collaboration. “We engage with a wide swath of partners,

both within the university and beyond,” Bader explains. At Case Western Reserve, students as well as faculty members take part in the center’s activities. Its external partners include schools and public libraries, park systems, science museums, research centers and foundations. Through these relationships, Bader says, the center furthers the university’s agenda in STEM education.

Demonstrating Commitment

Even before CSME was founded, college faculty were sharing their expertise with K-12 students and teachers. In the early 1990s, for example, **Christopher Cullis**, the Frances Hobart Herrick Professor of Biology and current chair of the department, developed a series of high school workshops on biotechnology—a field so new it hadn’t yet appeared in the textbooks. The series lasted two weeks and was open to 60 students at a time. Cullis also designed experiments to accompany the workshops, and he raised funds for a program to lend the required lab equipment to the schools.

Bader managed that program, and soon afterward he began recruiting faculty members to provide professional development for teachers. With colleagues **Martin Rosenberg** and **Ana Locci**, he developed a summer course on terrestrial and aquatic ecology. Classes met at the University Farm, and the teachers returned with their students during the school year for a day-long field experience. The biology department funded the course through a grant from the Howard Hughes Medical Institute.

CSME was created to coordinate initiatives like these, Bader explains. In addition, its early supporters wanted it to collaborate with outside programs that were successful at getting young people excited about science. **Edward Lowenthal** (ADL ’66), a former co-chair of the college’s visiting committee, first broached the idea for the center, and he demonstrated his commitment by providing the start-up

“At all levels, teachers need opportunities to stay up on what’s current in their disciplines and to refresh their fundamental knowledge.”

—James Bader

funds. His generosity soon inspired other donors. With encouragement from **Ellen and Bruce Mavec** of Cleveland, The Kelvin and Eleanor Smith Foundation awarded grants to CSME in each of its first two years. And in 2000, the center received a major gift from **Elizabeth Downs Charpie** (FSM '46) and her husband, **Dr. Robert A. Charpie**, of Weston, Massachusetts.

One of CSME’s first collaborations was with the JASON Project, an earth and space exploration program devoted to science education. Founded by Dr. Robert Ballard, who discovered the remains of the *Titanic*, JASON transmits broadcasts from research expeditions to the ocean’s depths, to Peruvian rainforests and even to the eyes of hurricanes. As the first JASON site in northeast Ohio, the center attracted thousands of students and their teachers to campus, where they watched the broadcasts in Ford Auditorium and asked questions, in real time, of the participating scientists.

Today, the center has ties to another of Ballard’s projects. Immersion Presents, a web-based exploration series, provides curricula for afterschool science programs. CSME incorporates some of its activities into a summer camp for 12- to 15-year olds.

Kwiatkowski has managed the center’s partnerships since it was founded. She didn’t actually start out as a science educator; her background is in sociology and public administration. But, she says, if programs like Ballard’s had existed while she was growing up, she might have gone into science herself.

A Robust Science Experience

In 2000, when Bader took over the center from founding director **Lawrence Badar**, he expanded its outreach to area teachers. With a six-year grant from the National Science Foundation, he established a mathematics and science partnership with the Cleveland metropolitan schools and started bringing teachers to campus for intensive summer courses.

“At all levels, teachers need

opportunities to stay up on what’s current in their disciplines and to refresh their fundamental knowledge,” he explains. “Even a veteran physics teacher can benefit from a refresher course on Newton’s laws. Of course, the laws haven’t changed in the past 20 years. But having a chance to investigate them again, and the ways they are connected to other topics, is important. And these are needs that the university is well positioned to address.”

As the partnership evolved, however, Bader realized that focusing on teachers’ content knowledge wasn’t enough. “There weren’t very many labs being taught in Cleveland high schools,” he recalls. Teachers were unfamiliar with “the whole process of constructing a robust science experience—designing their own experiments, identifying proper variables, manipulating the equipment, making sure the protocols ran smoothly.”



Mark Willis, associate professor of biology, shows off the finer points of moth anatomy to a captivated student during the Science is Fun! Family Day program.

JAMES BADER



MIKE SANDS

Students in the Environmental Heroes program measure water quality at the Ohio & Erie Canal Reservation, part of the Cleveland Metroparks system.

