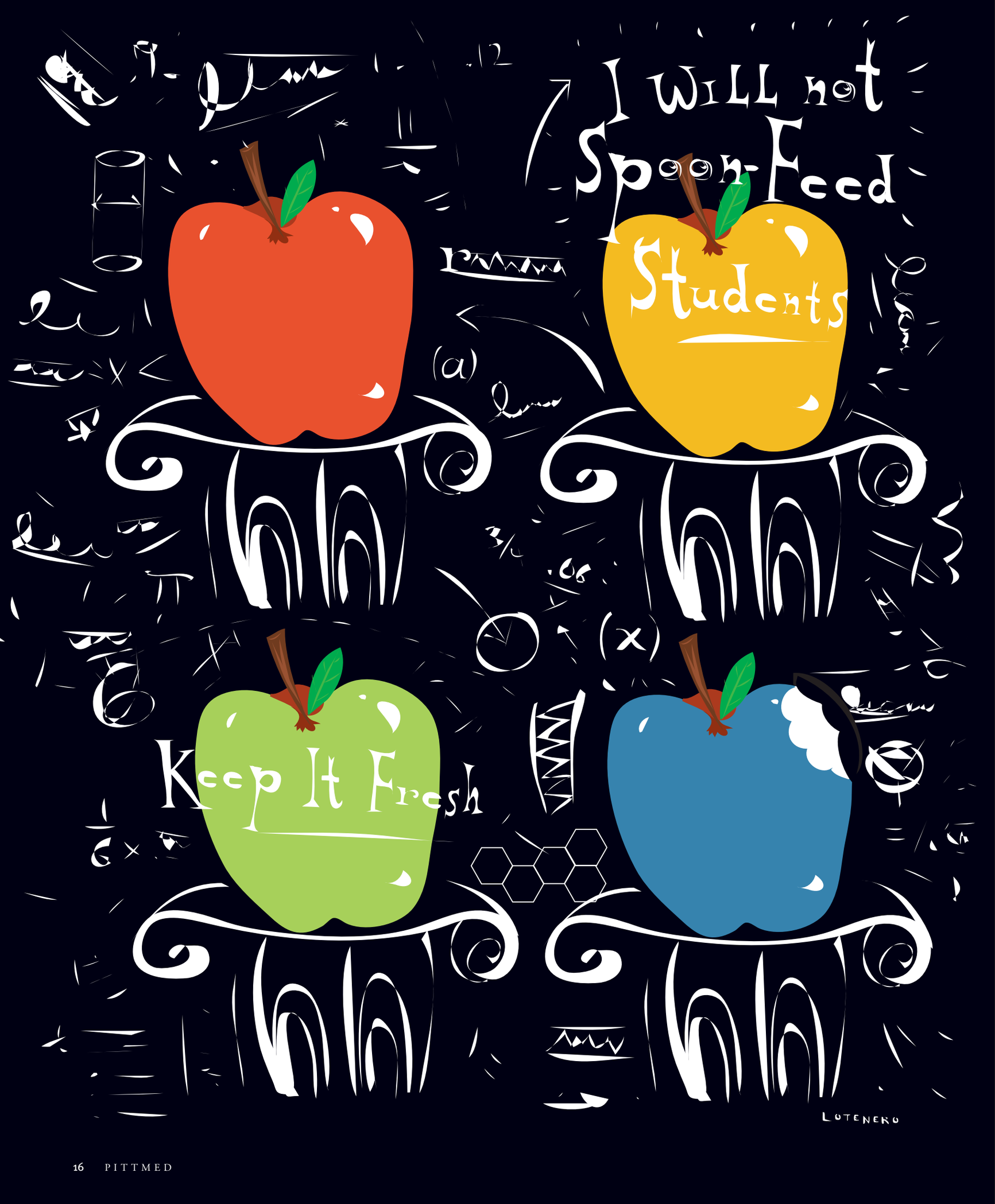
I will not
Spoon-Feed
Students
Keep It Fresh
LOTENERO

