Making a New Lesson Plan

A Warner School program aims to bring talented professionals and students to the math and science classrooms of high-needs school districts.

By Karen McCally '02 (PhD)

It's a Thursday afternoon at John Marshall High School, in northwest Rochester, and the students in Sean Coffey's Life Science class are growing restless.

It's been 10 minutes since, working in small teams, they've buried two slices of pineapple—one fresh, the other canned—into two separate cups of jello. And so far, not much has happened.

"Coffey!" shouts a student standing at a black lab table at the back of the classroom.

"Are they going to change colors?" he asks.

"I don't know. What did you predict?" Coffey says, approaching the student.

Coffey '09W (MS) is in his third year teaching at John Marshall. The students in his Life Science class, who range from 14 to 20 years old and from freshman to senior, have been learning about enzymes and substrates. By now they know that enzymes bond with substrates to generate chemical reactions. They also know, however, that enzymes and substrates work like locks and keys, meaning that enzymes and substrates have to form a perfect chemical "fit" in order to bond.

In just a couple more minutes, one team notices a slight change to one of its pineapple slices. Five minutes later, all of them have. The once-yellow slices of fresh pineapple are now the color of grapefruit. And they've softened.

Emboldened by their observations, the students reach for colored markers and the poster board on which each team records its predictions, findings, and explanation.

About 40 miles southeast of John Marshall High, Anne Baughman '09W (MS) is teaching general science to high school vocational students at the Finger Lakes Technical and Career Center. The center is located amidst the fertile farmland of central New York. Overseen by the Wayne–Finger Lakes Board of Cooperative Educational Services, it operates a half-day program for high school students, who spend the remainder of each day in a traditional academic program in one of nine surrounding school districts.

On an afternoon in late November, Baughman stands underneath the string of Christmas lights framing her smartboard. She removes one bulb, notes that the rest of the bulbs remain lit, and asks her

COFFEY BREAK: Developing a rapport with students, such as Craig Stanford (left), is an important part of his teaching, says Coffey, who won the Rochester City School District's Career in Teaching Award for First Year Teachers in 2010.

classroom of diesel technology students, "Are these bulbs arranged in parallel or in series?"

After a brief review, Baughman gives each student a packet consisting of more than 20 circuit diagrams, each with instructions about which bulbs to light in either a parallel, series, or combined arrangement. For the remainder of the 80-minute class, the students, working either solo or in pairs, map circuits using colored pencils and then test their predictions by creating the circuits on actual circuit boards.

To many educators, policymakers, and not least, scientists, Coffey and Baughman are the kinds of teachers American schools will have to continue to attract if the nation is to remain competitive in science and technology. Coffey excelled as a biology major at SUNY Geneseo, and by the time he graduated, he had worked in the labs at the Rochester-area biotechnology company Genencor

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How do you attract bright math and science majors—or professionals in science and technology—to become primary and secondary school teachers? How do you prepare them for teaching? And how do you get more well-qualified teachers to take assignments in some of the poorest school districts?

International. He might easily have pursued a career in research or medicine.

Baughman is a career-changer who studied chemical engineering at Northwestern University and worked at Kodak, where she helped reduce the environmental impact of photochemical processes. Later she earned a master's degree in environmental engineering at the University of California at Berkeley and conducted research on indoor air quality.

Both Coffey and Baughman attended the Warner School as Robert Noyce Scholars. The Robert Noyce Teacher Scholarship program, a program of the National Science Foundation, is designed to interest students who've excelled in math and science majors or professionals in science and technology in becoming secondary school teachers in districts where they're most needed—usually poor urban and rural ones. For more than 10 years, the foundation has been dispensing scholarship money on a competitive basis to hundreds of colleges and universities identified as having stellar undergraduate programs in science, technology, and mathematics, and stellar teacher preparation programs.

Thirty Noyce Scholars have graduated from the Warner School of Education since the school received its first Noyce grant in 2007. As of the 2010–11 school year, 95 percent of those graduates held teaching positions in mathematics or science across the country, according to Constance Flahive, a program evaluator at the Warner School. Last September, based on the success of the school's first round of Noyce Scholars, the foundation awarded it a second grant to fund 27 additional scholarships starting in 2012.

THE PROGRAM HELPS ADDRESS THREE VEXING PROBLEMS in American education. How do you attract bright math and science majors—or professionals in science and technology—to become secondary school teachers? Once they've made that decision, how do you prepare them for teaching? And how do you get more well-qualified teachers to take assignments in some of the poorest school districts?

Public school officials have know about those problems for years. In 2000, almost one third of school districts nationally reported that they experienced "serious difficulty" finding qualified candidates to fill math and science teacher vacancies. That's according to the National Center for Education Statistics, an entity within the U.S. Department of Education that collects and analyzes data.

Raffaella Borasi, dean of the Warner School and principal investigator on the grant, cites two reasons Rochester was successful in winning the Noyce grants.

The first is the strength of Rochester's programs in math, science, and engineering in the School of Arts and Sciences and the Hajim School of Engineering and Applied Sciences. "That really gives us a qualitative and competitive advantage," she says.

The second is the curriculum for the Warner School's science teacher preparation program. Among the program's distinctive features is the requirement that students begin their studies over the summer, working with kids in nontraditional settings, such as

CIRCUIT BUILDER: Baughman assists diesel technology student Jeremiah Aquilano, of Bloomfield, N.Y., as he arranges a set of circuits. He and his classmates will apply the concepts they learn in Baughman's general science class to diesel engines.

summer camps. It allows education students to begin to master the inquiry-based teaching methods the Warner program is known for without the pressure to prepare students for high-stakes exams. Borasi notes that in the foundation's written review of her grant application, "they pointed to the innovativeness of our program."

Borasi is a mathematics educator, who earned undergraduate degrees in mathematics and education at Italy's University of Turin before earning her doctorate in mathematics education at SUNY Buffalo. A faculty member at the Warner School since 1985 and dean since 2001, Borasi has refined and promoted an inquiry-based, student-centered approach to teaching mathematics. Active rather than passive, inquiry-based learning introduces concepts using research questions or hypotheses that students pursue themselves, with guidance from an instructor and interaction with fellow students. Inquiry-based learning mimics what people do in everyday

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problem solving and what scientists do, of course, in experiments. While there's a role for rote learning, that part comes only after students have mastered concepts through hands-on learning experiences—only after, in other words, students have a context for whatever facts they're asked to commit to memory.

NINE YEARS AGO, APRIL LUEHMANN WAS HIRED TO LEAD the design of the Warner School's science education program. Now an associate professor of education, Luehmann studied mathematics and education as an undergraduate, and earned her doctorate from the University of Michigan in science education and industrial and operations engineering.

"I had my charge spelled out for me very clearly about developing and supporting reform-minded science teachers," Luehmann says. "We've known what works in science education. We've known how people learn and how to support them at least since, and even before, the National Science Education Standards were published in 1996," she says, referring to guidelines published by the National Research Council after a four-year collaborative process involving thousands of scientists and science educators. "But if you go to any science classroom, it's really rare that you see the kind of teaching and learning we know that research is calling for."

She designed Warner's science education program in concert with other faculty at the Warner School and with input from faculty from the School of Arts and Sciences and the Hajim School.

