SONGS & STORIES: Jalon Howard '16 (above) and After Hours performed during an annual showcase of Rochester's a cappella groups; one of five speakers at MEL Talks, Fatima Bawany '16 (right) told the story of Voices of Hope, a summer program for teenagers that she founded.

Magnificent Meliora!

Meliora Weekend brings alumni, faculty, students, and family together to celebrate their connections to Rochester.

KEYNOTE CONNECTIONS: Author Walter Isaacson (top) talked with President and CEO Joel Seligman about Rochester's history of innovation after Isaacson's keynote address. A former editor of *Time* magazine, Isaacson is the author of *Steve Jobs,* a biography of the late Apple leader.

SHARING THE SPOTLIGHT: Aasif Mandvi (above), correspondent for Comedy Central's *The Daily Show,* shared stories with a Palestra audience, while Tony and Emmy Award winner Kristin Chenoweth featured Laura Sanders '16E, Nicole Beauregard '16E, and other students in her sold-out Kodak Hall show.

MEDICINE & MILESTONES: Jack Rowe '70M (MD), '02 (Honorary), former executive chairman and past chairman and CEO at Aetna, talked about changes in health care (top); Linda Kinyon McClusky '65E posed with her University medallion after a ceremony recognizing the 50th reunion Class of 1965 (above).

FAST START: Alumni, families, and students got an early start to Saturday with a fun run at Fauver Stadium.

OPENING NUMBER: Percussionists Nikki Joshi '16E, Colleen Bernstein '16E, and graduate students Andrea Venet and Hannah Weaver '12E helped welcome alumni, family, and students to the Eastman School with a performance during the school's welcome reception.

MILLER MOMENTS: Noted legal analyst and commentator Arthur Miller '56, '08 (Honorary) convened his annual "court" to explore issues surrounding sports gambling.

STAGE SHOW: Phoenix Fire, a student group that performs Chinese folk dances, was one of several performance troupes that took the stage during the Rochester Revue dinner show.

DEDICATION CEREMONIES: University Trustee Mark Ain '67S (MBA) and his wife, Carolyn, were joined by Duncan Moore, vice provost for entrepreneurship and Rudolf and Hilda Kingslake Professor in Optical Engineering, Ain-sponsored intern Kerrie-Ann Tucker '15S (MBA), President and CEO Joel Seligman, and Andrew Ainslie, dean of the Simon Business School, to mark the dedication of the Ain Center for Entrepreneurship.

GETTING TOGETHER: Chenille Rafferty '16 and James Bell '15 (top) were among the revelers at the 28th Annual Tropicana Dance, while Brittany Crowley '10 and Trevor Miller '11 (T5) (above) took their first photo together on the quad after dating for four years.

SYMPOSIUM SESSION: Stephen Uebbing, a faculty member in the Warner School of Education and director of the University's project with East High School, was a panelist for the Presidential Symposium focused on "The Crisis in K-12 Education."

Faces
of the
Nation

David Ward '74 helps give the Smithsonian
National Portrait Gallery a modern face-lift.

By Karen McCally '02 (PhD)

For years, the Smithsonian National Portrait Gallery in Washington, D.C., suffered from something of an identity crisis. It was conceived as a history museum, but its collections were artworks. In its early years, it pleased neither art critics nor historians. As for the lay public, the gallery was often overshadowed by the older and larger National Museum of American History and National Gallery of Art.

But in the eyes of some observers, the portrait gallery has aged well. According to Philip Kennicott, the Pulitzer Prize–winning art and architecture critic for the *Washington Post* who has been following the museum beat for several years, today it's the portrait gallery whose star is shining most brightly.

He gives a lot of the credit to David Ward '74.

"There is good news out of the National Portrait Gallery, which has proven itself an exception to the often dispiriting conformity and timorousness of other Smithsonian museums," Kennicott wrote in the fall of 2013, upon the gallery's announcement of Ward's promotion to senior historian.

Ward came to the gallery in 1981 as a research assistant. Later, as historian, he played a lead role in several special exhibitions exploring the themes of identity and self-fashioning in the context of ethnicity, sexuality, and professional and artistic roles. The exhibitions—"Face Value: Portraiture in the Age of Abstraction," "Poetic Likeness: Modern American Poets," and "Hide/Seek: Difference and Desire in American Portraiture," to name three—won positive attention in the art world, and in some cases coincided with noticeable upticks in a visitation rate that has averaged about one million visitors per year, according to Bethany Bentley, the gallery's head of communications and public affairs.