AWARD-WINNING PROFS FESS UP

COMPILED BY MEGHAN HOLOHAN, ERICA LLOYD, JESSICA MESMAN, AND JONATHAN SZISH

WHAT IT TAKES TO BE A TOP TEACHER

You know the ones we're talking about. The people who excite us about the life of the mind. Who won't let us get away with bluffing. Who make us aspire to be the very best we can be. Whose simple actions touch a sense of truth in us about what it means to live skillfully. Who aren't afraid to unplug a PowerPoint presentation.

We may not have even appreciated them until years later, but they are our favorite teachers. These creatures whose influence is so profound, how do they make it happen? To find out, we knocked on doors and filled e-mail boxes belonging to award-winning profs among our faculty and alumni. (A list of these sages is on p. 18.) These pages give us a glimpse of how they think, what makes them effective, and who colored their worlds.

ILLUSTRATIONS | MICHAEL LOTENERO

Tried and True

Guidance from the experts.

"You can't just give bare facts," says Basil Zitelli. "You have to tell how or why something occurs so students understand it."

Trust students to learn information on their own, so they're empowered, offers Gerald Merenstein.

Review the basics before moving on, no matter the level of the audience. "Otherwise, you're building a house on a shaky foundation," says Jamie Johnston.

Put as much time into planning the progression of your lectures as you do getting the talking points down on paper, suggests Cynthia Lance-Jones. She stresses the importance of linking ideas in a logical progression.

You have to know your audience, say Zitelli and Johnston, so you know the level you're pitching to. Often, physicians give lectures at a higher level of experience or education than is appropriate.

More than five basic ideas in a lecture are too many, says Johnston: "Some teachers just spray knowledge at you like a fire hydrant; you try to take a sip, and you get your lips ripped off."

Find ways to make the material fresh, even for yourself, says Johnston. One way to maintain enthusiasm when you're covering a topic for the hundredth time, he offers, is to remind yourself of the significance of your job. "Teaching is often not as sexy as surgery," he says. "But I'm helping a new generation of doctors whose patients will be affected by what I do in the classroom. And I can always get enthusiastic about patient care. That's why I do what I do."

Constructive criticism is vital, says Paul Rogers. At the same time, Rogers recommends telling students up front that they're going to get a lot of feedback so they realize it's part of the process and not a reflection on their performance. Adjust your teaching methods to meet student needs. "Give more or less feedback, more detailed instruction, change your curriculum, whatever it takes," he says.

Make students evaluate themselves. Heidi Feldman uses this tool so her students can learn their strengths and weaknesses and so that she can work on her listening skills.

Use different teaching formats, advises Carole Coffee. While she appreciates the value of the lecture, she is glad that there is a movement toward more problem-based approaches. "It's important to have a curriculum where the students have room to teach each other and themselves."

Remember that a professor can't teach everything that a student needs to know, says Gerald Merenstein. ■

Thanks to these sage teachers among our faculty and alumni, whom we canvassed for this feature:

Carole Coffee, professor emeritus of molecular genetics and biochemistry at Pitt, winner of the Chancellor's Distinguished Teaching Award

Georgia Duker (PhD '82), assistant professor of cell biology and physiology at Pitt, winner of the Chancellor's Distinguished Teaching Award, the Golden Apple, and six-time recipient of the Excellence in Education Award

Heidi Feldman, Ronald L. and Patricia M. Violi Professor of Child Development and Pediatrics at Pitt, winner of the Chancellor's Distinguished Teaching Award

Jamie Johnston (MD '79), professor of medicine at Pitt and a recipient of the Chancellor's Distinguished Teaching Award, Excellence in Education Award (six times), Pitt's Golden Apple, the National Golden Apple, and an Unsung Hero Award for outstanding resident teaching at West Penn Hospital