The program begins unconventionally. "In the first of the series of experiences, we throw the master's students out into Lake Ontario and ask them to design their own investigation around the question, 'Why is Charlotte Beach always closed and what can we do about it?'," says Luehmann, referring to water quality problems that have plagued the beach north of Rochester for years. "That gives them the chance to experience for themselves the richness, messiness, complexity, and excitement of hands-on, student-centered science learning." In the following weeks, they'll lead a group of middle school students through a similar investigation.

"We've known what works in science education. We've known how people learn and how to support them at least since, and even before, the National Science Education Standards were published in 1996. But if you go to any science classroom, it's really rare that you see the kind of teaching and learning we know that research is calling for."
—April Luehmann, associate professor of education

Luehmann says the significance of beginning in summer camps is that campers don't have to earn grades or pass high-stakes exams. That's a plus for beginning education students. "They have support from faculty to plan and debrief every day," she says. Among the topics students and their Warner professors discuss are, "how to appropriately confine the investigation for middle school kids who've never done a science investigation before, and how much freedom to give the kids to ask their own questions, collect their own data, and analyze it."

At a place like the Finger Lakes Technical and Career Center, this hands-on approach is a natural fit. And Baughman, with her research background, warmed to an inquiry-based program. She felt well prepared to work with the center's practically minded students.

Take her approach to Newton's Laws. Teaching auto body and auto mechanics students, she decided to show videos of simulated car crashes and ask students to analyze them as a group in terms of the 17th-century scientist's universal laws of motion. "It connects to something they know, and they're really getting the concepts down before they just see these equations," says Baughman.

Scott Benedict, who teaches diesel mechanics at the center, says Baughman's class is essential for the students, and her approach has struck exactly the right note.

"She's really embraced a hands-on approach to teaching," he says. "She breaks concepts down. We're going to transfer those skills to bigger equipment down the road," he adds, gesturing toward a series of small, diesel engines aligned along workbenches in an expansive garage just downstairs from Baughman's classroom.

Over the next few weeks, Benedict says, he'll be introducing the students to electrical systems. "When we start talking about electrical systems—batteries, starting systems, charging systems, lighting systems—what she did today, explaining series and parallel—that will relate directly to what we'll be talking about with batteries. Because we hook up batteries in series or parallel depending on the truck or tractor they're on."

"What I say to the kids," says Benedict, "is, 'When we do electrical here in a few weeks and I say hook that battery up in series, you'd better know what I mean, because I'm not going to spend two days doing what Ann just did.'"

Coffey's challenge is different. He's required to prepare his students for the New York State Regents Living Environment exam. He describes a "colossal disconnect" between the inquiry-based approach he learned at the Warner School and the memorization and drilling that New York's high-stakes testing can encourage.

Coffey designed the pineapple experiment with his mentor at the Warner School, JoAnn Morreale, adjunct professor of teaching and curriculum.

"We get together every Wednesday for two hours, and we just plan," he says.

For every unit, "we look back at the last 10 Regents exams, which are all online, and for whatever topic it is, we'll pull out all the questions from it," says Coffey. "So we have a really good idea of what they're going to ask and how they're going to ask it."

"We'll design activities that are not just memorizing how to answer that question, but give them some sort of experience to hang the knowledge on that they'll need to answer that question. So we kind of work backwards," he adds.

As the Warner School begins its second round of Noyce grant funding, Borasi says she's started to step back and analyze what

DEAN'S MESSAGE: Borasi, dean of the Warner School, notes that in awarding the Warner School the Noyce Scholars grant, the National Science Foundation paid particular attention to the school's innovative, inquiry-based science education curriculum.

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they've learned so far. One area she wants to research is how to retain teachers like Coffey and Baughman—both of whom have exceeded their two-year commitment to teach in high-needs districts—in the places they're needed most.

"The turnover in high-needs schools is well documented across disciplines," Borasi says.

One element she expects is key is mentorships and ongoing professional support from other reform-minded teachers. "Having even just a seminar or a forum that meets a few times a year, where people can come back, share their issues, have a way to talk about and get some advice—everyone pointed that out to be very, very valuable," says Borasi, referring to feedback from graduates now in the field. Those graduates, she notes, "are benefitting from such opportunities now, as part of Noyce post-graduation activities."

One thing she says she's sure about is that the scholarship money is a critical component to attracting top talent to the profession. "Scholarships really do matter," she says, adding that the Noyce program not only attracted more applicants to the Warner School's math and science teacher preparation programs, "but a more diverse, more interesting, higher caliber of people."

To maximize their impact, the foundation has required that the scholarships pay the entire cost of tuition. But like many grant programs, the Noyce program covers only a portion of the total costs—in this case, half the tuition for each student. The other half comes from the Warner School.

"It's a significant effort," says Borasi, of the Warner School's financial obligations to the program. "But we get such fabulous students that I knew it was worth it."

When the next 27 Noyce Scholars graduate, the Warner School will no longer be eligible for National Science Foundation funding. If it wants to continue to offer scholarships, it will have to find funding of its own.

Meanwhile, science education faces another challenge: fiscal problems within the school districts themselves. The Noyce Scholars have been successful in finding jobs. But as the last hired, they're the first to be moved or even laid off. Baughman, during her two years in the Rochester City School District, was moved twice, and laid off and rehired once.

At the Finger Lakes Technical and Career Center, Baughman is a one-year replacement for a colleague seeking to leave teaching for administration. Her future at the center depends on that colleague's success, and on the financial outlook at the center.

John Marshall High School is what the Rochester City School District has designated as a "phase-out school"—a school, usually with an especially high concentration of children in poverty, slated for gradual closing. Coffey, with three years of teaching experience and a strong commitment to urban education, sees himself remaining in the district.

When Borasi applied for the grant in 2007, she held up as one of her goals a partnership with the district to help provide it with well-qualified, well-trained science teachers. She considers the current climate a bump in the road.