Without concurring with Kennicott's general assessment of the Smithsonian, Ward says the gallery has become, of late, used to surprising its critics. "We've gotten tired of being called the best secret in Washington," he confides.

Anne Catharine Hoof Green

BY CHARLES WILLSON PEALE, 1769 OIL ON CANVAS

In this Peale portrait, Green looks like the typical, upper-class Annapolis, Maryland, planter's wife, mistress of her domain in the home. But you also notice that she's holding a newspaper under the table. Green was one of the first women newspaper publishers in America. When her husband died, instead of selling the *Maryland Gazette,* she ran it.

There's a dividedness in Peale. On the one hand, he bows to gender conventions. If he'd been painting her husband, he probably would have portrayed him next to a printing press. But being a man of his time, Peale couldn't create an assertive, confident, public woman. That just violated too many conventions.

But if you decode the picture, you see the newspaper, literally under the table, as a marker for public status that can only be half acknowledged. It's a very clever way for Peale to code in these divergent roles.

Green also looks slightly wistful, kind of downcast, a little bit shy, and a little bit unforthcoming. That's how women were supposed to present themselves in a public portrait. But that's contradicted by her life. There's a masking going on, a depiction at war with the fact that she's a newspaper editor.

It's no mystery what the surprise is about. "Initially we were conceived almost like a hall of fame. It was very much the political nation," Ward says, noting that the gallery was envisioned in the mid-1960s as an American version of Britain's National Portrait Gallery in London. "We've struggled against that. And I think we've successfully struggled against that."

As a mode of artistic expression, portraiture fell almost entirely out of favor among artists by the mid-20th century. According to Jonathan Binstock, an art historian and the Mary W. and Donald R. Clark Director of the Memorial Art Gallery, portraiture often still gets a bad rap.

"If you were to walk around places like Chelsea in New York City, Hong Kong, Berlin, Los Angeles, wherever you might go where

FACT AND FICTION: "Portraiture is often about disguise," says Ward, who seeks to convey the richness of portraiture to a broad audience.

there's a high density of contemporary art, you wouldn't find much portraiture at all," says Binstock.

But he says there are unique virtues to portraiture, and this past summer he transformed the museum's opening gallery into a display of portraiture, a strength of the museum's permanent collection.

"It's a very welcoming way to invite people in. You come in and you're engaged with other people, as it were. With faces, you look at them, and they look back at you. And you can start your conversation with art there."

Viewers haven't always been encouraged to "converse" with portraits. Says Ward, "Portraits have had a hierarchical, authoritative role, and that goes back to the Renaissance. They're up on the wall. And you look up at them." And then there's the gaze, which Ward calls a "powerful laser beam of political and cultural control, this kind of magisterial, death-ray stare coming out of the subjects."

Modern viewers have come to see that stare in a different light.

"As we've become less comfortable with hierarchy, even in official portraiture, the gaze has been altered," Ward says. "For one thing, we're interrogating the portrait as well."

In the 2014 exhibit "Face Value," Ward and his colleagues turned the marginalization of portraiture in the post–World War II era to their advantage, displaying a mix of familiar artists and works to advance an alternative view of the period: that abstract artists were not abandoning portraiture, but reinventing it; that a time long assumed to be the nadir of portraiture might instead be seen as a rich period in its evolution.

Ward often draws from both the permanent collections of the

gallery and works on loan. He's overseen exhibits that have been criticized for relying too much on familiar artists and works. But there's a reason for working with familiar material, which Ward demonstrated most forcefully in "Hide/Seek." He calls the exhibit, which he cocurated with Jonathan Katz, director of the visual studies doctoral program at the State University of New York at Buffalo, "my *succès de scandale*." It brought into the limelight what the curators say had long been hidden in full view. As Ward told one critic at the time, it was an exploration of the ways in which gay, lesbian, and bisexual artists and subjects had resisted the "forbiddenness" of their sexuality in mainstream culture "by developing new visual ways to code, disguise, and express" their identities in portraiture. It was well attended and attracted positive attention from critics from Washington to New York to London, and condemnation from some religious groups and members of Congress. G. Wayne Clough, then secretary of the Smithsonian, ordered the removal of one of the exhibit's works.

Ward says he's tired of talking about the controversy, but not about the art. "It was an incredibly rich artistic show," he says.