So CSME expanded the summer curriculum to cultivate these skills.

"In the sciences, we built in these multi-day experiments that the teachers did from start to finish," Bader says. "Then we ended the course with a poster session in Hovorka Atrium. The chemistry and biology groups would come together and look at each other's posters. It was a really good way to examine the entire process, from conceiving of an idea to asking a question, right up to presenting the results and defending them before your peers. We had them try this model in the hope that they could replicate it in their classrooms."

Chemistry teacher Sandra Ammon went on to do just that. After four years in the program, she came away with a repertoire of experiments she felt confident about. "When you get these labs, you know they're going to work," she explains. "You don't have to worry that you will set up a lab for your first-period class, have it fail and then be stuck with it for the rest of the day."

When Ammon enrolled in the partnership, she was the only chemistry teacher at Jane Addams High School. For the first time in her career, the program gave her the chance to share ideas with other teachers in her discipline, both during the summer and at meetings throughout the year. It also provided funds for equipment and supplies so that she and her colleagues could implement a lab-based curriculum.

Today, as a teacher at the School of Architecture and Design on the John Hay campus, Ammon enhances her lessons with knowledge she gained from working with college faculty. For instance, she tells students about the time she spent doing nanochemistry with associate professor **Clemens Burda**, whose research explores the energy-generating potential of infinitesimal particles of gold. At the nanoscale, Ammon explains, gold has unexpected properties; it is cranberry colored, and absorbs light at the same wavelength as some natural pigments. For this reason, chemists and engineers are hoping to use nano-sized gold on solar cells and panels.

Ammon wants her students to grasp the importance of such research. "Nanotechnology is going to do for the next 20 years what computers did for the last 20 years," she tells them. She hopes they will remember her words and be inspired to pursue scientific careers.

Exploring Lakes and Wetlands

Faithful to its origins, CSME continues to engage directly with young people. Each February, it draws as many as 600 middle and high school students to campus for the Northeast Ohio Regional Science Olympiad. This isn't just a matter of opening up a few buildings on a Saturday; the center enlists faculty, staff, students and alumni to oversee scores of science and engineering events.

Two newer initiatives offer students more sustained experiences in STEM education. The first is a two-week summer camp that builds on middle schoolers' fascination with shipwrecks. Participants visit the Peachman Lake Erie Shipwreck Research Center and

use its online resources to hunt for lost vessels from the late 19th and early 20th centuries. They learn about the weather conditions that lead to shipwrecks, and the geological formations on the lake floor where the ruins come to rest.

In addition, since this *is* a camp, the youngsters take canoe trips and scuba diving lessons, practice land and sea navigation, and build small, remotely operated vehicles that they launch on tranquil voyages across Wade Lagoon in University Circle.

The center's partners for Shipwreck Camp include Cleveland Lakefront State Park and the Cuyahoga County Public Library, which holds related events for children, families and teachers throughout the year. All of these activities are supported by a grant from the Martha Holden Jennings Foundation.

A second new program engages middle schoolers in biological fieldwork. Developed in collaboration with Cleveland Metroparks, Environmental Heroes is conducted year round at the Ohio & Erie Canal Reservation, a 4.4-square-mile wildlife habitat that runs through the villages of Cuyahoga Heights and Valley View.



MIKE SANDS

Chemistry teacher Sandra Ammon has her students do lab experiments with supplies she obtained through the Cleveland Mathematics and Science Partnership.

Students in the program “invest time in learning about science, but they also conduct real research that is of benefit to the park system,” Kwiatkowski says. So far, they have tested water quality in the reservation, analyzed the distribution of amphibians and reptiles, and assessed the spread of invasive plant species. They know that by collecting good data, they are contributing to efforts to conserve the park.

The students often meet with biology faculty members and with staff scientists from Cleveland Metroparks. One visiting researcher showed them how he uses radio telemetry to track the migration patterns of Blanding’s turtles. Kwiatkowski asks, “How many kids go out into the field with a frog specialist or a turtle researcher? How can you do that without a program?”

Before they joined Environmental Heroes, few of the students had ever examined the natural world at close range. The experience has made them into acute observers and listeners. In February, weeks before the official beginning of spring, the youngsters heard the first frog calls rising from the reservation’s vernal pools. Once they learned what a chorus frog sounded like, they could distinguish it from a leopard frog or a wood frog. Eventually,

Kwiatkowski says, they will mark and recapture these creatures as part of a wildlife census.