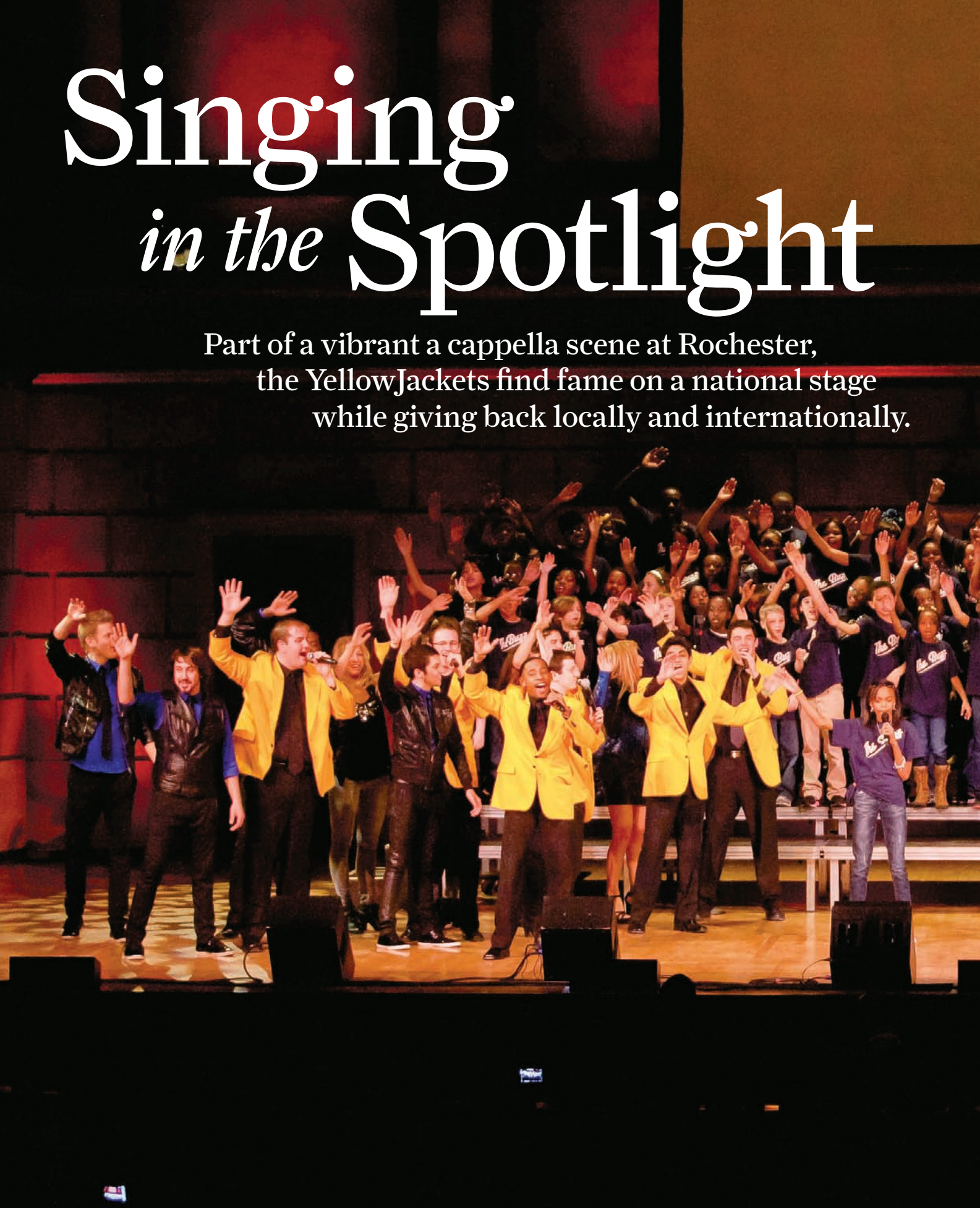
"Warner graduates are prepared to weather the current economic climate. The scholarship program has created a unique opportunity to attract talented professionals and students who can have a meaningful, positive impact in math and science education," she says. "They are the ones who will stand out in the competitive job market."

That job market is also national in scope. In many districts across the country, the problem of finding qualified candidates to fill math and science teaching positions remains, even in a tough economic climate.

"If people are willing to relocate," says Borasi, "the jobs are still there."

Singing *in the* Spotlight

Part of a vibrant a cappella scene at Rochester, the YellowJackets find fame on a national stage while giving back locally and internationally.



HOMECOMING: With their guests Pentatonix—the a cappella group that won last fall's NBC television competition *The Sing-Off*—members of Delilah—a group that was also on *The Sing-Off*—and children from Rochester's World of Inquiry School No. 58, the YellowJackets sold out two shows at Kodak Hall at Eastman Theatre in December.

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By Scott Hauser

NINTH-GRADER QUINTERRA ROBINSON had no idea who the YellowJackets were last fall when the group first arrived to help mentor her and her fellow Rochester city school students who were interested in singing.

Then she and her classmates from World of Inquiry School No. 58 saw the Rochester student ensemble on *The Sing-Off,* a national TV show that pitted 16 a cappella groups in a competition to win a Sony recording contract.

The YellowJackets opened the show with their rendition of "Wavin' Flag" by Somali-born musician K'naan.

"When they did the first song," Quinterra says, "I was like, 'Wow, those guys are amazing! Wow!'"

Consider Quinterra a fan. And count in her classmate Erika Tryon. And Jahlil Bell, a fourth grader in the music program at World of Inquiry. Add to them the 5,000 people who packed Kodak Hall at Eastman Theatre in December for two sold-out shows organized by the group to raise money for their outreach efforts.

They, like many in the University and Rochester-area communities, have been bitten by the YellowJacket bug.

And don't forget the emails from admirers around the world, the marriage proposals proclaimed on Twitter, the key to the city, and all the other stop-you-in-the-street moments that come with being in the national spotlight.

"We had no idea what was coming our way," says Aaron Sperber '11, '11E, a KEY student and a former director of the YellowJackets. "This year has changed our lives. It hasn't just changed the shape of the YellowJackets, it has changed our lives, personally and as a group."

Not since the Men's Glee Club from the former College for Men made a national television appearance on the *Ed Sullivan Show* in 1960 have fans of Rochester's vibrant a cappella culture had so much to cheer about. The YellowJackets' performances on *The Sing-Off* were "must-see TV" for many on campus and among the University community this fall. Finishing in *The Sing-Off*'s final set of seven groups, the YellowJackets remained favorites among the show's fans, winning first place in NBC's online vote after each performance and landing in the Top 10 for online sales on iTunes.

The show's judging panel of Sara Bareilles, Ben Folds, and Shawn Stockman had high praise for the YellowJackets' musicianship, camaraderie, and social outreach, as exemplified by the group's musical exchange with a village in Kenya. But ultimately, the group Pentatonix won the 2011 season of *The Sing-Off.*

The YellowJackets say they hope to parlay their experience on *The Sing-Off* to further their musical and outreach efforts. In addition to working with the children of World of Inquiry School, the group began a musical exchange last spring with children in the village of Maseno in Kenya. They're working on a documentary—scheduled to be released later this year and titled *United We Sing,* the film follows their African exchange—and are hoping to put together more touring opportunities.

The Sing-Off is opening doors—as well as ears and hearts, says Sperber.

"We came in as musicians with a lot of passion and a lot of heart," he says. "What *The Sing-Off* helped us to do was to channel that and to focus it and make it not just about how much heart we were feeling, but finding ways to use music as a tool to share and communicate that heart with our listeners and have people feel what we're feeling."

Sperber is not alone in the College in his passion for music and its power. While the YellowJackets, which were founded in 1956 as an offshoot of the Glee Club, have the longest history, the group is one of four supported by the College's student government. The three others—the all-male Midnight Ramblers, the all-female Vocal Point, and the coed After Hours—all have a loyal fan base, regularly produce CDs, and perform widely on campus, at alumni and University events, and in regional and national competitions.

A Chorus of A Cappella

See profiles of the College's a cappella groups, **page 33.**

As many as 60 students routinely try out for only a handful of openings in each of the groups each year.

Jamie Wilson '13, the music director for Vocal Point, says she's seen interest in cocurricular vocal music grow over the past three years. The popularity of television shows like *Glee,* the Fox dramedy that follows the travails of a fictional high school musical performance group, and *The Sing-Off,* the NBC show that completed its third season this fall, have helped spur that interest, she says.

"I knew there was a big a cappella environment here," says the music major from Levittown, N.Y., "but since my freshman year

IN TUNE: Vocal students from World of Inquiry School No. 58 (above) shared the stage with their mentors at a ceremony during which the YellowJackets received a key to the city from Mayor Thomas Richards. Scan the code below to see a video of the ceremony.

the popularity of a cappella has spiked tremendously."

Jared Suresky '12, the publicity director for the Midnight Ramblers, was also looking for a campus awash in music when he arrived at Rochester from Goshen, N.Y., and he's found a "second home" at Rochester with the Ramblers. He enjoys being able to pursue an interest outside his major of economics and says a cappella groups reflect the wide-ranging academic, social, and cultural endeavors of the Rochester student body as a whole.