Ward arrived at the gallery in the early 1980s by what he calls "serendipity." He studied history at Rochester at a time when, he boasts, "it was probably the best American history department in the country." He took courses with several of the department's stars, notably Eugene Genovese, Christopher Lasch, and Herbert Gutman. He decided to pursue graduate study in labor history, traveling to England to earn a master's degree at the University of Warwick, and then to Yale for doctoral work. "This is where my life took a strange turn," he says.

Today he jokes that his early pursuit of labor history was "my big Oedipal rebellion." His father was John William Ward, who in the 1950s was among the founders of the emerging field of American studies. American studies was interdisciplinary, drawing heavily on literature and art, for example, to illuminate American culture and ideals as expressed in everyday life. The elder Ward's 1953 book, *Andrew Jackson: Symbol for an Age*, was a foundational text of the American studies movement. In the 1970s, labor history was a subdiscipline of social and economic history. "I didn't like it," Ward says. "I left Yale without finishing."

Needing a job, he landed one at the gallery, working as a research assistant on the papers of the early-American portrait artist Charles Willson Peale. Ward says he started "to refocus on history instead of feeling sorry for myself, which is kind of what I was doing when I was at Yale." Peale became the subject of Ward's first book, *Charles Willson Peale: Art and Selfhood in the Early Republic* (University of California Press). Working on the book was a personal journey during which Ward found that a study of American culture steeped in the arts was where he, too, could make a mark, his father's career notwithstanding.

"I'd become more and more interested in biography, and more interested in self-fashioning, and identity and individualism, within the context of American society," he says.

Ward is drawn to what he calls "the elusive and elliptical, a way of getting at a kind of deeper truth."

"When I was in my 20s, I was really certain about a lot of things. Now that I'm in my 60s, I'm completely uncertain about most things. There's nothing wrong with the kind of archival history that I started out doing. There are just other ways of doing it," he says. "It's like, let's think imaginatively about the past." ®

W. E. B. Du Bois

BY ADDISON SCURLOCK, C. 1911   GELATIN SILVER PRINT

I think DuBois is probably one of the smartest people in American history. And what I love about this portrait is the way it emphasizes his head. There's just a glow emanating from this massive brain, and it gives you a sense of the power of his intellect.

I don't know if Scurlock intended the piece in this way, but profile portraits are a convention of Renaissance classicism. And if you look at this portrait, it could be subtitled *The Thinker*. You wouldn't have to know it's DuBois. It could be Rodin's *Thinker*.

DuBois doesn't look any more cheerful than Green. In fact, he looks a little bit downcast as well. But I think we see his expression as contemplative and brainy in a way that we might not see Green's. And that raises an interesting question: are we bringing our gender presuppositions to each piece?

Nonetheless, they're both pictures of interiority. What we're really drawn to is, what's going on inside their heads? What is Green thinking about in terms of getting the paper out, and what is DuBois thinking about in terms of founding the NAACP and his role as an activist intellectual?

Self-Portrait

BY CHARLES WILLSON PEALE, C. 1791   OIL ON CANVAS

Peale painted roughly 17 self-portraits. He was fixated on this notion of self-fashioning and self-creation. He came from a disadvantaged background. His father was a convict, and he was orphaned at any early age.

As he was making his way in the 18th-century world, how did he move up in terms of wealth and in terms of fame? How did he navigate the planter society of Maryland? I became tremendously interested in those questions when I was working on my biography of Peale.

