Tinkerer, Scholar, Hacker, Innovator

New initiatives aim to guide the creative energies of Rochester undergraduates in digital media and in engineering innovation.

By Scott Hauser

For more than a week in May, Andrew Tomich '14, Jared Suresky '12, and other members of the Midnight Ramblers will hole up in makeshift recording booths in the basement of Spurrier Gym. There, over the course of back-to-back, 12- to 15-hour days, they will haul into the building their own microphones, their own portable recording system, computers loaded with professional software, and other equipment to record up to a dozen new songs.

At the end of the marathon sessions, the members of the a cappella group will emerge, bleary-eyed—maybe a little hoarse—but with a laptop containing the gist of their 10th "studio" album. The do-it-yourself method is how the Ramblers have recorded all nine of their albums over the last decade: on their own, late into the night, with their own equipment.

They have no faculty members to guide them, no tech support crew to troubleshoot problems, and no formal training in how to record digital music. They have just their own desire to create a collection of music they can share with their fans.

"We keep teaching ourselves how to do it," says Tomich, a biomedical engineering major from Cleveland. "A lot of what we've learned is through experimentation, and through one generation of Ramblers handing off the knowledge to another generation.

"We kind of make do," he says.

And make do very well. With albums regularly selected as among the best in the collegiate a cappella world, the Ramblers are something of an ongoing digi-

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tal media enterprise. In addition to recording their own tracks (they rely on a professional engineering company to mix the albums), they conceive, record, and produce their own videos, and they oversee their own advertising and communications effort. All done digitally on their own equipment.

As the tools—the cameras, computers, software—that used to be available to only the most sophisticated professional have become practically standard on introductory laptops, if not on smartphones, students at Rochester and across the country are teaching themselves how to create their own artistic, personal, and professional digital portfolios.

And they take on the projects because they want to, regardless of their majors or whether they've taken classes or been formally trained in digital media. It's not just for film geeks or photo mavens or computer jocks any more.

Couple that ubiquity with the 24/7, can-do, let's-make-something-cool spirit

ROLL 'TAPE': Setting up their own equipment in practice rooms in Spurrier Gym, Jared Suresky '12 (singing), Kevin Layden '13 (left), Noah Berg '12, Andrew Tomich '14, and the rest of the Midnight Ramblers have recorded nine CDs, teaching themselves how to use new technology.

Introducing Digital Media Studies

Rochester is the perfect place to explore the connections between digital technology, critical analysis, production, and innovation, says Tom DiPiero, dean for humanities and interdisciplinary studies.

With its collegial campus, Rochester is known for its interdisciplinary approach to the liberal arts. Couple that with a tradition of expertise in imaging and entrepreneurship and ties to George Eastman House International Museum of Photography and Film, and the time is right to focus on connections between digital technology and the arts.

"What we're doing is addressing the fact that digital media are going to represent the new literacy for the 21st century," says DiPiero. "That doesn't mean that everybody has to be a whiz-bang, whiz-kid Web designer. But it does mean that in future employment possibilities, in the future of academia, of writing, more and more of the kinds of language, the kinds of thinking that we produce is going to be tied to these forms of digital media.

"So what we're trying to do with this program is recognize the need to be a critical consumer of media as well as a savvy producer of media."

The newest major in the College, the program was approved by New York State early this year. Students will begin taking courses in the program this fall.

The major incorporates disciplines from the arts and humanities as well as from engineering. Majors are required to take at least 12.5 courses across a wide spectrum of analysis, history, production, and technology courses, including at least 5.5 courses based in the humanities and 7 courses based in the natural sciences and engineering, or vice versa.

During their final year in the program, students will work in small groups to complete a capstone project that combines the approaches, ideas, and skills that they learned throughout the major.

"It's one of very few majors that we have found across the country that combines the study, analysis, and interpretation of the media with its production," says DiPiero. "Something else that distinguishes it is that it has a year-long capstone project in which all of the students in the major—they form a cohort—will bring an idea for a digital media object from its conceptualization through its production to fruition."