"We're composed of many different people with many different backgrounds, majors, interests, and perspectives," Suresky says. "But we're also a bunch of goofy River Campus students who like to sing."

The Ramblers, too, have found success and some time in the spotlight. Their version of "Fireflies," by the group Owl City, was selected to be included on the 2011 compilation *Best of College A Cappella 2011,* produced by the International Championship of Collegiate A Cappella. The Ramblers turned up on TV last spring on the game show *The Price Is Right,* serenading host Drew Carey and the studio audience after Rambler Aaron Michalko '14 was selected to participate on the show. The group had made an impromptu decision to attend a taping while on a spring break performance tour in Southern California. And this winter, former Rambler Chris Aguilar '10 was a winner of a national Austrian TV singing competition (see age 48).

Such an experience—of performing in the pressure-cooker atmosphere of a nationally televised competition—is enormously beneficial for a group of musicians, says Jamal Moore '12E, a vocal performance major at the Eastman School and director of the YellowJackets.

Musically, the group has matured by leaps and bounds because of *The Sing-Off,* says Moore, who, as the 2011-12 William Warfield Scholar at Eastman, has sung at some storied campus venues.

"We've grown to a whole new level as far as our musicality," says the Augusta, Ga., native. "We've developed a really professional approach and attitude now."

And while the group's success on the show has altered the course of their careers, the YellowJackets almost passed on the chance to try out for the show. Asked to audition last May after the show's producers heard the group's most recent album, *Bad Bromance,* the request came during finals week. And it came during the whirlwind of planning the trip to Kenya and getting ready to leave the country.

But, after a performance at the George Eastman House, the group drove overnight to New York City for the audition. When band members said that they couldn't return for a round of callbacks, the producers asked them to do their callback right there, Moore says.

After returning from Kenya, the group flew to Los Angeles where *The Sing-Off* started taping in July.

When band members returned to campus in the fall, Sperber asked them to work with him on a Kauffman Entrepreneurial Year project with World of Inquiry School. For two hours a week, the YellowJackets met with the schoolchildren, leading the younger group in performance and music lessons.

"We're pretty passionate about how music can bring people together, help kids who might feel alone at certain times in their lives to feel not so alone," Sperber says. "It can also be not just an outlet, but a place to learn, where maybe kids don't even realize they're learning, but they're learning about the importance of acceptance and respect and collaboration and especially hard work. And even the music itself—I think music can be the thing that gets kids to school in the first place."

The group's social outreach represents a desire to give back to Rochester and to others who have helped support the YellowJackets and their music over the years, says Sperber, who grew up in the Rochester suburb of Pittsford.

"We're not just the 15 guys that you see on stage. We're now plus 91," he says, referring to the schoolchildren, "plus the thousands of people in Rochester who have helped us along the way and really have made us who we are."

Moore agrees.

"We've realized that our music can help shape the lives of people all over the world." R

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YellowJackets

The longest-running male a cappella group is finding new fame.

IN STEP: The YellowJackets (left to right) are Michael Pittman '13, Simon School graduate student Matt Francis '11, Ross Pedersen '13, Simon School graduate student Jonathan Greenhalgh '09, Matt Carlin '14E, Warner School graduate student Christopher Young '11, Jordan Fontheim '13, Galen Dole '13, Simon School graduate student Abhishek Sharma, Nick Wiggins '11, '11E, Jamal Moore '12E, and Aaron Sperber '11, '11E, '12 (KEY) (not pictured: Kiernan Kriss '12, Aden Brooks '14E, and Danny Rubenstein '11).

YellowJackets Online
www.jackets.org

Jamal Moore '12E admits he was unfamiliar with a cappella music when he arrived at Rochester as a freshman at the Eastman School to study opera performance.

In the four years since then, he's not only come up to speed with the genre, but he's taken a leadership role in helping shape the current edition of the YellowJackets as musical director. And he's discovered that he's become part of a rich tradition of musical performance at the University.

"It's not just a performance ensemble," says the senior from Augusta, Ga. "It's like a brotherhood. These are 13 or 14 of my best friends."

Moore, who is the Eastman School's William Warfield Scholar for 2011–12, says the close bond is a key element in the group's success—both historically and as new members are welcomed into the group each year. As YellowJackets, the members spend a lot of time together, rehearsing as many as 8 to 10 hours a week along with performing several times.

Founded in 1956 as an offshoot of the Men's Glee Club, the YellowJackets are the longest-running male a cappella group on campus.

Moore says interest in the ensemble has skyrocketed since the group's performance last fall on the NBC reality competition *The Sing-Off*, and he says he and the YellowJackets are trying to balance their newfound fame with their lives as students and their commitment to social outreach projects, including working with schoolchildren in Rochester and in Kenya.

Is it a lot of work?

It is, says Moore. "But it's so rewarding that, in the end, you don't worry about that."

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Vocal Point

The University's only all-female a cappella group charts its own course.

IN HARMONY: Vocal Point features (back row) Cory Robinson '14, Jamie Wilson '13, Da Hye Oh '12, Lindsey Garrison '11, '12 (T5), and Amanda Page '13; (front row) Sophie Fishbein '15, Baily Gripshover '13, Lindsay Forbes '13, Eliza Barnes '15, and Hannah Silver '12; (not pictured: Sun Hae Park '15, Gillian Friedman '12, Claire Crowther '13, and Allison Eberhardt '14).

Vocal Point Online
www.urvocalpoint.com

For someone interested in composing and in music education, Jamie Wilson '13 says, Vocal Point is the perfect group.

Founded in 1969 as a women's ensemble with accompaniment, Vocal Point officially joined the a cappella community in the early 1980s. Since then, the group's members have prided themselves on arranging nearly all the music that they use in performances.

"Ninety percent of our repertoire is arranged by a current member or alumnae members," says Wilson, a music major from Levittown, N.Y., and the musical director for 2011–12.

A member of the group since her freshman year, Wilson has watched interest in a cappella music grow during her time on campus. As many as 60 women audition each semester for as few as two or three open spots in the group.

Once in, the members commit to more than six hours a week of rehearsal and four to five performances a month. Vocal Point is in the midst of recording a new album that they hope to release in late April. They also will compete in the International Championship of Collegiate A Cappella competition in February.

Planning to pursue a career in music education, Wilson says Vocal Point—and the University's broad support for cocurricular a cappella—have been extraordinary complements to her musical interests.

"It's a really great environment now for different types of people who can be united by music," she says. "It really becomes a community."

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Midnight Ramblers

Founded in 1998, the group considers campus its home.

AT HOME: The Midnight Ramblers are (left to right) Noah Berg '12, Andrew Tomich '14, Daniel Slavin '14, Kevin Layden '13, Matthew Watman '12, Gregory Corrado '14, David Keener '15, Eric Quesada '15, and Aaron Michalko '14; (kneeling) Jared Suresky '12.

Midnight Ramblers Online
www.midnightramblers.org

Fourth-year Midnight Rambler Jared Suresky '12 says the all-male a cappella group likes to keep its repertoire as "all over the board" as the wide-ranging nature of the majors and interests represented by the group's members.

But, Suresky says, the ensemble has one main interest when it comes to performing.

"Our priority is the campus and student community," says Suresky, an economics major from Goshen, N.Y., and publicity director for the group. "Our roots are here at the U of R."