Peale became a painter largely by accident, because he was handy. And he dedicated himself to the task of improving himself physically, culturally, and mentally, and then making himself visible through portraiture. It was like he had to convince himself that he was making it in the world, and so he would paint another portrait of himself. His most famous one, done in 1822, is this gigantic self-portrait called *The Artist in His Museum*. But in this much smaller portrait, I just see somebody who is really hard-bitten and determined. He paints his determination into that canvas in a way that I think is really interesting.
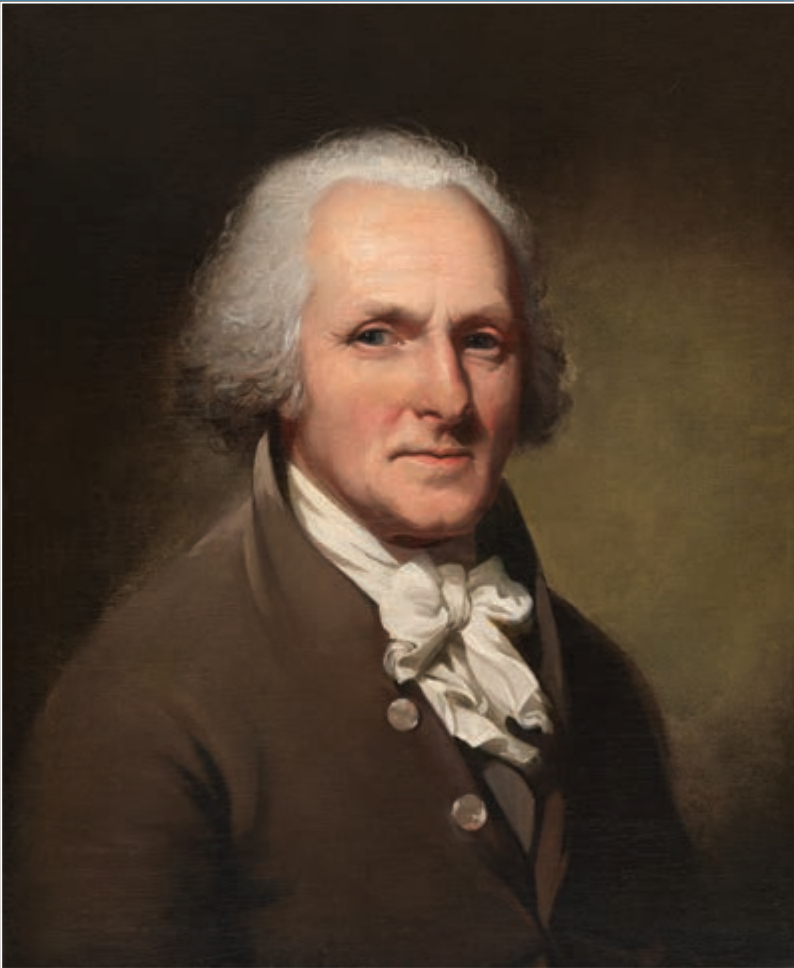

Abraham Lincoln

BY ALEXANDER GARDNER, 1865   ALBUMEN SILVER PRINT

One of the reasons I'm interested in Lincoln is that he understood early on how powerful photography was. You didn't just want to have one pose. You didn't just want to have one likeness. You could change things. And when he started running for president, one of the first things Lincoln, being known only in very small political circles, did was to have Matthew Brady take his photograph. It was a way of making himself visible and showing that he wasn't just a country bumpkin with bad clothing. He bought a Brooks Brothers suit.

I find this portrait of Lincoln uncanny because of its circumstances. First, it's singular. The glass plate cracked at some point during the development process in February 1865. Gardner printed one image and threw the glass plate away. It's slightly out of focus, but it's an amazing picture of Lincoln.