An Unexpected Impact

Finally, thanks to a recent gift from **Mark Gelfand**, CSME has begun providing mentors to Cleveland students working on science fair projects. The mentors, known as the Gelfand Science and Engineering Fellows, are all Case Western Reserve undergraduates or graduate students, and many were once science fair winners themselves.

After the first 18 fellows were selected last fall, they got some preliminary coaching from Bader and **Nancy Dilulio**, a former biology instructor who is now an undergraduate dean. Together, they reviewed the district’s science curriculum to see what children at each grade level are expected to know. They

discussed strategies for helping students generate meaningful questions, design valid experiments and analyze the results. Then the fellows fanned out to 20 schools across the city.

Ramya Raman, a senior biochemistry major, worked with students at John F. Kennedy High School. "I started by asking them what their hobbies are, what they like to do for fun, and then tried to see if we

could come up with research questions from that," she said. "I challenged the students to create something that was really their own, something they could connect to. That was the most important step."

Taking their interests as the starting point, Raman guided her students through some unusual experiments. One young woman, an inveterate shopper, devoted her project to shoe styles; she wanted to assess the pain that girls incur by wearing heels of different sizes. She designed a survey that captured the amount of walking the subjects did and the number of hours they wore the shoes in question.

From a project like this, Raman says, the young woman could go on to study the anatomy of the foot. "We're trying to tie the project to science and still make it something they can relate to and have fun with," she explains. "If



MIKE SANDS

Catie Abood (left), 15, a student in the Environmental Heroes program, examines macroinvertebrates with Kathryn Kwiatkowski, CSME's assistant director.

they have fun with science, maybe they will continue doing it."

In some cases, the Gelfand Fellows helped students obtain equipment for their projects. At Forest Hill Parkway Elementary School, **Sarah Lukowski**, a sophomore psychology major, advised a group of sixth graders who wondered how much air they took in with each breath. Lukowski asked her mother, a public health nurse, for a box of peak flow meters. Other supplies were less obviously scientific. A team of seventh graders wanted to test the effectiveness of football helmets in blunting the impact of a blow. But since their school has no football team, it has no helmets, either. Lukowski got the university's athletic department to donate one.

The two Gelfand fellows found it an advantage to be relatively close in age to their students; they had musical

tastes and other cultural reference points in common. But they also gained respect as Case Western Reserve undergraduates and as women scientists.

"You are a model for them," Lukowski says. "When you tell them their project is a good project, they light up 10 times more than they do when the teacher tells them. They start believing in themselves."

Forest Hill Parkway held its science fair in mid-February,

and with one exception, every student participated. "They all did something, they all had a board and they all were excited to talk," Lukowski recalls. "Even though I already knew most of their projects, they wanted to go through their speech with me and tell me all about it." Near the bottom of several boards, she noticed a line reading, *Thank you to Case Western Reserve and to Sarah for helping us.*

"I didn't know I had made that much of an impact," Lukowski says. But to anyone familiar with the center's contributions to STEM education, it comes as no surprise. ■

A New Era for an Historic Space

Announcing the creation of CWRU's Milton and Tamar Maltz Performing Arts Center at The Temple – Tifereth Israel



TONY GRAY

Man must have more than one world in which to live. . . . Alongside of his job-world he must construct for himself a leisure-world wherein he can live freely and joyously in the role of a creative amateur, pursuing objectives not out of economic necessity but because of his sheer love of them.

Abba Hillel Silver
"Education and the Good Life" (1930)



FOR INCREASING NUMBERS OF STUDENTS across the university, performing arts have become an integral part of a Case Western Reserve education. In any given semester, 1,000 undergraduates take courses in music, dance or theater, and more than half of all undergraduates participate in extra-curricular ensembles. Within this group, one can find both "creative amateurs" and students preparing for careers as performing artists.

Now, with the creation of CWRU's Milton and Tamar Maltz Performing Arts Center at The Temple – Tifereth Israel, a majestic Cleveland landmark will provide a new home to programs that have largely outgrown the spaces they inherited from the college's predecessor institutions.