DiPiero expects between 20 to 25 students a year to declare a major in the new program, but he admits the College won't have a clear idea of the interest for a few semesters.

While the major will take advantage of the computer, recording, and fabrication studios in a new building, which is expected to open in 2013, instruction for the major will mostly take place in other campus classrooms.

"The building is designed as lab space, not as classroom space," he says.

And while students who graduate as digital media majors may gravitate toward employment in communications, entertainment, and computers, DiPiero says the skills students learn in the program will give them the broad perspective of a grounding in liberal arts.

"Students will have the critical thinking and writing skills of liberal arts and the technical skills of engineering and production," he says. "You don't see these skills combined very often. We're excited about that."

—Scott Hauser

that's contagious among college students, and academic leaders say the University is poised not just to make advances in the world of digital media and art, but also to help rekindle a spirit of innovation.

Tom DiPiero, dean for humanities and interdisciplinary studies, says one of the hallmarks of students who have grown up in the Internet era is that they're immune to the notion that creativity is bound within individual disciplines. Riffing on the British scientist C. P. Snow's famous critique of academia and the danger of compartmentalization, DiPiero says students don't think in terms of "two cultures" any longer, if they ever did.

"Any of us who are older still think in terms of the divides—the arts and humanities side and the science and engineering side," says DiPiero. "That's not how kids think today. They might have a predilection toward one or the other side of things, but they don't think in those kinds of boxes."

In an effort to further strengthen the connections among intellectual interests, Arts, Sciences & Engineering is launching a multipronged initiative this spring with the goal of providing students with an academic and cocurricular home for their multidisciplinary interests.

The clearest manifestation is a new building, which campus planners hope to break ground on later this year, that will house state-of-the-art space for students to explore, create, and study digital media, including video and audio production, website technology, and mobile applications.

Built to connect with Morey Hall, the new building will provide much of the technologically equipped studio space for two new majors designed to give students an academic structure to channel their interests in the arts, humanities, and digital technology. One major, in digital media studies, has begun enrolling students for the fall; the second, in audio and music engineering, is expected to be approved soon.

DiPiero says the new major in digital media is designed to give students a liberal arts grounding in perspectives about narrative, analysis, video production, film history, media, technology, and other humanistic approaches, complemented with production-oriented classes in video, audio, Web, and other technologies.

Such a program will not only improve the digital skills of students, but will also provide them with a broad perspective to think critically about the technology around them, he says.

"If you know the history, if you know the aesthetics, you are much more likely to be able to produce something that people will want to watch," says DiPiero. "But we also want to address the fact that every educated adult needs to be both a critical reader of media—that is, they need to know how to look at media, how to understand them historically, socially, and even aesthetically—and at the same time, they need to know something about how to produce these forms of media."

Tomich of the Ramblers says having a broader sense of the history and aesthetics of media production would only improve the quality of the group's productions. "As a non-major, I'm interested in those things; as a user I'm interested in those things," he says. "If it was a major, I'd still be interested in those things. Knowing where things have come from enables you to create better work.

"I would have no qualms about taking a history class to understand why we have what we have, and how it has progressed to this point. I think that's really cool."

The idea of channeling student inquisitiveness and innovation guides a second main component of the new building—a state-of-the-art "studio for engineers"—known as the fabrication center, or "fab lab," where students can fabricate prototypes and work with materials for shaping ideas into products.

Rob Clark, dean of the Hajim School of Engineering and Applied Sciences, says the design of the fab lab and its placement within the new building acknowledges that innovative ideas come from across the spectrum of students.

He, too, has seen a trend among students to bridge what traditionally have been seen as distinct disciplines. For example, last year, when a computer-aided design course required for mechanical engineering students was mistakenly listed in the course schedule as having no prerequisites, the first 25 to 30 seats were filled with arts and sciences students. The Hajim School had to offer a second section to accommodate the additional demand.

Clark attributes the enrollment to students' interest in the gaming industry and the growth of virtual online worlds, but he says it's a fitting example of how students approach new technologies.