Cynthia Lance-Jones, associate professor of neurobiology at Pitt and a recipient of Pitt's Excellence in Education Award and

...es

the Kenneth E. Schuit Award, Dean's Award for Master Educator

Gerald Merenstein (MD '66), professor of pediatrics at the University of Colorado, two-time winner of the Outstanding Teacher Award, Department of Pediatrics, Fitzsimons Army Medical Center

Joel Merenstein (MD '60, Res '61), clinical professor of family medicine and director of research and fellowships at UPMC St. Margaret; winner of the Society of Teachers of Family Medicine Excellence in Education Award

R. Harsha Rao (Fel '88), professor of medicine, director of fellowship training in Pitt's Division of Endocrinology, recipient of the Chancellor's Distinguished Teaching Award

Paul Rogers, professor of critical care medicine and medicine at Pitt and a five-time recipient of the Golden Apple, winner of the Chancellor's Distinguished Teaching Award, the Kenneth Schuit Award, and the Leonard Tow Humanism in Medicine Award

Nina Schor, assistant dean for medical student research at Pitt and professor of pediatrics, neurology, and pharmacology; recipient of the Chancellor's Distinguished Teaching Award

Basil Zitelli (MD '71), Pitt professor of pediatrics and recipient of the Kenneth Schuit Award

Things Fall Apart

Do great teachers ever make mistakes? Yup. Top faculty reported failed projector bulbs and then some.

Nearly 25 years ago, Joel Merenstein was teaching residents at what is now UPMC St. Margaret. A third-year resident asked for Merenstein's help with Gloria, a patient who suffered from lower abdominal cramping pain but had no other symptoms. Test after test came back normal, but her pain remained. After Gloria told Merenstein about her mysterious symptoms, he guided the discussion to her marriage, then to her sexual relations. Finally, Gloria opened up: She cried, explaining her husband's demands and her disappointments. Merenstein suggested they had uncovered something important and encouraged her to come back for more help with the resident.

"I simply gave her an opportunity to talk about herself and focus on the real source of her pain. I had no preconceived ideas," says Merenstein.

As Merenstein was mulling the creation of a new course on how to get patients to open up to residents, weeks passed. Gloria never came back. Nor did she return several phone calls.

To this day, Merenstein wishes he knew what he should have done differently: "Demonstrating psychosocial aspects of care without interfering with the relationship between resident and patient remains a delicate issue."

For years, Heidi Feldman has invited families of children with a variety of conditions to talk to her classes about their experiences with physicians. The first mother to present to one of Feldman's classes had a premature baby. The mother told her story, and when she talked about a conflict that she had with a doctor she'd say, *I would have preferred he'd done it this way. Or it would have been more helpful if ...* With presenters like this, Feldman's students were gaining excellent insight for how it feels to be the parent of a sick child and how they might communicate best as a doctor. Then one day, the father of a recently diagnosed child came to present. *Doctors don't listen. Doctors aren't helpful*, he said. Feldman cringed as the father attacked the medical profession. She watched her students tense up in their seats, listening to this angry man, learning little but what it's like to be unhappy. This kind of situation happens to Feldman rarely, perhaps with 2 percent of her class visitors. So Feldman remains committed to having her students hear firsthand from the parents and children they will serve. It may become charged emotional territory, yet it's certainly worth the effort.

One evening, a resident in the neonatal unit approached Gerald Merenstein with an idea for a treatment for a premature baby. Merenstein listened to the young physician's suggestion about using pulmonary vasodilators to open the arteries going to the lungs to help a child with underdeveloped lungs.

"What's the evidence for this?" Merenstein asked. The resident didn't have any evidence. It was a hunch.

About a decade later, pulmonary vasodilators are the standard of care for helping premature babies breathe. Merenstein laughs as he bemoans how he dismissed the suggestion; he wishes he hadn't quashed the young doctor's idea.