"Decades ago, a religious community had a dream—a dream of a soaring structure that would hold the emotions and the aspirations of generations of congregants," said **President Barbara R. Snyder**, who announced a partnership between the university and the

congregation at a press conference in the sanctuary on March 19.

"Today," Snyder continued, "we envision legions of young people honing their craft in rehearsal rooms within this complex, and then showcasing their talents in its theater and other beautiful spaces, including this venue. *Our* dream is that these performances will carry their own sense of hope and possibility, and that artists and audience members alike will be transformed by their experiences here."

Case Western Reserve's partnership with The Temple – Tifereth Israel has been launched with a \$12 million lead donation from The Maltz Family Foundation of the Jewish Community Federation of Cleveland. **Milton and Tamar Maltz**, whose other philanthropic projects include the Maltz Museum of Jewish Heritage in Beachwood, Ohio, are longtime members of the congregation.

Under the partnership agreement, the university will assume ownership of The Temple after completing

The sanctuary of The Temple – Tifereth Israel is named for Abba Hillel Silver, who led the congregation for 46 years, and his son, Daniel Jeremy Silver, who succeeded him.

fundraising efforts directed toward its renovation. Even then, however, the 1,400 families of the congregation will continue to hold High Holy Day services, b'nai mitzvot and other special observances in the University Circle building. The congregation has operated its religious school and other programs at a second complex in Beachwood since 1971.

University officials estimate that renovations to The Temple will cost \$25.6 million. Preliminary plans call

for modernizing the heating and air conditioning, installing new lighting and sound systems and replacing the original 2,000 seats in the sanctuary.

Speaking at the press conference, Milton Maltz said that one goal of his family's gift is to create "a gorgeous, modern facility without sacrificing the heritage and beauty of the structure itself." Beyond this, he added, he and his wife embraced "the opportunity to do something positive for Cleveland."

November 1925, Richard R. Stanwood offered what may still be the most detailed appreciation ever written.

With its gold-colored dome, Stanwood observed, The Temple appeared "symmetrical and unified no matter from what direction it happened to be seen." The Indiana limestone of the exterior, and the Tennessee marble of the vestibule floor, enriched the structure with their patterns and colors. Stanwood especially admired the great interior arches of the sanctuary and the recessed stained glass windows on each of its seven sides. Praising "the unusual softness and mellowness" of the lighting, he compared it to the "subdued daylight" in medieval cathedrals.

The Temple – Tifereth Israel complex originally included a chapel, a library, a meeting hall large enough to accommodate 1,000 people, and a school with 27 classrooms. In 1959, the congregation added a new wing with a 750-seat auditorium. It also acquired a seven-acre parcel, now known as Silver Park, extending along Ansel Road to 101st Street. This property, like The Temple itself, will become part of the university's West Campus.

A Thriving Culture

The renovated facility will expand opportunities for students in all of the college's performing arts programs. **Karen Potter**, director of the Mather Dance Center, offers one example. For years now, CWRU dance ensembles have presented their concerts in a studio theater. This small, intimate space has its advantages; for one

Subdued Daylight

Located at E. 105th Street and Ansel Road, The Temple was dedicated in 1924. Its construction, which took two years and cost \$1.3 million, was overseen by Rabbi Abba Hillel Silver, whose gifts as a scholar and orator led to his appointment as Tifereth Israel's spiritual leader when he was only 24. Silver would become a major figure in Reform Judaism and a powerful advocate for the creation of the state of Israel. He led the congregation until his death in 1963, and to this day, many Clevelanders call the building "Silver's Temple."

Designed by Boston architect Charles R. Greco, The Temple won early acclaim for its monumental scale and artistry. In the lead article for *The Architectural Forum* in



AL FUCHS

Mark Cochrane '10 is a member of the CWRU Jazz Ensemble, which performed at the March 19 press conference.



TONY GRAY

At the ceremony announcing the university's partnership with The Temple – Tifereth Israel, Milton and Tamar Maltz (first row) celebrated with music department chair Mary Davis, Dean Cyrus Taylor, theater and dance department chair Ron Wilson, and dance program director Karen Potter (second row, left to right).

thing, it gives audience members an unobstructed view from any seat in the house. But the new center opens up the possibility of mounting productions on a proscenium stage. And that experience, Potter says, “really prepares young dancers for the professional world.”