And while the group travels widely—a trip to Southern California to perform at charity events turned into an impromptu appearance on the TV game show *The Price Is Right* last spring—the group prides itself on collaborating and interacting with fellow student organizations. "Improvapella," an annual show featuring the student-run improv group In Between The Lines along with the Ramblers, is an example.

Founded in 1998 as a group dedicated to performance and innovation, the Ramblers have become a campus mainstay. The group's ninth studio album, *Revival,* was released last November. In addition to three two-hour rehearsals a week, often late at night when group members are more likely to be free, the Ramblers perform six or seven times a month and schedule two major shows, one each semester. As many as 60 students audition over the course of the year, and the group takes in, on average, three new singers each year.

Suresky says that while he doesn't plan to pursue music professionally after graduation, he's learned important lessons about working with a large group of people whose perspectives often differ from his own. And he's learned about working toward a goal.

"It takes focus and determination," Suresky says. "It's not always going to be easy but to get the results you want, you have to work hard, and you have to be persistent."

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After Hours

The coed group brings a contemporary sound to campus.

ALL TOGETHER: After Hours features (clockwise from left) E.J. Kim '15, Liana Buniak '12, Alex Murray '13, Alaina Sawyer '13, Rohini Rege '14, Caitlin Mack '12, Natalia Wannon '13, Quinlan Mitchell '13, Tad Bezerra '13, Ben McCormack '13, Jalon Howard '15, Rei Ramos '15, Caroline Sterling '15, and Ethan Lobenstine '12. (Not pictured: Maddie Freeman '15)

After Hours Online
www.urafterhours.net

Ethan Lobenstine '12 is pretty clear about the role that the After Hours a cappella group plays in his life on campus.

"After Hours has been the defining force of my college career," says the music major from Rochester, who joined After Hours as a freshman and has been with the group ever since. He serves as musical director this year.

"We are essentially a group of friends who love music and who love performing together," he says of the group that includes students from a wide range of majors and interests, both academic and cocurricular.

Founded in 1998, the ensemble began life as a vocal jazz group, but within a few years had transitioned into rock and pop music and is now known for its contemporary repertoire.

Each year, the group presents two major campus shows—one each at the end of the spring and fall semesters. During the year, After Hours performs as much as one show a week—whether on campus, in Rochester, or traveling to other campuses and cities in the Northeast.

Add to that at least six hours of rehearsal time each week along with other duties that come with being in a large group, and the commitment adds up. But Lobenstine says the members wouldn't have it any other way.

"We don't just sing," he says. "We're very much friends."

ADAM FENSTER

MASTERS OF A NEW UNIVERSE

With a new degree program in New York City as well as new degrees in health care and technology, Rochester aims to meet the needs of students looking for master's level education.

By Robin L. Flanigan

Eight stops on the train from Queens, New York, to the middle of Times Square, and Barclay Keith is in class to earn a master of science degree in finance from the Simon School of Business.

For Keith, recently promoted to account manager at Bloomberg L.P. in Manhattan, earning a salary while furthering his education is crucial, which is why he was drawn to a program that brings Simon's experts in finance, accounting, and economics to where the action is—Manhattan.

"It's a lot more work, I'm not going to lie," Keith, who holds an undergraduate degree from Kennesaw State University and a master of science degree in management with a concentration in global entrepreneurship from Babson College, says of juggling his 10-hour workdays with nightly homework.

"But they have a bang-up lineup as far as professors go, and I can use what I've learned the very next day. Just being able to experience how the material is actually used, that adds value right there. It's not just all in theory anymore."

While Keith has no current plans to leave Bloomberg, where there is significant internal flexibility, he's confident that the finance degree will help him move faster up the ranks than he would without it.

"When it comes down to who's more qualified and the scope of the job I can move into," he says, "it's definitely going to pay off."

The master's program, offered through the Simon School, is one of several new, flexible, and often interdisciplinary graduate programs being offered by the University. No longer seen merely as a step along the way to a higher degree, specialized master's degrees are being sought after by those searching for innovative ways to do their current jobs better and differentiate themselves come promotion or hiring time in a highly competitive, continuously volatile job market.

According to a 2010 report by the Commission on the Future of Graduate Education, a national group of higher education officials, advanced training is a strategic national asset, one that's necessary for the United States to remain viable and strong in the

SHANNON TAGGART FOR *ROCHESTER REVIEW*

FINANCIALLY CENTERED: Raquel Antonious '06, a student in the Simon School's new Manhattan-based master's program in finance, says the location of the program is key. "I want to stay in New York, and the network here is very powerful."

EXPANDING ROLES: A student in the University's new master's degree in health professions education, Christine Arnold is also a nurse who teaches in the School of Nursing.

21st century. The report calls for state and national efforts to increase graduate school enrollment.

For its part, the University has added several new master's degrees over the past two years, ranging in fields from business to health care to engineering and literary translation.

"It's about offering the opportunity to get a deeper appreciation and understanding of a particular field," says Wendi Heinzelman, dean of graduate studies for Arts, Sciences, and Engineering. "And one of the advantages of having a wide range of unique programs is that they appeal to a diverse group of students."

Structured for working professionals, the 13-month, part-time MS in finance program includes 10 courses in midtown Manhattan on alternate weekends and two weeklong programs, one at the University's campus in Rochester and another in Europe. And with approximately 3,000 alumni in the tri-state area, the program also offers opportunities for networking, mentoring, and support.

Of the 19 students in the inaugural class, which will graduate this spring, at least five have already started new jobs or been promoted.

"People recognize the Simon brand and come to us for a rigorous and highly respected degree," says Janet Anderson, director of Simon's part-time programs, both in Rochester and New York City. "To be able to get that while continuing to work in New York City, the globally accepted mecca of finance, is a real strength for their résumé."

Raquel Antonious '06, who majored in mathematics and statistics as a Rochester undergraduate, enrolled in the program to broaden her résumé after spending three years in equity research. "I knew I wanted to stick to the financial sector, but I felt like I specialized so early, and that there was more for me to learn," she says. Antonious has since moved into financial management consulting at KPMG, and predicts the degree will guarantee her a lengthy, upwardly mobile career in Manhattan.

"It does give us a lot of leverage," she says. "I want to stay in New York, and the network here is very powerful. I can't tell you how much I appreciate this opportunity."

Jack Chang '09, who earned an undergraduate degree in optical engineering, has equal appreciation for his master of science in technical entrepreneurship and management, or TEAM, degree, which he says was the reason he started fielding job offers four months before graduation in 2010. The hybrid degree, jointly administered by the Hajim School of Engineering and Applied Sciences and the Simon School, combines the latest advances in both engineering and business.

"I was prepared more holistically, which made me a better candidate," he says.

Two months before earning his graduate degree, Chang secured a job as a supporting sales engineer with a Rochester-based manufacturer of high-end optical components. He has since taken another job designing optical filters, hoping that the niche work will ultimately translate into a new business.

"To stimulate an economy, you need a more entrepreneurial mindset," he explains. "You need to have more people who are willing to take risks, and that's where TEAM plays an essential role."

TEAM students create business plans to commercialize patented technology from the University's Offices of Technology Transfer, compete and apply for start-up funding, and have the potential to launch their own businesses based on University technologies.

Seventy-five percent of graduates from the class of 2010 received multiple job offers before receiving a diploma. The Class of 2011 had its own impressive statistics, with every graduate placed either in a full-time job, an internship, or a continuing education program.

"It's not just about business savvy, and it's not just about technical research," says TEAM executive director Andrea Galati '05, '11W (MS). "It's about being well-versed in two different languages."