As Lincoln was sitting for this photograph, he was looking toward his second term. But when we look at it, we know he's going to die. He's thinking about the second inaugural, and this and that politically, and we know that he's going to go to Ford's Theatre and be killed, and that will change everything. It changes the course of Reconstruction, it changes postbellum history. It's this incredibly tragic moment, and that's when Lincoln becomes a myth. You can read that into that portrait. It's my favorite picture in the gallery.
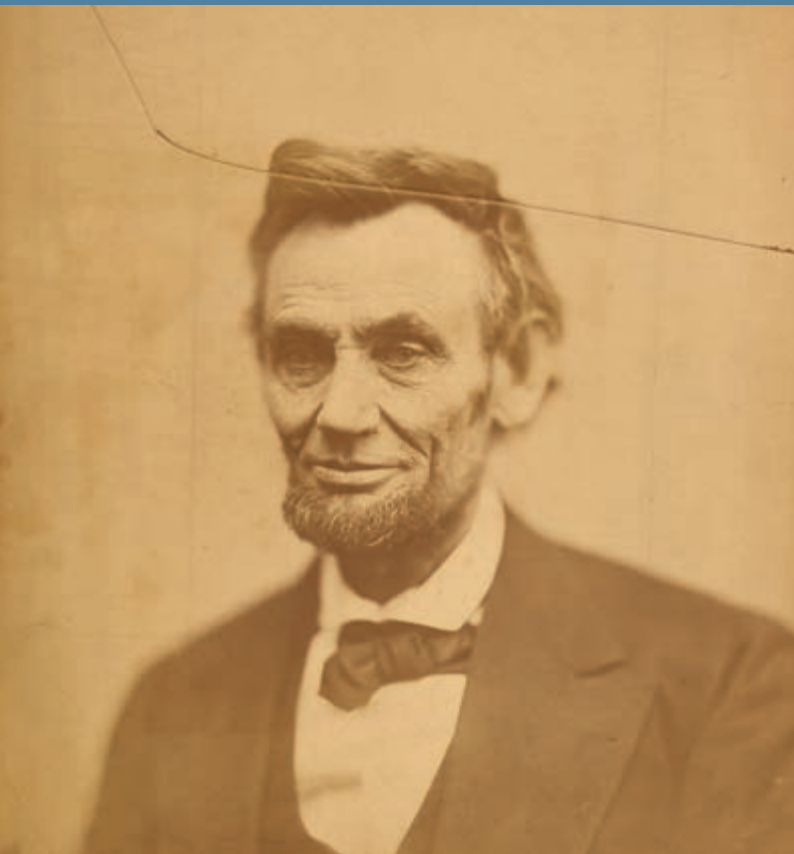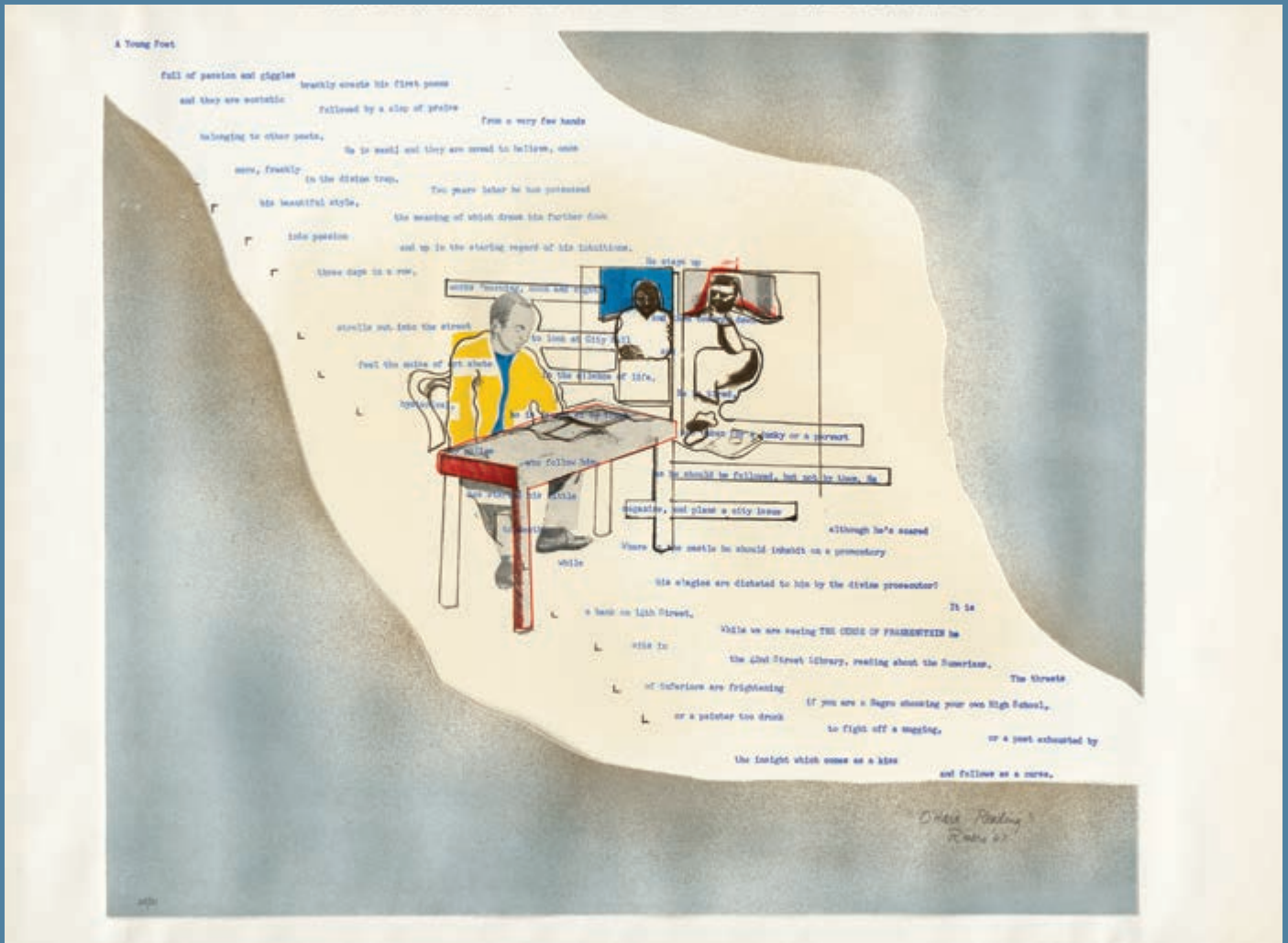
O'Hara Reading