For student actors, the center will bring chances to “perform in varying theater configurations,” says department chair **Ron Wilson**. It will also provide updated technical facilities and support areas, including a scene shop, a costume shop and dressing rooms. Eldred Theater, which has hosted student productions since 1898, is “charming but technically antiquated,” Wilson says. Moreover, it is on the other side of campus from the department’s offices and classrooms. Within the unified space of the Maltz Performing Arts Center, students will have more frequent interactions with theater faculty and administrators.

Music ensembles will benefit from having their rehearsal and performance spaces in a single building, says department chair **Mary E. Davis**. The CWRU-University Circle Orchestra, for example, currently rehearses in Denison Hall (a former infirmary) but performs in Severance Hall and other venues. For each concert, the percussionists spend hours transporting their instruments, rolling the timpani into and out of elevators and trucks. Once the new facility opens, the musicians won’t be doubling as movers nearly so often.

The Maltz Performing Arts Center will also allow the department to enhance its relationships with the Cleveland Institute of Music and other University Circle institutions, Davis says. For example, she imagines practice sessions bringing small groups of student musicians together with members of the Cleveland Orchestra. As it is, finding the right spot for such interactions is a challenge, since “every

performance space in this area is already booked 24/7 or is not suitable for small-scale activities.”

Beyond these considerations, Davis points to the symbolic significance of the Maltz Performing Arts Center. “There is a thriving performing arts culture on this campus, but it’s always been under the radar,” she explains. “Now, for the first time, the performing arts as a unified entity will be recognized for their importance to the undergraduate and graduate student experience at Case Western Reserve.” ■

Published sources: Abba Hillel Silver, *Religion in a Changing World* (New York: Richard R. Smith, Inc., 1930); Ruth Dancyger, *The Temple – Tifereth Israel: One Hundred and Fifty Years, 1850-2000* (Cleveland: Epstein Design Partners, 1999).

The Greatest Energy in the Smallest Package

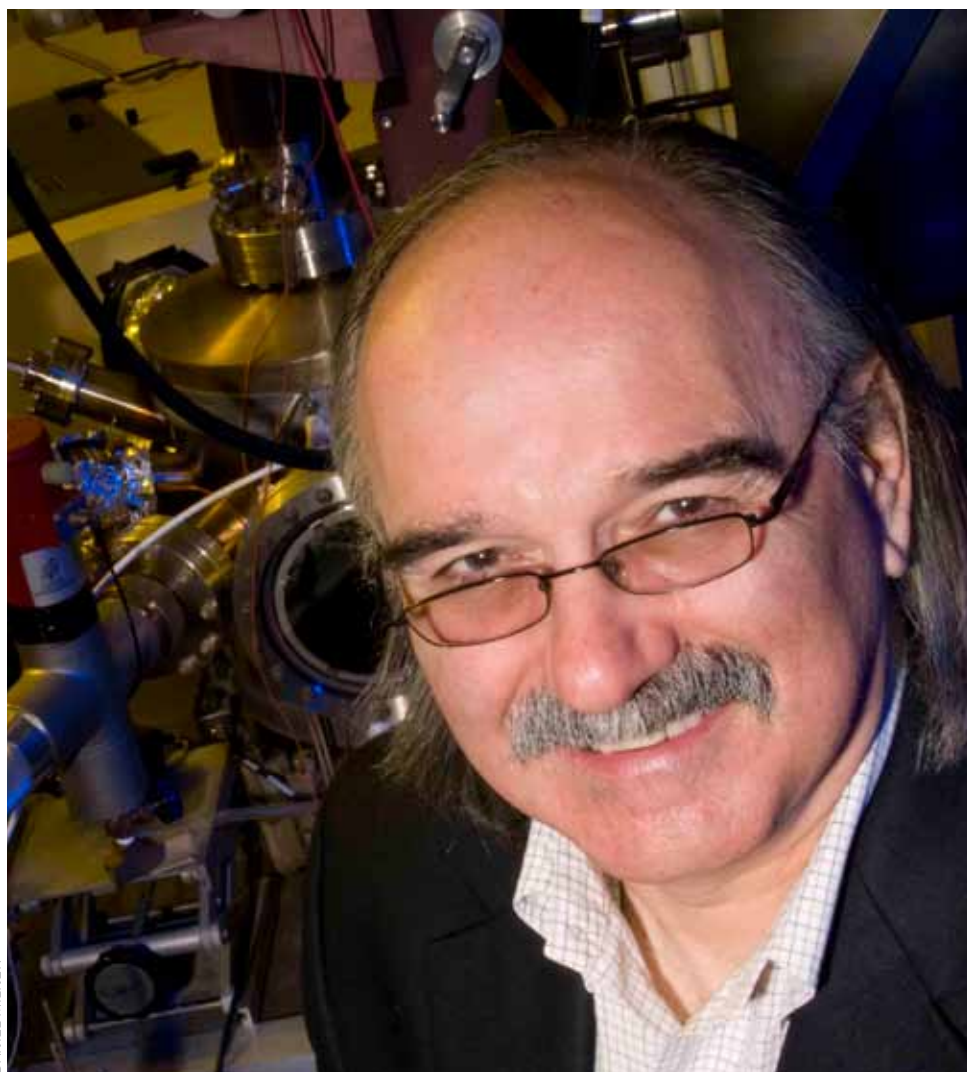
With an Ohio Third Frontier Award and an industry partner, two chemistry professors prepare the way for the next generation of lithium-ion batteries