Matt Munderville '07, a 2011 TEAM graduate, says that bilingualism is responsible for much of his success at a start-up company in Pristina, Kosovo, where he's working to bring small-scale wind power to rural farms. He has developed a clear financial plan for the company, which he presents to development groups and potential local investors.

"The program really focuses on giving students the tools necessary to tackle the unknown in a structured manner," says Munderville, who was a physics and English double major as an

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undergraduate. "TEAM helped me develop an intuition I can rely on, and a résumé that lets others know that they can rely on it, too."

Interest in the program is growing. The number of applications grew from 75 to 140 in the last year, and given that prospective students began sending in applications in September for the 2012–13 academic year, the program is on track to grow even more.

"You're always going to need people who are real specialists, who can do a deep dive into an area or discipline," says Duncan Moore '74 (PhD), vice provost for entrepreneurship. "But these students understand the market opportunities at the same time, so they'll be much better at doing that deep dive. That's what will differentiate them in the marketplace."

With market opportunities increasing all the time in the swiftly expanding health care field, Christine Arnold, both a student and a nurse currently teaching at the School of Nursing, enrolled in the master of science in health professions education program to develop a more sophisticated level of expertise. Rochester is the first university in the region and one of a small number worldwide to offer the comprehensive, interdisciplinary master's degree.

Raised in a culture of lectures and written exams that she says was more about convenience than education, Arnold appreciates an integrated approach that has her learning alongside doctors, physical therapists, occupational therapists, dentists, and other health care professionals.

"A lot of medical professionals are trained separately in silos, and then we throw them together and say, 'OK, take care of this patient as a team,' and they're not well-equipped to do that," she says. "This program goes a long way in promoting professional collaboration, increasing communication, and leveling the hierarchy that's in health care right now. I'm not intending to go anywhere soon, but I certainly have become a much more competitive and valuable candidate with this education behind me."

Up and running for about a year and developed by the Warner School of Education, the School of Nursing, and the School of Medicine and Dentistry, the health professions education program draws on faculty from each of the schools, and all courses are aimed at helping students become more effective teachers, faculty members, professional development providers, and patient and family educators. The idea is that by focusing on how people learn, their efforts will have a far greater impact.

"This is a very nontraditional way of thinking about teaching in education," says Raffaella Borasi, dean of the Warner School. "We recognized the need for complementary expertise, which is an important piece for the next generation of practitioners."

The demand for such candidates is expected to escalate as hospitals and other health care institutions turn more and more to the business world for its expertise in cost and quality control.

In response, Rochester is offering an MS in business administration with a concentration in medical management that's geared toward students with few to no years of work experience. The program is in addition to Simon's long-running part-time program for more seasoned professionals.

With close connections to Strong Memorial Hospital and other local health care institutions, both programs allow students to use what they learn in the classroom to help medical professionals solve real dilemmas.

"For younger candidates with less work experience, the new degree will go a long way to helping them land their first position," says Samuel Ogie, director of the Simon School's programs in the health sciences.

The MS in biomedical engineering with a concentration in medical technology innovation, one of the University's newest offerings, is another nod to the increasing demand for collaborative expertise in the workplace. Launched this year with a focus on cardiovascular device design, the program is expected to expand across fields of medicine "Historically, there has been a big hole in combining biomedical engineering and medical center technologies," says Pia Bunton, recruiting and marketing manager for graduate programs in Arts, Sciences, and Engineering. "A student coming out of this program will have all the knowledge to make a real impact on the medical device field."

And taking cooperative learning to a new level, Rochester Institute of Technology and the School of Medicine and Dentistry have teamed up to offer a master of science degree in medical informatics. The degree combines the computing strength of RIT's College of Computing and Information Sciences and the expertise of the medical school—an attractive mix to employers.

Eight students are enrolled in the program, which began in September and is the first joint degree offered by the two institutions.

"With the tremendous uptick in the implementation and acquisition of electronic health records by providers, offices, and medical centers, the need for qualified 'health informaticists' who understand how to improve health care through the use of technology has skyrocketed," says David Krusch, chief medical information officer, director of medical informatics, and professor of surgery and informatics at Rochester. He adds that the program is designed to give students "a practical, applied working knowledge" of the skills required to meet that need.

Providing such a grounded understanding of a new field is a key element of other new degree programs at the University.

A new master of science program in alternative energy targets the increasing demand for development of sustainable energy through solar cells, fuel cells, biofuels, and nuclear fusion, using the chemical engineering faculty's strong research programs in advanced materials, biotechnology, and nanotechnology.

Meanwhile, the master of arts in literary translation studies program includes a requirement to complete a book-length translation of publishable quality, an important skill as global boundaries shrink and access to foreign literature becomes more important.

"Only 3 percent of literary works published today are works in translation, and we're trying to remedy that," says Thomas DiPiero, dean for humanities and interdisciplinary studies. "There is so much literature being published every year, partly influenced by the speed of communication, and we're past the period in which the only thing that matters are Western languages."

The need for leading-edge education isn't diminishing anytime soon.

"We're going to stay at the forefront of the trends," says Heinzelman, the dean of graduate studies for Arts, Sciences, and Engineering, "and develop new degrees that meet evolving demands."

Robin L. Flanigan is a Rochester-based freelance writer.

Rochester Romance

Did you find your heart at Rochester? In the spirit of Valentine's Day, we ask a small sample of alumni couples to tell us their stories.

Profiles by Robin L. Flanigan | Introduction by Susan Hagen

After more than 40 years of researching relationships, Harry Reis is struck by how our connections to other people are central to human life.

One of the most compelling findings of the research, the Rochester professor of psychology says, is "just how extensively relationships pervade every part of our lives. There is almost nothing that is not impacted in a profound way by our relationships—school, work, health, you name it."

And while Rochester alumni have many connections to their alma mater—friends, classmates, family, other members of the University community—for about 10 percent of graduates, the ties are a little deeper.

According to University records, about 9.5 percent of Rochester's roughly 108,000 living alumni are married to another alumnus. That's not counting those who are in long-term relationships but who are not married.

Such long-term relationships are especially beneficial to each partner's well-being, says Reis, the author of more than 120 papers on how the connections between people affect their psychological and social health. The longer couples are together, he notes, the more each partner reaps a host of benefits, including longevity, happiness, overall health, and more productive work lives.

"Relationships are a source of support. They help people deal with stress, and make people happier," he says. "People have a need to be connected, and when they have those needs met, they have more energy for other pursuits as well."

That's not to say long-term love is always a bed of roses. Hundreds of studies have shown that the No. 1 ingredient in a healthy relationship is the ability to handle conflict in a constructive way. Being able to really listen, to recognize the other person's perspective, and to compromise are also essential, Reis says.

"Lifespan research shows over and over, if you ask a senior what's important in life, they say, 'Pay attention to your relationships.' Look at tombstones. No one writes, '. . . worked at this or that business for 28 years.' They write: 'Husband, mother, sister, brother.'"

With that in mind, we asked a small sample of alumni couples to tell us the stories of their Rochester romance.

‘A Lasting Union’

Allan ’54M (MD) and Helen Uebel Inglis ’49

A mutual friend invited them to dinner, and after a lively evening, Allan Inglis ’54M (MD) offered Helen Uebel ’49 a ride home.