BY LARRY RIVERS, AFTER FREDERICK WILLIAM MCDARRAH, 1967   COLOR LITHOGRAPH WITH COLLAGE ON PAPER

If I could have any one picture—if I could own any one picture in our gallery—it would be this one. The collage effect, O'Hara's own poem in the middle, and the little portrait of O'Hara reading, all create a kind of flow, like O'Hara's kind of poetry. There's essentially this river running down the middle of the piece. You can't necessarily see it in a reproduction, but the collage is layered. There's a river of words running through it.

O'Hara had a regular job, at the Museum of Modern Art in New York. He went to the office, he filled in his time there, and also wrote poetry. He'd take a walk every lunch hour and he'd write a poem about it. In *Lunch Poems*, he creates an archive of pop culture, and because he's preternaturally sensitive, he picks up on everything.

O'Hara was killed in an awful auto accident. His sister and John Ashbery went to his apartment and discovered this file cabinet full of poems. There were, maybe, a thousand poems. It's a touching story. Everybody knew he was a poet, but it was, like, "wow."

I do think this portrait is stupendous. I'd really like to own it, but that's never going to happen. It's a print, and there are about 45 of them. But I've never seen one on the market. And I never could afford it.

—David Ward '74

In the field of
human-computer interaction,
computer science
meets human behavior.

Dancing

<!-- WITH COMPUTERS -->

By Kathleen McGarvey

Go into any public space and look at the people around you. Odds are, some if not most of them will have their neck craned downward, their eyes lowered, and one hand cradling their phone.

You're looking at one of the primary relationships in the lives of many people today. But let's face it: it's not quite rapport. Conversations with our computers are pretty one-sided. Even storied innovations in voice recognition—Hello, Siri?—are often frustrating and fruitless.

"Every other day, I feel like throwing my laptop out the window because it won't do what I want it to do," says Henry Kautz, the Robin and Tim Wentworth Director of the Goergen Institute for Data Science and professor of computer science. He's an expert in artificial intelligence—so if throwing your laptop or smartphone out the window has crossed your mind on occasion, too, well, at least you're in good company.

What if relating to computers were more like the way we communicate with other people?

That's a vision that scientists in the field of human-computer interaction, or HCI, are working to realize. It's an ambitious goal, but they're making significant headway.

Philip Guo, assistant professor of computer science and codirector of the Rochester Human-Computer Interaction Lab, calls HCI a blend of science and engineering.

"It's about attempting to understand how people interact with computers—that's the science part—and creating better ways for them to do so. That's where engineering comes in," he says.

The field emerged around the 1980s, with the rise of personal computing and as the work of computer scientists began to be informed by cognitive science. Anyone who can recall

EHSAN HOQUE, ASSISTANT PROFESSOR OF COMPUTER SCIENCE AND ELECTRICAL AND COMPUTER ENGINEERING

the labor of entering DOS commands to complete even the simplest tasks knows well the trajectory computers have taken toward their more intuitive configurations today.

The issues that HCI experts at Rochester are investigating range widely: improving online education, helping people to communicate more effectively, monitoring mental health, and predicting election outcomes.

Personal Communication Assistance

"I like to build interfaces that allow people to interact with computers in a very natural way," says Ehsan Hoque, assistant professor of computer science and electrical and computer engineering.

And what would an "unnatural" way be? That's the way we use computers now, he says.

When we talk with someone, we use not only words, but also facial expressions, patterns of stress and intonation, gestures, and other means to get our points across.

"It's like a dance," says Hoque, who codirects the HCI lab with Guo and Kautz. "I say something; you understand what I'm trying to say; you ask a follow-up question; I respond to that. But a lot of the things are implicit. And that entire richness of conversation is missing when you interact with a computer."

Much of what we communicate, and what others communicate to us, isn't registered by our conscious minds. Eye contact, smiles, pauses—all speak volumes. But most of us have little idea of what we actually look like when we're speaking with someone. Our own social skills can be a bit of a mystery to us.

So Hoque has developed a computerized conversation assistant—called "LISSA" for "Live Interactive Social Skills Assistance"—that senses the speaker's body language and emotions, helping to improve communication skills. The assistant, who looks like a college-age woman, evaluates the nuances of the speaker's self-presentation, providing real-time feedback on gestures, voice modulation, and "weak" language—utterances such as "um" and "ah." Intriguingly, the system allows people to practice social situations in private.