Carole Coffee and another teacher presented a junior high science class for broadcast to all of Oak Ridge, Tenn. The two planned to show a spontaneous combustion.

As the cameras rolled, the teachers dove under the desk to avoid the fallout from the explosion. Coffee, curious to see how the combustion was going, crawled from underneath the desk, not thinking about the fact that she was wearing a suit and panty hose, not thinking about how this image of her was being broadcast to classrooms throughout the larger metropolitan area.

As long as Coffee lived in the community she was exposed to the fallout from the explosion. Students would say, *Hey, aren't you that teacher who showed the spontaneous combustion? I remember you crawling around.* It proved to be an indelible image, but not one she would have chosen to contribute to her credibility among students and their parents.

Who Inspired Them

We asked top teachers, what teachers do you admire?

It was Gerald Merenstein's first night on call as an intern at Fitzsimons General Hospital in Aurora, Co., when a couple rushed in with their 11-day-old daughter. She was critically ill. Merenstein (MD '66) admitted the girl at midnight and stabilized her.

The parents had driven for most of the day and night from their home in Florida to bring their daughter there. "Can you call Dr. Plunkett?" they asked Merenstein. The couple knew pediatrician **Daniel Plunkett** from when he cared for their older daughter with anemia. Soon, Plunkett arrived and talked to the family, while Merenstein continued caring for their child. Merenstein couldn't believe that someone would drive all that way to see a doctor. Plunkett always said you have to care for and about the patient, and now Merenstein was able to see the devotion that could inspire.

The family soon moved to Colorado to be closer to Plunkett. But when he left Aurora, Merenstein became the children's pediatrician.

In Basil Zitelli's earliest memory of **Catherine DeAngelis (MD '69)**, she is an intern at Children's Hospital of Pittsburgh, soothing a fussy toddler so that a group of eager medical students can lay their hands on the child's chest, leaning in to listen for the rhythm of his heart. "She alleviated his fears so that we could learn," says Zitelli. DeAngelis (now a Pitt trustee and editor in chief of *JAMA*) taught by demonstration; her warm, easy manner seemed to calm even the most distressed child. Now a pediatric specialist, Zitelli has developed his own method of disarming and distracting his patients while obtaining practical diagnostic information—he thumb wrestles them. "It relieves stress," he says, "and allows me to assess their strength and motor skills." He's often surprised by their power; in his experience, the patient often schools the doctor.

Nicholas Cauna was a professor of anatomy and embryology at Pitt when Cynthia Lance-Jones first came to Pittsburgh. She remembers he could draw any embryo at any stage—with either hand. "His final drawings were often spectacular, but he always started out simple, so the students could follow," she says. When PowerPoint eclipsed the blackboard as a visual aid for lecturers, Lance-Jones fears many lost sight of the value of the latter's effectiveness. Many teachers are wooed by the beautiful pictures they can copy from textbooks or the Web, but in her lectures, Lance-Jones' touchstone is Cauna's elegant chalkboard renderings. Like Cauna, she takes the students on the journey with her, instead of just showing them pictures of their destination.

If the late Pitt surgeon **Charles "Chuck" Watson** asked you a question during rounds, says Jamie Johnston, you knew that he already knew the answer. He knew the literature better than anybody. But if you didn't know the answer, he wasn't going to tell you. You had 24 hours to find out. Johnston remembers Watson saying, "It's not a sin to say you don't know. But it is a sin to say you don't know 24 hours later." This principle taught Johnston never to be content with his own knowledge base. He says he thinks of Watson every time he tells a student or a patient "I don't know." "As a doctor, you are a lifetime student," he says. "It's your responsibility to find out."