He was characteristically quiet, but weeks later called to invite Helen out to dinner and a movie. She told him she had plans to attend a concert, but that she’d love a raincheck. The next invitation came a month later, to accompany him to a class party. They arrived early, so Allan, a squash player, brought Helen over to the squash court, where she took off her high heels and chased after balls in her stockinged feet.

“I didn’t expect her to be very good, but I thought we would have a good time,” says Allan. “My classmates cheered us on.”

Over Christmas break, back home in Oregon, Allan kept mentioning Helen’s name. His mother was on a plane to Rochester that January.

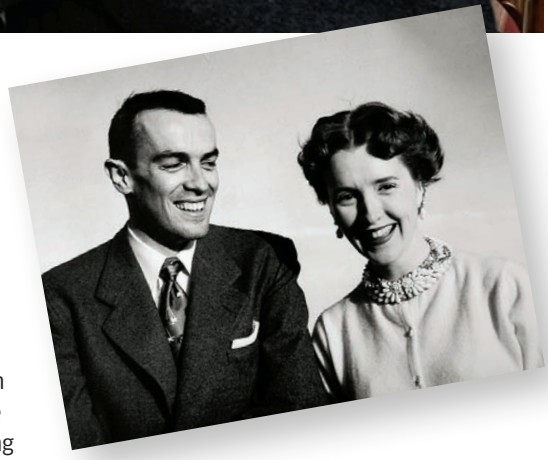
“She came to look me over,” Helen recalls. “I was an Easterner, for heaven’s sake. And worse yet, a redhead.”

Helen passed the test, and Allan passed a similar one with Helen’s friends months later at a party she hosted before departing on a European summer vacation with a friend. “All the girls were circling around him and doing a ‘Oooh, where did you find him?’ kind of thing,” she says. “I acted nonchalant.”

The couple married in June 1955. They went on to have seven children, two of whom are doctors. They moved 10 times between Allan’s graduation from the School of Medicine and Dentistry and their decision to settle in Rye, N.Y.

The Inglises agree that the University gave them a nice start to their lasting union.

Says Allan: “It was a lovely place to spend the first year of our wonderful marriage.”



After meeting on a double date with friends, Allan and Helen Uebel Inglis married in 1955. “We had a lot of fun,” says Allan of life on campus as a couple.

BILL KOUSTRON/AP IMAGES FOR *ROCHESTER REVIEW*

‘Best Thing That Ever Happened in My Life’

Robert ’58M (PhD)
and Janet Eddy Scala ’55N

A month after starting medical school, Bob Scala ’58M (PhD) ended up in the emergency room. It turned out he had significant internal bleeding, and after being moved into a private room, was told his vital signs would need to be checked every 30 minutes.

“The first person through the door was a young student nurse to whom, it is claimed, I said, ‘Get the hell out of here and leave me alone,’” he says. “She turned on her heel and walked out.”

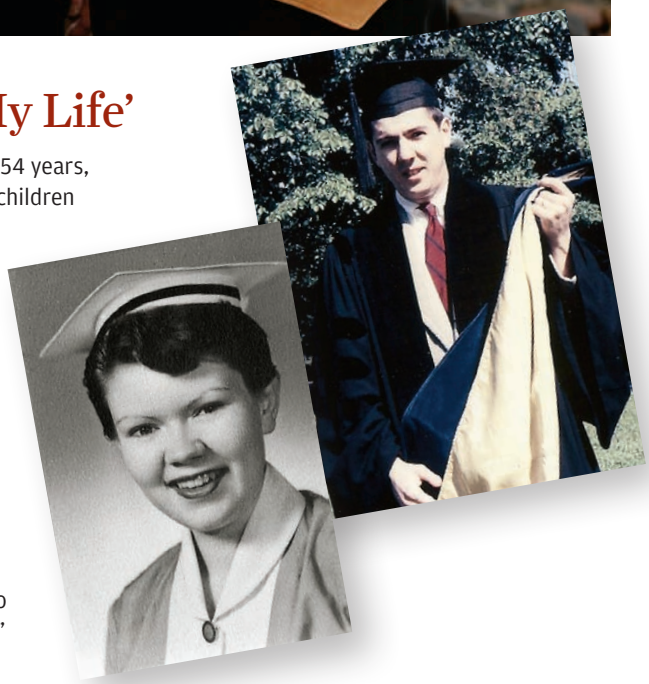
She went back in, of course, and over time even brought him up to the roof in a wheelchair so he could get some air. Janet Eddy ’55N was a second-year nursing student then.

“I just kept peeling off one layer after another,” she says. “He was such an interesting guy.”

They howled through a Jerry Lewis and Dean Martin comedy on their first date, and have been laughing—and playfully teasing each other—ever since. Married 54 years, with four children and 10 grandchildren (other Rochester graduates include son John ’80 and grandson Andrew ’11), the couple lives in Tucson, Ariz.

“For me, Rochester has meant two great things,” says Robert. “I got to meet this lady, which was the best thing that ever happened in my life, and I got a superior education, which has led us to be pretty regular contributors to the school. We’re proud of that.”

Janet echoes her husband’s assessment of the University, as well as his affections, though with one last ribbing about his overdue proposal: “I don’t think there are ever any coincidences in our lives. I’m an old romantic, and I could easily say he just lit up my life. Apparently, after four years, I lit up his.”



The first of three generations of Rochester students, Robert and Janet Eddy Scala met on campus in the early 1950s, while Janet was working toward her nursing degree and Robert was a PhD student at the School of Medicine and Dentistry.

RICK SCUTERI/AP IMAGES FOR *ROCHESTER REVIEW*

‘Constantly at Each Other’s Sides’

Chris ’82 and Elizabeth Pedro Taggart ’82

During the first week of NROTC freshman orientation, Chris Taggart ’82 came across to Elizabeth Pedro ’82 as straightlaced and much too eager.

“We wanted to be dismissed and do other stuff, and he would continue asking questions,” she says. “We would all sink further down into our seats.”

But about a month later, at a party, the two got to talking and found they had a lot in common. They’d both come from military families, participated in student government, and been involved in speech and debate in high school. Shortly after that, Elizabeth asked Chris on a date.

“She took pity on me,” he says. “I told her I had 8 a.m. chemistry classes and went to bed every night at 10 p.m., and she couldn’t believe I had such an austere, non-social life. So she took me to see *Barry Lyndon*.”

Commissioned into the Navy first, Chris then commissioned Elizabeth, and after exchanging vows in a military wedding in 1983, the couple lived in several states before settling in Greensboro, N.C., where they raised their two children. They both now work for the same defense industry contractor.

Though they haven’t been back to Rochester since 1986, the Taggarts are looking forward to attending their 30th class reunion this fall, and are members of the planning committee. They say they carry with them four years’ worth of shared memories that include swim meets, sorority events, and educational spring break trips. Even their wedding photos pay homage to their alma mater—a University of Rochester sticker is prominently displayed in the foreground of an image of the pair sharing a kiss through a car’s back window.

“We were constantly at each other’s sides our entire time there,” says Elizabeth.

Adds Chris: “It’s where I met the love of my life and best friend.”

“It’s where I met the love of my life and my best friend,” says Chris Taggart of meeting Elizabeth Pedro Taggart during the first few months of their freshman year in 1978.

JIM R. BOUNDS/AP IMAGES FOR *ROCHESTER REVIEW*

‘It Was Love at First Sight’

Jimmie ’75 and Dolores Ramirez Reyna ’75

With brown hair that fell past her knees and green eyes, Dolores Ramirez ’75 had Jimmie Reyna ’75 hooked.