The first iteration of the project was Hoque's doctoral thesis at MIT. There he tested the system—then called MACH, for My Automated Conversation CoacH—on MIT undergraduate job seekers. Career counselors found the students who had practiced with MACH to be better job candidates. He has since tested the technology with date-seekers for speed-dating, in a study designed with Ronald Rogge, associate professor of psychology, and Dev Crasta, a psychology graduate student. Their study showed that coaching by LISSA could help online daters subtly improve eye contact, head movement, and other communicative behaviors.

Hoque is also adapting it for use by people with developmental disorders, such as autism, to help them enhance their interactions with others.

People with autism often have an "unusual inflection or intonation in their voice—it's one of the things that interfere with their social communication," says Tristram Smith, a professor in the Department of Pediatrics and a consultant on the project.

Job interviews can be very difficult for people with autism. "We don't have a lot of interventions to help with their conversational skills, and problems with conversational speech are really at the core of what autism is," he says.

But computers are well suited to assisting. They're better at analyzing speech patterns than people are, and they can show children what happened when they spoke, bringing together as a visual display the words they uttered and the gestures they made.

Helping people become better communicators is a project close to Hoque's heart.

"I have a brother who has Down syndrome," he says. "He's 15, he's nonverbal, and I'm his primary caregiver." When he was doing his doctoral research at MIT, Hoque knew that he wanted to build technology that benefits people in need and their caregivers. He worked on assisted technology to aid people in learning to speak effectively, improve their social skills, and understand facial expressions in context.

From that work, he has created other tools, such as ROCSpeak, which aims to help people become better public speakers by analyzing the words they use, the loudness and pitch of their voice, their body language, and when and how often they smile. He's even developed "smart glasses" that provide speakers with real-time, visual feedback on their performance. That system is called "Rhema," after the Greek word for utterance.

The United States Army has funded Hoque's work to use the technology to study deceptions. "We can say it's out-of-sync behavior, so it could be deception, it could be stress, it could be nervousness," says Hoque. "But when the behavior is getting out of sync—when your speech and your facial expression are not in sync—something is wrong, and we can predict that."

Analyzing Social Networks

Predictions are the core of the work of Hoque's colleague, Jiebo Luo. A professor of computer science, Luo has many projects afoot.

In one of them, he is working—with researchers at Adobe Research—to harness the power of data contained in the sea of online images by training computers to understand the feelings that the images convey. For example, the photos of political candidates that people choose to post or share online often express information about their feelings for the candidate.

By training computers to digest image data, the researchers can then use the posted images to make informed guesses about a candidate's popularity.

A team led by Luo and Kautz is using computers to improve public health. Their "Snap" project uses social media analytics for a variety of health applications ranging from food safety to suicide prevention.

They're also investigating how computers can help in diagnosing depression by turning any computer device with a camera into a tool for personal monitoring of mental health. The system observes the user's behavior while using a computer or smartphone. It doesn't require the person to submit any additional information.

"There's proof that we can actually infer how people feel from outside, if we have enough observations," says Luo.

Through their cameras, devices can look back at us as we view their screens—and extracting information from what the camera

"sees" allows the device to "build a picture of the internal world of a person," he says.

The camera can measure pupil dilation, how fast users blink, their head movement, and even their pulse. Imperceptibly to the casual observer, skin color on the forehead changes according to blood flow. By monitoring the whole forehead, the computer can track changes in several spots and take an average. "We can get a reliable estimate of heart rate within five beats," he says.

Online Learning

While Luo's work, like Hoque's, turns the computer into an observer of human behavior, Guo's research uses computers to bring people metaphorically closer together. His focus is online education.

"I'm trying to humanize online learning," he says.

It's easy to put videos, textbooks, problem sets, and class lecture notes online, he says, but the simple availability of materials doesn't translate into people actually learning online. Education research has shown that motivation is a decisive factor—motivation that is effectively instilled through small classes and one-on-one tutoring.

"The challenge of my research is how do you bring that really intimate human interaction to a massive online audience," Guo says. He's working to build interfaces and tools that will bring human connection to large-scale online education platforms.

He has already made headway in a website for people learning the popular programming language called Python. His free online educational tool, Online Python Tutor, helps people to see what happens as a computer executes a program's source code, line by line, so that they can write and visualize code. The site has more than a million users—enormous, for a research site—from 165 countries. Guo is working to connect people through the site, so that they can tutor each other, even though they may be continents apart.