By Trudy E. Bell

RECHARGEABLE LITHIUM-ION BATTERIES power small devices like computers, cameras and cell phones. Why can't they also be used to power full-sized electric vehicles?" wondered **Daniel A. Scherson**, Charles F. Mabery Professor of Research in Chemistry.

That deceptively simple question led Scherson and his colleague, chemistry professor **John D. Protasiewicz**, to join Novolyte Technologies, Inc., in seeking a major grant from the Ohio Third Frontier (OTF) Advanced Energy Program. Earlier this year, the team was awarded more than \$1.1 million to develop new electrolytes—mixtures of solvents and salts—for next-generation lithium-ion batteries.

In battery research and development, "everything boils down to how to pack the greatest energy into the smallest package and the smallest weight," says Scherson, who also directs the Ernest B. Yeager Center for Electrochemical Sciences. The greater the energy density of the battery in an electric car, the farther the car can travel on a single charge. And of all the



DANIEL MILNER

In his Clapp Hall laboratory, Daniel Scherson takes a "combinatorial approach" to electrochemical research. Among other honors, he was awarded the Faraday Medal of the Electrochemistry Group of the Royal Chemical Society in 2004.

elements in the periodic table, there is no better choice for energy-dense batteries than lithium.

Still, engineering a battery with sufficient energy density to compete with a tankful of gas is only part of the challenge. "On a freeway, a battery also must be able to accelerate a car from 0 to 60 miles per hour in under half a minute," Scherson explains. Fast acceleration demands a high-power battery that can deliver energy as quickly as an internal combustion engine does.

Finally, battery developers must address a safety issue. When lithium-ion batteries are overcharged, they can heat up and even burst into flame. Scherson and his team hope both to enhance power and to reduce flammability by figuring out the optimum internal chemistry of lithium-ion batteries.

Electro-what?

All batteries convert chemical energy into electrical energy; that is, they initiate chemical reactions that force electrons (negative charges) to flow as current through wires. For this purpose, every battery consists of two electrodes—one negative, one positive—immersed in a conductive medium: an electrolyte.

In a lithium-ion battery, the positive electrode is a solid that includes lithium ions; the negative electrode is made primarily of carbon. A salt dissolved in the electrolyte contains lithium ions as well. While the battery is charging, lithium ions migrate out of the positive electrode into the electrolyte.

"Many wonderful inventions we use today were discovered by sheer accident. So, in our battery research, why can't we deliberately create the right conditions for a lucky accident?"

—Daniel Scherson

Meanwhile, lithium ions from the electrolyte migrate into the carbon structure of the negative electrode. As a result, the chemical composition of both electrodes changes—and it stays that way as long as the two electrodes remain disconnected, as they are when a battery-powered device is turned off.

When the device is switched on, however, the external circuit is completed. Spontaneous chemical reactions cause electrons to flow through this circuit. Inside the battery, meanwhile, lithium ions leave the negative electrode, flow through the electrolyte and return to the positive electrode. By the time the battery has fully discharged, both electrodes have reverted to their original chemical composition.