James Ferrante (MD '65) was the longtime family practice residency director at UPMC St. Margaret. Joel Merenstein thinks that what really made him a great teacher was how well he got to know his residents and his desire to help them learn. He would sit in the preceptor's room (though he never really sat still for very long) and guide a medical student with gentle questions as she translated pathophysiology into patient care. He would tell a resident who was getting too dependent on his preceptors to "Go look it up yourself." He was a role model, displaying the care and personal touch appropriate for an elderly woman with multiple chronic illnesses and not much available treatment. And for residents who were getting a little too self-assured, he'd ask just the right questions to let them know they really didn't know enough yet.

Then, he would sit back and ask all of them about their spouses. He knew the names of everyone's children, as well as their grades, and in what activities they participated.

When Ferrante became ill with lung cancer, he used himself to point out to students and residents physical cues to notice. Ferrante died when he was 54. In his last days, he would leave his hospital room in his robe to attend medical conferences at St. Margaret; and he always added something to the discussion that no one else had considered.

When Nina Schor was a resident in pediatrics in the early '80s, she had an idea for a research project. She hoped to change the way doctors fought neuroblastoma, one of the deadliest tumors that can afflict the nervous systems of children age 4 or younger. Hers was a crazy idea out of the blue, as she puts it.

She needed a mentor and home base for her work. So she visited **Manfred Karnovsky**, professor in the Department of Biological Chemistry at Harvard Medical School. The work she wanted to pursue was not directly related to his lab's. But Schor wanted to apply his group's techniques to the clinical arena.

"I met with him, presented my ideas," says Schor. "A discussion ensued, and the next thing I knew, he showed me to my lab bench and laminar flow hood."

During the next three-and-a-half years, they met countless times.

"He was always available when I needed him; he was always nowhere to be found when I needed to be left on my own to do my own thing."

Schor's "crazy" idea is used as part of a neuroblastoma therapy today. ■

Their Tips, Tools, and Tricks

There's a method to their magic.

IT'S LIKE THIS "Think of the liver as a factory," R. Harsha Rao tells his students. "It makes a product—glucose—that it sends out into the yard, which is the blood. The horse and cart are the delivery system—insulin—that carries the product to the consumer, represented by the house, which represents every organ in the human body."

Several simple, hand-drawn cartoons appear on a screen. A factory spewing out black smoke, with piles of its product stored in the yard. A house. An animated horse and cart glide across the screen, delivering packages from the factory to the house.

Rao is describing to first-year medical students the concepts that underlie the metabolic changes in diabetes mellitus. The cartoons, drawn by Rao himself, explain how diabetes throws the body's finely balanced system of production and consumption into disarray. Rao's students may remember some favorite cartoons:

Type 1 diabetes: The horse is sprawled on the ground, obviously dead. There is no insulin, so packages of the factory's product pile up in the yard, which illustrates dangerously high blood glucose.

Insulin resistance: This time the house is set on a hill. The horse is normal, but it can't meet the delivery rate required because of the burden of going uphill.

Compensatory hyperinsulinemia: The image of the normal horse dissolves, and in its place is a caricature of the equine, twice as large as before, muscles bulging everywhere.

"If the horse you have is not strong enough to do the work, you have to go out and get… Arnold Schwarzenhorse," Rao says. Compensatory hyperinsulinemia is the physiologic equivalent of the "horse on 'roids"—higher insulin levels in the blood, in response to insulin resistance, Rao explains.

Arnold Schwarzenhorse and Rao's other cartoons have been fixtures in his cell science nutrition lecture since 1994. So notorious is the lecture that students who see him in subsequent years during their clinical rotations often say, "You're the one who gave us the Arnold Schwarzenhorse lecture!"

"All I can do," says Rao, "is shake my head ruefully and respond, 'Yes, but it's really the diabetes lecture!'"

Jamie Johnston also encourages his students to visualize everyday analogies for complex concepts: "I always try to use as examples things we're all familiar with, like driving a car." These real-world analogies also translate to the bedside. Later, students can rely on the same methods to explain concepts to their patients.