A 'Grand Challenge'

Hoque's work with Smith on developing the communication assistant for use by children on the autism spectrum is part of a collaboration with colleague Lenhart Schubert, a professor of computer science, that has received funding from the National Science Foundation. They aim to improve the assistant so that it can understand—at least in some limited way—what a user is saying and respond appropriately.

They began testing the language comprehension part of the system in the speed-dating experiment. There they had a person helping the computer to provide appropriate responses, in what's known as a "Wizard of Oz" study, in which an operator is controlling the avatar from behind the scenes. Now they're in the process of automating the system.

But the problem of natural language processing for computers is a thorny one. Teaching computers to understand spoken language has preoccupied artificial intelligence researchers since at least the 1960s.

Computers now can recognize speech within a relatively limited domain. You can ask your smartphone for help in finding a Chinese restaurant or ask it to help you make an airline reservation to fly to Los Angeles. But when it comes to the kind of dialogue that people actually have—not narrowly focused but free-flowing and context-dependent—it's much harder to predict what's going to be said, and the computer is operating according to predictions. "Basically that's been beyond the capacity of artificial intelligence for all these decades," says Schubert.

Improvements in machines' ability to parse the structure of language have moved the project forward—but not far enough. In a sentence that's 20 words long, typically the machine will make a couple of mistakes.

Consider the sentences "John saw the bird with binoculars" and "John saw the bird with yellow feathers." You know that it's John, and not the bird, who has the binoculars—and that it's the bird, not John, that sports the feathers. And the seemingly simple question "What about you?" calls for very different answers depending on whether the previous sentence was "I'm from New Jersey" or "I like pizza" or "I'm studying economics." But such context-dependent information is much more elusive for computers than it is for people.

"The system has to have world knowledge, really, to get it right. And knowledge acquisition turns out to be the bottleneck," Schubert says. "It has stymied researchers since the beginnings of artificial intelligence." He calls it "the grand challenge."

But a grand challenge is there even for the nonverbal part of the equation, says Hoque. "Even something simple like a smile: when you smile, it generally means you're happy—but you could smile because you're frustrated; you could smile because you're agreeing with me; you could smile because you're being polite. There are subtle differences. We don't know how to deal with that just yet. So there's still a long way to go on that, too."

The HCI program graduated its first crop of doctoral students last spring. Erin Brady '15 (PhD)—whose research is concerned with using technology and social media to support people with disabilities—is now an assistant professor at Indiana University-Purdue University Indianapolis. Yu Zhong '15 (PhD) works on mobile apps for accessibility and on ubiquitous computing—inserting microprocessors in everyday objects to transmit information. Google Research has hired him as a software engineer.

The third member of the class, Walter Lasecki '15 (PhD), is now in his first year as an assistant professor of computer science and engineering at the University of Michigan. He began his doctoral work at Rochester in artificial intelligence but moved to HCI to explore how crowds of people, "in tandem with machines, could provide the intelligence needed for applications we 'wish' we could build," he says. "I realized that much of what we know how to do, what we think about how to do, is limited by what we can do using automation alone today," he says. Combining computers with human effort—in what's called "human computation"—is essentially letting researchers try out new system capabilities.

"It lets us see farther into the future. We can deploy something that works, something that helps people today. And as artificial intelligence gets better, it can take over more of that process."

What initially drew Lasecki to HCI was his interest in "creating real systems—systems that have an impact on real people," he says. Kautz cultivated this focus in the computer science department by hiring first Jeff Bigham—now at Carnegie Mellon—and then Hoque and Guo. As Bigham was, they're concerned with practical applications. "That's certainly a strength, this focus on applications and system building," Lasecki says of Rochester's program.

Those systems will become an ever-more pervasive part of our lives, Hoque predicts, and the field of HCI will gradually become an essential part of other disciplines. In fact, it's already happening. More than half of the students in HCI courses at Rochester aren't computer science majors. They're from economics, religious studies, biology, business, music, studio arts, English, chemistry, and more.

Hoque quotes the founder of the field of ubiquitous computing, Mark Weiser, who once wrote, "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."

Computing, Hoque says, is on its way to becoming like electricity: it's everywhere, but you don't really see it.

"We won't see it, we won't think about it. It will just be part of our interaction—maybe part of our clothing, part of our furniture. We'll just interact with it using natural language; it will be natural interaction.

"And we're working toward that future." ®

ROCSpeak is available for use at https://www.rocspeak.com.