"Students here and at other institutions are less driven by the requirements and constraints put on any particular discipline," Clark says. "They are interested in learning what they're curious about at the time. They're less interested in the boundaries between disciplines. I think this space creates an opportunity to say, 'We encourage that.'"

Bradley Halpern '12, president of the Students' Association, says students have long been tinkering with media production, particularly campus performing groups who produce video and audio projects. Regardless of major, students think nothing of drawing on other disciplines to figure out how to solve a problem.

"People are starting to realize that you need cross-disciplinary study to solve the world's problems," says Halpern. "It's a way of thinking that makes us, as students, more capable and more likely to take that approach when we're in the workforce."

An engineer, Halpern is focusing his major on human-computer interaction, a field that explores the social, cultural, and psychological ways that people interact with technology and how to improve that experience. He draws on his interests in computers, political science, music, and other fields as he explores ways to make technology more user-friendly.

DESIGNING TIMES: Computer science professor Jeff Bigham says technologists have begun to recognize the contributions of humanists and social scientists in making technology more user-friendly.

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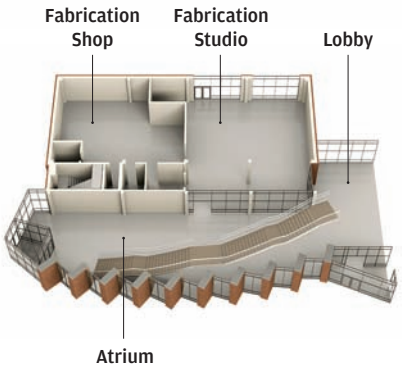
Designed for Collaboration

Much like its "embracing arm" that curves gently between Morey and Lattimore Halls, plans for a new campus building call for a welcoming, collaborative space where students from arts and sciences and from engineering can tinker with their ideas, explore their hunches, and work together in ways that foster an innovative and collaborative spirit.

Designed by the Boston-based architectural firm of Goody Clancy, the proposed 18,000-square-foot building would feature studio, production, fabrication, and small group meeting spaces over three floors, all connected by a glass-filled atrium.

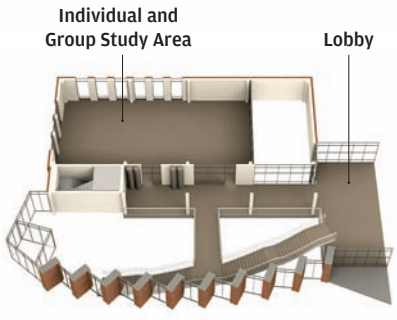
Conceived as a space that would be open 24 hours a day, the building is designed with the understanding that inspiration—especially when it comes to creative and innovative projects—doesn't strike at regularly scheduled times.

Funding for the project will come from a combination of University resources and philanthropic gifts through *The Meliora Challenge:* The Campaign for the University of Rochester. For more information about the Campaign, visit http://campaign.rochester.edu.



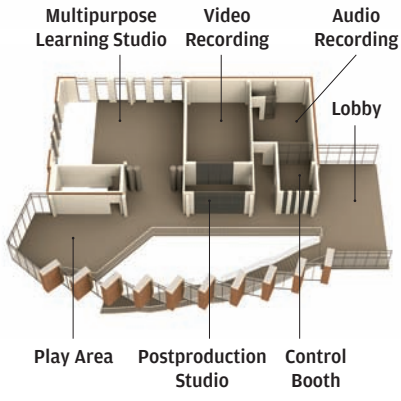
Fabrication Center

Home to the "Fab Lab," the ground floor would house an area filled with electromechanical tools and materials, prototyping tools, and other equipment for students to design and build physical products. The floor would also serve as a connection between the Residential and Eastman Quads.



Collaborative Learning

Designed to provide plenty of collaborative opportunities, the second floor would feature high-end hardware and software for graphics, animation, 3-D printers, and other computer processing intensive tasks. The floor would also feature flexible spaces so small groups of students could configure areas to work together comfortably and efficiently.



'Play Area' and Production

Overlooking the Wilson and Residential Quads, the third floor's "Play Area" would provide a casual lounge next to a learning studio where students could brainstorm ideas, map out plans, and discuss their projects. The floor would also feature state-of-the-art audio and video recording studios, editing rooms, and equipment.