“I have the event indelibly inscribed in my mind,” Jimmie says of the moment he noticed her at an orientation program just before their freshman year. “She was the most beautiful woman I’d ever seen. It was love at first sight for me.”

The relationship moved fast, with Dolores bringing her new beau home to the Bronx three months later for Thanksgiving, and with Jimmie announcing to his parents over Christmas break in New Mexico that he was very serious about his new girlfriend. They courted over games of backgammon and chess—“I used to beat him at chess,” notes Dolores—and during the spring semester, on March 4, they married.

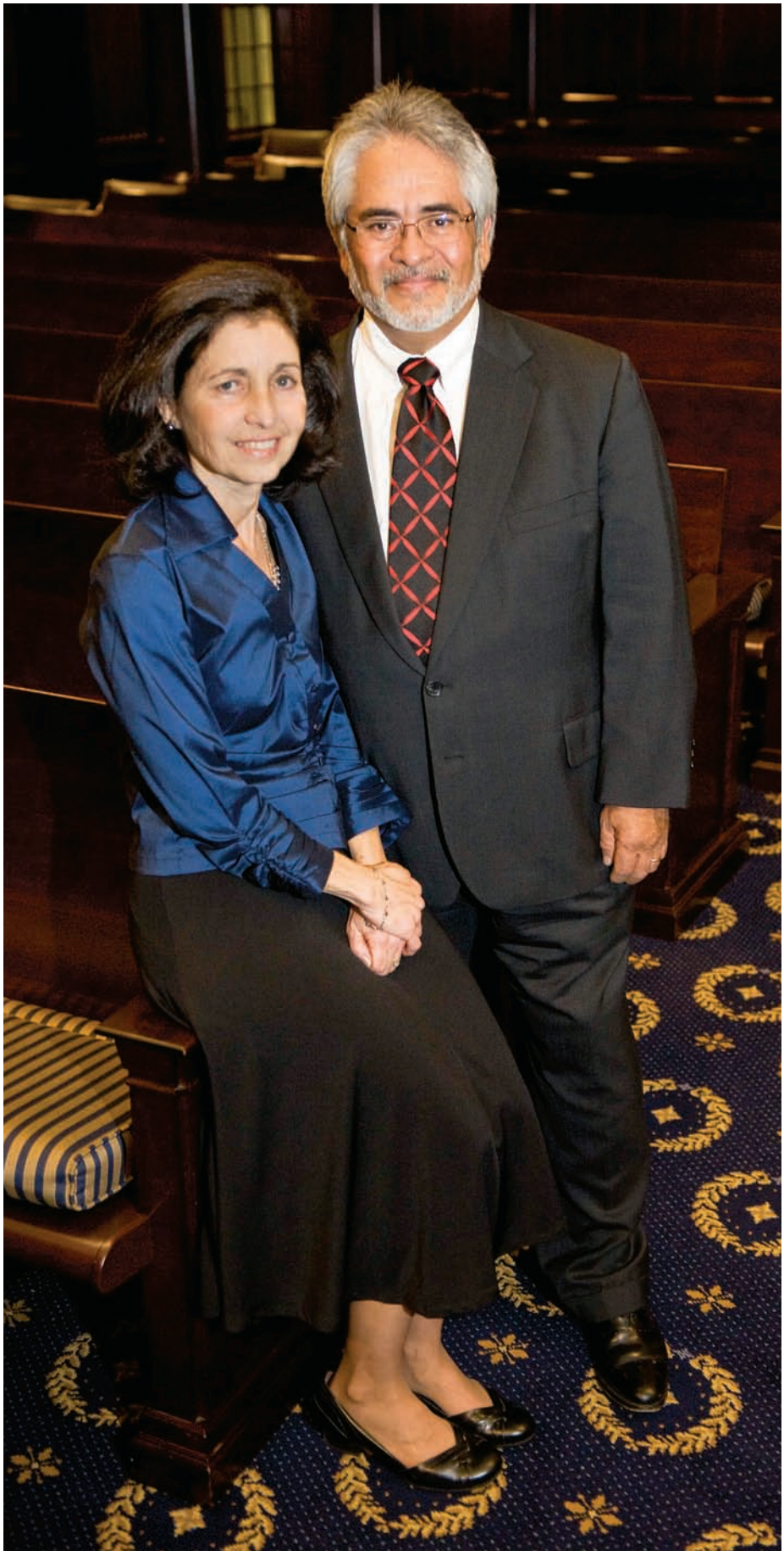
The newlyweds moved to an off-campus apartment, but when the woman in charge of married student housing, at the time available only to graduate students, discovered they were crossing the railroad trestle over the Genesee River to get to classes, she offered them a small place to live.

Now, about to celebrate their 40th anniversary, the Reynas live in Silver Spring, Md., and have two adult sons (including Justin ’99). Last year, Jimmie was appointed by President Barack Obama to the United States Court of Appeals for the Federal Circuit. Dolores is a high school counselor.

They are each thankful for the opportunity to attend the University on full scholarships—even as they raised a family, aligning their schedules so that one would be home while the other was in class.

And all these years later, Jimmie can easily snap back to his first experience as an undergraduate and that unforgettable impression of his soon-to-be wife.

“Everybody tells me how lucky I am,” he says. “I know that.”



Married as freshmen in 1972, Jimmie and Dolores Ramirez Reyna will celebrate their 40th anniversary this spring.

KEVIN WOLF/AP IMAGES FOR *ROCHESTER REVIEW*

‘The Rest Is History’

Arthur ’70S (MBA) and Margaret Stolze Bernstein ’70

As a graduate student walking past Todd Union with a friend, Arthur Bernstein ’70S (MBA) wanted to meet the attractive coed a few steps in front of him, so he tapped her on the shoulder and asked for directions to the football stadium.

“She looked at me like I was clueless,” he recalls.

Still, Margaret Stolze ’70 accepted his invitation to attend a business school function that night. They got engaged the following fall, and married the summer after that.

To commemorate the 40th anniversary of that day in 1968, Arthur arranged for a bench to be installed near the spot where they’d met. He decided to surprise Margaret with it during Meliora Weekend in 2008, while making their way from one event to another.

But when they walked by the bench, several people already were sitting on it. Arthur suggested that they relax on a different one nearby, and after stalling for quite some time, proclaimed the day a beautiful one and recommended moving to another spot—the just-vacated bench—to enjoy the sun a while longer.

Margaret, a bit confused by her husband’s behavior, noticed the plaque before sitting down.

“I said, ‘Wow, that plaque has your initials on it,’” she says. “Then I looked again and said, ‘Wait a minute. It has my initials, too.’ I was flabbergasted. I couldn’t believe it.”

Except for this past fall, the Bernsteins, who have two sons (Jeff ’04 and Brett), have traveled to Rochester from their home in Boca Raton, Fla., every year for Meliora Weekend. (They’ve already made hotel reservations for 2012.) And every year, they stop to rest on their bench, reconnect, and reminisce about their Rochester days, which included Arthur having Margaret’s father, the late William Stolze, as a business professor.

The simple phrase inscribed at the bottom of the bench plaque says it all: “The rest is history.”

After meeting during a fall weekend in 1968, Arthur and Margaret Stolze Bernstein graduated together in 1970. In 2008 they celebrated the 40th anniversary of their first meeting by having a bench installed at the spot on campus where they met.

MARC SEROTA/AP IMAGES FOR *ROCHESTER REVIEW*