NEVER SAY DIE Physicians rarely allow students to manage crisis situations, says Paul Rogers. So his students spend an hour a day in the simulated intensive care unit at WISER (the Peter M. Winter Institute for Simulation, Education and Research), where the patient is a life-size mannequin whose vitals Rogers controls. If the mannequin is having trouble breathing, the student has to assess the situation quickly and make a treatment plan. The student might have to insert a breathing tube. But what if he can't get the tube in? In the simulation center, there's no attending to call for help. The dummy's blood pressure and oxygen level will drop, and the student will have to resuscitate. Rogers finds that his students learn quickly how to handle surprises. "They get to see in one month what I've seen in 25 years," he says. But in his class, the dummy never dies—Rogers will end the simulation before tragedy occurs. "I let it get uncomfortable," he says. He's found that when the mannequin dies, students tend to focus on the bad outcome and don't learn the objectives for that session.

WITH PLEASURE Georgia Duker keeps a *Prince Valiant* cartoon in her office. In it, one of the king's sons is in the library with his tutor, wistfully staring out the window at jousting knights. Then the boy runs outside to watch more closely. The caption reads: *Jeffery sets the boy free and remembers that what is learned without pleasure is forgotten without regret.*

When Duker lectures, she thinks about this cartoon and recalls that most students only have an attention span of 15 minutes, so she breaks up the class period. Sometimes she has students briefly engage their neighbors in a related discussion. Sometimes she has them write down their thoughts and tell them to her at the end of the class. These breaks keep the students actively engaged during long class sessions, she says.

WHERE'S THE PROOF? One of Gerald Merenstein's favorite mentors (besides his brother Joel Merenstein, who's also an award-winning teacher) always insisted he give evidence, before evidence-based medicine was in vogue. Today, Merenstein often asks students, "What's the evidence?" He'd like the field of medical education to hold itself to the same standards. He asks why, for example, more medical educators don't use adult learning theories to shape curricula.

THINK FOR THEMSELVES One summer, an undergraduate honors student was working in Nina Schor's laboratory. Schor asked the student to take a stock solution of a reagent and dilute it to use in an enzyme assay. The student came to Schor, calculator in hand, asking for the formula by which she should decide how much 10-molar solution and how much distilled water to use to make a .5 molar solution.

"There is no formula by which to do that," Schor said.

The student looked at Schor, dumbfounded.

"By what factor does 10 differ from .5?" Schor asked.

The student punched away at her calculator, then said, "20."

"Then that's the factor by which you want to dilute the stock solution. Dilute it 1-to-20."

"Is it 1-water and 20-stock solution or 1-stock solution and 20-water?" the student asked.

Schor paused. "Do you want to change the concentration by a lot or just by a little?"

"Oh," the student said, a little miffed. But she had caught the meaning of Schor's exercise. Schor believes the student actually accomplished much more through this circuitous route than if she had diluted the solution appropriately from the start.

Schor reminds us that a student's brain is often the best teaching tool. ■

What not to Do

These missteps will make you less effective as a teacher and role model, according to our top teachers.

Don't belittle, yell, intimidate, or embarrass. Instead, find ways to provide criticism without injuring self-esteem. Direct comments to the educational experience—what the class as a whole can learn—rather than the person.

Don't call medical students "kids." Give them the respect they deserve as adults.

Don't "pimp." That is, don't grill students for the sake of flaunting your own knowledge. (Put on a white coat, head out on rounds, and you're in danger of adopting the nasty habit of attempting to establish authority by quizzing others on lab values from 1963—among other obscure facts.) Pimping has nothing to do with patient care.

Don't let anyone get away with memorizing without understanding.

Don't go over the time limit of the class.

Instead of focusing on what you are teaching, focus on what the students are learning.

Don't spoon-feed.

Don't think that teaching is easy work—it takes passion. ■

LIGHTNING IN A BOTTLE

NEW ACADEMY OF MASTER MEDICAL EDUCATORS

BY JESSICA MESMAN

The student was halfway down the hall when Steven Kanter gave chase.