ILLUSTRATION BY STEVE BOERNER FOR *ROCHESTER REVIEW*; ARCHITECTURAL SOURCE: GOODY CLANCY

Halpern works with Jeff Bigham, an assistant professor of computer science who helped draft the new major in digital media studies. Bigham says technological fields like computer engineering are just beginning to recognize how much artists, psychologists, and humanists can bring to the design of technology.

The new initiatives can only spark more collaboration among students, who, he agrees, no longer think in terms of "us" and "them" when it comes to digital culture.

"We older people might think that there are two groups," he says. "Younger people are just thinking, I'm a digital media person and I might sample from computer science or I might sample from art and art history. They're already doing it; why not just formalize it?"

Bigham notes that the willingness of students to explore the potential of technological tools is not new. Such creativity lies at the heart of what most people think of as "hacking," or the nonmalicious approach of taking a gadget apart, figuring out how it works, and using its concepts and parts to create something new. In that sense, the arts and humanities are particular hotspots right now, he says.

"It used to be the computer scientists who were going off and gluing together hardware, and they were writing their own software to do stuff that they thought was cool, to get stuff done," Bigham says.

"Now, we've matured as a discipline; we have all this stuff. Now it's the artists, who don't have formal training in computer science or in electrical engineering, who are taking whatever they can find, gluing it together in whatever way they want to be able to achieve whatever art they want to create. They are the ones who are doing the hacking that really started with computer programming."

FOR HIS PART, CLARK WOULDN'T MIND REKINDLING THE IDEA THAT BEING a good engineer means being a good tinkerer.

As do other engineering administrators around the country, Clark notes that the profession's success in making sure that students are mathematically prepared and comfortable working with computer technology has lessened the likelihood that incoming engineering students have experience in developing, producing, or improving physical products.

"Our students come in with great math and science skills," he says. "That's true across the field of engineering. It's generational. But part of education is always to find the components of the things that someone needs to learn to succeed in a particular career. In engineering part of what you need to succeed is to understand how things work. To do that, you need to be able to take things apart or put them together and to conceive design.

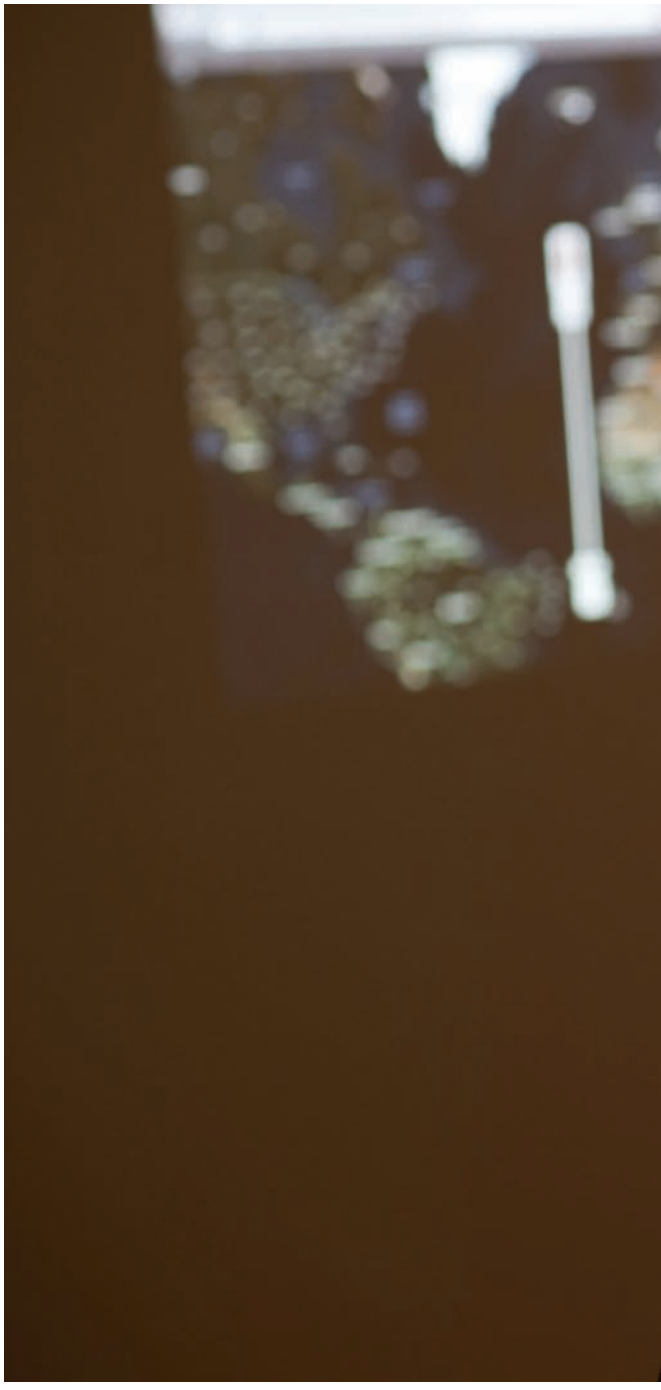
"I want to encourage engineering students to use the space as an art student would use an art studio. If you're a sophomore and you have an idea of some widget you want to build, then you should be able to figure out what tools you need to use to build the device and be able to go into the lab and build it."