Surprisingly, the electrolytes in all of today's commercial lithium-ion batteries rely primarily on only two or three salts and solvents. "But many more promising chemicals exist—so many, in fact, that the exact properties of various combinations are not well understood," Scherson says. Electrochemists also want to learn more about a film that forms on the negative electrodes of lithium-ion batteries. This film, called the solid electrolyte interphase (SEI), determines to a large extent how efficient the battery can be over many charge/discharge cycles.

At this point, no chemist or battery manufacturer knows the best and

safest electrolyte for a high-energy, high-power, rechargeable lithium-ion battery—especially a larger-format battery that would power an electric car. Moreover, because of the sheer number of combinations of potential salts and solvents and the lack of fundamental knowledge about them, it is impossible to predict what the recipe for an optimal battery electrolyte might be.

Enter Scherson and his team, whose distinctive research approach won them the OTF award.

Lucky Accidents

"Many wonderful inventions we use today were discovered by sheer accident," Scherson observes. "So, in our battery research, why can't we deliberately create the right conditions for a lucky accident?"

To this end, Scherson and his team will borrow a technique widely used in biomedical applications and research on catalysts. Scherson calls it a combinatorial approach and says, "It will allow us to test 10,000 different combinations of solvents and salts in just a few months."

Part of the OTF grant will fund the custom-building of a 10-by-10 array of 100 "cells," each of which is essentially a small lithium-ion battery. A computer will control syringe-like injectors that will deliver precisely measured amounts of a single solvent and a single lithium salt into each cell. Then,



DANIEL MILNER

John Protasiewicz, professor and associate chair of chemistry, is collaborating with Scherson on the Ohio Third Frontier project. He leads a research group devoted to the construction of novel materials and has received an unbroken string of National Science Foundation grants since 1997, including an NSF CAREER Award and an award for special creativity.

over the next 24 hours, the computer will automatically monitor the behavior of each cell over many charge/discharge cycles. Every 24 hours, all the cells will be flushed and new combinations of solvent and salt will be injected for testing.

"Yes, in a way, it's a fishing expedition," Scherson laughs. "We're dropping lines all over the lake to discover the best spots to fish. We're prospecting!" But with such a systematic and automated empirical approach, the team expects to take less than six months to identify the combinations of solvents and salts that deliver the highest power. They will also take a similar approach to identifying additives that reduce flammability and to studying the chemistry of the SEI.

Novolyte Technologies, based in Independence, Ohio, will provide the chemicals for this research. Novolyte "has the highest-purity salts and solvents of any company in the world," Scherson declares. "They produce 95 percent of the electrolyte formulations for lithium and lithium-ion batteries in

the Western world. It was a marriage made in heaven." Along with its U.S.- and Asia-based manufacturing platforms and global supply relationships with lithium-ion battery manufacturers, Novolyte provides an established channel to commercialize the innovative products born from the OTF-funded research.

"We are looking forward to working with such a well-known institution of higher learning, and with Dr. Scherson, whose expertise is world renowned in the field of electrochemistry," says Dr. Martin Payne, Novolyte's global technology manager. "The partnership also allows us to accelerate our own program for battery development and commercialization." Ultimately, Payne hopes that the team's discoveries will help generate high-tech energy jobs in Ohio—the sorts of jobs that might appeal to future Case Western Reserve graduates.

By the conclusion of the OTF grant, Novolyte's goal is to offer commercial quantities (metric tons) of the newly

discovered electrolytes for sale to battery manufacturers. Those firms will use them to build and test prototype lithium-ion batteries suitable for powering electric vehicles.

Scherson acknowledges that converting to plug-in electric cars wouldn't necessarily reduce overall emissions of carbon and other pollutants. But it would offer one significant advantage: "Pollution and emissions would be localized to individual electric power plants rather than spread all over the nation—and pollution and emissions from one place are far easier to capture and mitigate than generalized sources are." For this reason, Scherson says, "Going to electric vehicles would be a huge service to society." ■

Science journalist Trudy E. Bell is a Presidential Fellow in the SAGES program, leading the seminar "Political Hype vs. Science Fact: Evidence, Risk, Preferences, Values and 'Spin.'"

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