She'd stopped by the medical school vice dean's office to ask if he could recommend a good neurologist, a referral for a sick friend. But Kanter was in a meeting, addressing one of the dozens of administrative necessities that break his day into 20-minute increments. This one adjourned early—a rarity. When his assistant told him he'd just missed a student, he bolted and caught her just before the exit.

"What did you need?" he asked.

You might guess that he was breathless from the effort. But Kanter's gentle, measured demeanor seems unflappable. Go ahead, give him 20 minutes. You'll think you can accomplish anything.

"Oddly enough, it can be frustrating," says Cynthia Lance-Jones, an associate professor of neurobiology. Kanter entices faculty to do the impossible, to add one more helping to an overflowing plate.

"He brings up great ideas about teaching and student interaction," she continues. "You would like to have time to think about all of them, but often you just don't." These remarks come from someone who's no teaching slouch. Lance-Jones is a favorite teacher and an award winner for her contributions to the Pitt med curriculum.

With all the pressure on med school faculty to increase clinical and research productivity, their professional development as educators probably receives less attention than it should. The dean has laid out Kanter's newest mission: Capitalize on the teaching genius in our midst. Offer an environment that encourages the school's best educators to further develop their own ideas about teaching and mentoring and to build on the talents of others.

This academic year, the school will launch its new Academy of Master Medical Educators. The organization will be a think tank of the medical school's best educators. Similar organizations have shown up recently in Harvard Medical School, Baylor College of Medicine, and at the University of California, San Francisco. A recent article in *Academic Medicine* proclaims an "Academy Movement" is sweeping American medical schools. But most of those other programs focus only on medical student educators; Pitt's will extend across the spectrum of its faculty—recognizing those who teach med students, interns, residents, fellows, PhD students, and those who are part of continuing medical education programs.

"The boundaries between medical student education and resident education are person-made," says Kanter. Sharing ideas across the curriculum, and across specializations, is a way to improve the educational experience for everyone in the institution, he believes.

Currently, about 800 faculty members teach students in the School of Medicine. The academy, shepherded by six charter members, will honor about 50 of them. Nominees will be subjected to a rigorous peer review of their teaching, mentorship, research, and intellectual leadership. But what the school is really looking for are those who have contributed to Pitt's program in ways that are imaginative, creative, and innovative. For example, these teachers might have helped start a significant new program.

So once all the members have been invited, what exactly will they do?

The charter members will figure that out in the coming months. Right now, Kanter is just excited about the prospect of getting 50 brains in the same room to share ideas, whether for a seminar series or a social event or a mentoring session with junior faculty. These are some of the ways the school expects the academy will leverage faculty expertise in a more structured way.

There will be immediate benefits to members of the academy, including a prestigious honor to add to their CVs, a financial incentive, and a real opportunity to contribute to the educational mission of the medical school. Memberships will be eligible for renewal every few years based on teaching productivity. (Kanter refuses to use the term "teaching load": "You don't hear people talking about their 'research load.' It's a cultural issue in academia.")

That said, Kanter characteristically points out that the best teachers know the real reward is internal. Being in an academic environment, having direct contact with students every day, inspires them, he notes.

"Teaching is the most rewarding thing I can imagine," says Paul Rogers, professsor of critical care medicine and a multiple Golden Apple Award winner. "I teach a large portion of the graduating class to go out and be a better doctor than I was."

This kind of enthusiasm, in turn, inspires students. Send an e-mail asking Pitt med students to tell you a story about how their teachers have influenced or otherwise impressed them, and your inbox will soon be inundated.

We have the kinds of teachers, they'll say, that make you want to be a better student, a better doctor, a better colleague, a better person. The kinds of teachers who make others want to teach.

Some might say that trying to institutionalize that kind of charisma is about as easy as catching lightning in a bottle.

Kanter would introduce them to Pitt's new academy. ■