Cary Peppermint, assistant professor of art and art history, says artists have traditionally been willing to do exactly that—go into a studio and use the tools at hand to pursue an artistic vision. What's new is that the technology is different and the approaches to art tend to be more collaborative and interactive than they've been in the past.

He's the founder of an artistic collective that uses technology such as GPS programs, Web interfaces, and social media to analyze and question modern society's connections with nature.

In his classes, he and his students explore ways to repurpose technologies to create new artistic works and to develop interactions between artists, viewers, and art.

"The collaborative and interdisciplinary component is different from an artist's perspective," he says. In contrast to the stereotypical image of the lone artist, most digital art requires a group of programmers, graphic designers, artists, digital video, and sound producers.



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"No one can be an expert in all those things," Peppermint says. "It's a new way of working. That's very exciting."

One of the students in Peppermint's introduction to digital art class, Nicolette Howell '13, says she's used to tinkering as a studio arts major interested in photography. The brooding images in a recent portfolio of her work hide a menagerie of menacing shapes and shadows within swirls of computer-enhanced smoke. All created with imagination, vision—and software.

Like generations of photographers and artists before her, the junior from Dacula, Ga., is learning to experiment with her medium and her equipment to get the results she sees in her mind's eye.

She's already acquainted herself with Photoshop, After Effects, Illustrator, and other commercial-level image and design programs. In the course on digital art last winter, she used software to animate her images so that they moved as viewers clicked them on a computer screen.

The project was her first effort at interactive art, and it piqued her interest in improving her skills with increasingly advanced technology. She doesn't want to be a computer programmer, but she does want to know enough about software to help express her artistic ideas.

Says Howell: "I always think that learning about more things will make my work better." R

STUDIO ARTIST: Nicolette Howell '13, a studio arts major from Dacula, Ga., says an introductory class on digital art piqued her interest in learning more about how she can use technology to broaden the range of artistic expression she can bring to her photographic work.

Focal Points

Students share their photos from around the world—including for the first time, photos from the United States—in our fourth annual Study Abroad Photo Contest.

For the fourth edition of our annual Study Abroad Photo Contest, we received just over 200 photos from 53 students who took part in an academic program sponsored by the College Center for Study Abroad and Interdepartmental Studies during 2011.

Submitted in the categories of culture, people, and physical world, the photos were taken in 33 countries, representing five continents.

And we added a new perspective this year. Working with the International Services Office and the Office of the Dean of the College, we invited international students to submit their photos of the United States.

This year's grand prize winners receive a Kodak Hero 5.1 All-in-One Printer from Eastman Kodak Co., our grand prize sponsor. Students who win categories and who earn honorable mention also receive prizes. ®

To see all the photos in this year's contest, visit www.rochester.edu/pr/Review.

Grand Prize: Study Abroad

INDIA

Morning Ritual on the Ganges River

Scott Strenger '12, an entrepreneurship major from Plainview, N.Y. *December 2011*

Physical World: Winner

INDIA

The Pink City

Elizabeth Riedman '13, an anthropology major from Canandaigua, N.Y. *November 2011*

People: Winner

GHANA

The Left Hand

Christine Rose (T5), an anthropology and studio arts major from Dansville, N.Y. *October 2011*

Culture: Honorable Mention

ITALY

Laundry Day

Simone Zehren '14, an archaeology, technology, and historical structures major from Washington, D.C. *June 2011*

Physical World: Honorable Mention

POLAND

Auschwitz

Marina Isaacson '12, an international relations major from Fairport, N.Y. *March 2011*

Culture: Winner

MOROCCO

A Camel Ride

Mary Pilarz '13, a biology major from Buffalo. *October 2011*

Physical World: Honorable Mention

VIETNAM

A Sudden Storm

Louisa Durkin '13, a molecular genetics major from Belmont, Mass. *October 2011*

People: Honorable Mention

ENGLAND

On a Steam Train

Jintian Li '12, a film and media studies major from Beijing, China. *May 2011*

Culture: Honorable Mention

GHANA

Fishermen and Nets

Christine Rose (T5), an anthropology and studio arts major from Dansville, N.Y.
October 2011

People: Honorable Mention

ISRAEL

Shopping in the Old City

Jacqueline Carpentier '13, a psychology and studio arts major from Portland, Maine.
September 2011

Physical World: Honorable Mention

TANZANIA

Sunset over the Serengeti

Sarah Smith '13, an environmental sciences major from Newton, Mass. *October 2011*

International: Honorable Mention

SAN FRANCISCO

San Francisco at Night

Pak Lam (Jack) Yung '13, an electrical and computer engineering major from Hong Kong, China. *December 2011*

Thanks to Our Judges and Sponsors

Our panel of judges included Adam Fenster, University photographer; Allen Topolski, professor and chair of the Department of Art and Art History; and Brandon Vick, digital assets manager for University Communications.

Jacqueline Levine '80, '84 (Mas), director of the Center for Study Abroad and Interdepartmental Programs; Sylvia Kless '91W (MA), associate director of the International Services Office; and Molly Jolliff, international student counselor in the Office of the Dean of the College, helped coordinate the contest.

Each grand prize winner receives a Hero 5.1 All-in-One Printer from Eastman Kodak Co., our grand prize sponsor.

For more about study abroad, visit www.rochester.edu/College/abroad.

For more about international study, see www.iso.rochester.edu.

International: Grand Prize

ARIZONA

The Antelope Canyon

Yuhong Yao, a graduate student in optics from Tianjin, China. *December 2011*

International: Honorable Mention

ROCHESTER

The Lady in the Lake

Ding Zheng, a graduate student in materials science from Hangzhou, China.
October 2011

WHAT WE TALK *about* WHEN WE TALK *about* TIME

How do scholars and scientists from different disciplines think about time? That was the focus of the inaugural Ferrari Humanities Symposia.

By Kathleen McGarvey

ASK PHYSICISTS WHAT COMES TO MIND WHEN THEY THINK ABOUT time, and you're likely to get an answer that's worlds away from the answer you would get from historians. Or musicians. Or philosophers.

Every discipline in the University has its own particular way of thinking about time.

"We measure time by years, days, hours, and minutes, and in spans as large as a geological era or as small as a femtosecond," says Tom DiPiero, dean for humanities and interdisciplinary studies. "Precise measurement of time is crucial in fields as diverse as physics, music, religion, and history. But there is a tremendous divergence between the ways we measure time and the varying, sometimes competing, ways that diverse cultures and different historical periods experience—and use—time."

Bringing such wide-ranging perspectives together to explore a broad theme that touches many academic disciplines is the goal of a new, annual initiative supported by Bernard '70, '74M (MD) and Linda Gaddis Ferrari.

Structured this spring around the broad theme of time, the inaugural Ferrari Humanities Symposia featured a multidisciplinary course titled The Art and Science of Time and a public lecture by prominent historian Anthony Grafton on the scholarship of early European chronology.

During this spring's course, nine faculty members from six disciplines led discussions, exploring how their disciplines conceive of time, how those conceptions have influenced work in their fields, and how our conceptions of time have changed over, well, time.

We asked a few of the participating faculty members to provide a glimpse of how their disciplines think about time.

Medieval Studies: 'The Secularization of Time?'

Richard Kaeuper, Department of History

That a historical period called the Middle Ages—say 500 to 1500—existed is a product of our dividing up continuous historical time. Though created by negative value judgments of later humanists and Protestant historians, it actually holds together and can be given a completely different valence. Far from a static or uniform "dark age," it created fundamental aspects of European civilization, especially from roughly the "renaissance of the 12th century"—demographic and urban take-off, increased trade, governing institutions and legal innovation, universities, cathedrals, vernacular epic and romance literature (to touch only some

STOP TIME: How the arts, sciences, and engineering think about time was the focus of the first Ferrari Humanities Symposia, an annual initiative to explore multidisciplinary issues in the humanities.

ISTOCKPHOTO

TIME SETTERS: Early European efforts to study chronology offer a model for interdisciplinary study today, says Grafton.

A Tour of Time

When Anthony Grafton, the Henry Putnam University Professor of History at Princeton, took the lectern to deliver the inaugural keynote lecture of the Ferrari Humanities Symposia, he took the audience that crowded the Hawkins-Carlson Room at Rush Rhees Library on a dizzying tour of early modern Europe's efforts at chronology. How did scholars reconstruct ancient calendars, and reconcile biblical accounts of the past with other depictions of bygone events?

"Chronology transformed the study of history," Grafton told his listeners, calling the historical effort "more cosmopolitan than what would be taught until the 20th century."

"I think this is a kind of model for how to think about interdisciplinary study now," he said.

Grafton's lecture, titled "Maps of Time: Science, Scholarship, and History in Early Modern Europe," launched a course for undergraduates called The Art and Science of Time that was taught by nine faculty members from six departments, including art, physics, and English.

The author of 10 books and the coauthor, coeditor, or translator of nine others, Grafton has received a Guggenheim Fellowship, the Los Angeles Times Book Prize, the Balzan Prize for History of Humanities, and the Mellon Foundation's Distinguished Achievement Award. He was president of the American Historical Association in 2011. His research focuses on the cultural history of Renaissance Europe, the history of books and readers, the history of scholarship and education in the West from antiquity to the 19th century, and the history of science from antiquity to the Renaissance.

—Kathleen McGarvey

aspects). If the later medieval centuries endured the Plague and destabilizing warfare, many of the achievements continued into more modern times.

A noted scholar, Jacques le Goff, argues that the great growth of Europe required the secularization of time in order to allow "usury"—the selling of time through interest on loans and mercantile endeavor in general, mistrusted formally by clerics. Early commercial capitalism, far from representing popular set will, generated fears and uncertainties within the population at large. In practice, elite clerics enthusiastically employed merchant-bankers.

The technological measurement of time in this era is equally interesting. Moving beyond ancient water clocks and sundials, medieval fabricators created a wealth of mechanical clocks, especially from the utilization of a suitable escapement mechanism by late decades of the 13th century. The age was technologically innovative. Richard of Wallingford is just one example of that inventive spirit: the orphaned son of a blacksmith and an Oxford-trained abbot, Wallingford in the 1330s wrote astronomical and mathematical treatises (one on spherical trigonometry) despite the lack of good numerical notation, thus requiring him to explain all ideas in Latin prose. He built a *machina mundi,* a mechanical cosmographical "clock" that not only rang hours, but also showed planetary motion.

Over the next century clocks appeared prominently around Europe and helped to regulate life, even as they demonstrated medieval inventiveness.

Religion: 'In and Out of Time'

Emil Homerin, Department of Religion and Classics

Time may be a fundamental dimension of the universe or an innate structure of the mind. But, in terms of religion, time is relative to something much, much bigger: eternity.

Religions have often sought to understand the connection between this timeless infinity and our finite temporal lives. Worship, prayer, revelation, and enlightenment are religious activities and states of mind that often aim to transcend the duality of space and time in order to approach and, perhaps, merge with an eternal reality. Though eternity may be forever timeless, finite creation exists in time, though time's direction may vary depending on religious traditions. Time may be linear or circular, progressive, static, or degenerative, and time's direction may profoundly shape a believer's view of the world. Many ancient and tribal religions have often viewed time as cyclical and bound up with the rhythms of the natural world, with the alternation of day and night, the changing seasons, and the phases of the moon. Other religions, especially the monotheistic traditions, generally conceive of time as linear, with a sequence of moments composing a meaningful history in which God is often depicted as acting purposefully.

Yet, no matter if a religion conceives of time as linear, circular, or both, the limited temporal world can still assist the believer in transcending time for eternity. With such a view, believers may spend their lifetimes living in a spiritually meaningful way. For all religions, one's time in the world, then, has a direct effect on one's contact with eternity, and various religious traditions have designed rites and rituals to assist their followers in leading a proper life marked by sacred times. These occasions are often part of annual communal rites and rituals that revolve around holy days and other sacred times that serve to spiritually renew or re-create the world. Further, mystical traditions in many religions urge us to step out of time in moments of selflessness, receptivity, and union not in order to see new worlds, but to see our old world anew.

Optics: 'A Snapshot of Now'

Carlos Stroud, The Institute of Optics

We generally think of the present, or "now," as a moving boundary between the past and the future. As a boundary it would seem not to have any duration of its own.

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However, the limitations of human perception only allow one to determine which of two events came first if they are separated by more than about 1/20th of a second. Thus, one might reasonably argue that "now" lasts about that long. Technological advances in the past 150 years have allowed us to artificially expand the boundaries of "now" from the age of the universe, 10^{17} seconds (about 14 billion years) to the duration of the shortest laser pulse produced to date, 10^{-17} seconds. Our perception of reality changes completely depending on the duration of our "now."

The argument is illustrated by a simple experiment using a picture of highway traffic, shown with exposure times ranging from 4 seconds to 1/4000th second. On long exposures, the cars vanish; on short exposures, we see a grainy picture due to the arrival of individual quanta of light, photons. With an exposure time of a few centuries, the highway vanishes, and at an exposure of a few tens of thousands of years, the river alongside it vanishes. Eventually even the solar system will vanish from our imagined picture.

Such ideas prompt a series of questions: Has our increasingly precise ability to define "now" changed our fundamental perception of reality? Do individual humans vanish on the time scale of eternity? Could intelligent creatures exist on time scales much different from ours? What are the time scales of nations and those of individual people generally? The speed with which information is communicated has increased from walking speed to the speed of light. How does this affect the relation between time and distance?

Media Studies: 'Televisual Time'

Joel Burges, Department of English, Film and Media Studies

As a critic whose work is obsessed with temporality in the present, I am interested in exploring the narrative structures that give rhythm and tempo to the experience of television.

For me, TV is all about time. I devote a big chunk of my free time to it. And I am only one among many. As writer Clay Shirky has pointed out, Americans spend billions of hours annually in front of the "boob tube." This is a debt of time that in a decade rivals the national debt that politicians have bemoaned so much these past couple of years.

The series I most love often require a temporal commitment not only to a season, but also to a series. The TV industry also thinks about TV in terms of time. Almost every episode we watch is constructed around a series of "beats"—industry-speak for scenes—typically no longer that 2.5 minutes that give a rhythm to the 30- and 60-minute shows we watch in huge numbers every day. All of this is to say that TV is defined by a medium-specific temporal magnitude: the broadcast signal is—or was—ongoing across many channels 24 hours a day, 7 days a week, 365 days a year.

How does an episode of *Community* that can be watched independently of any other episode of the series organize televisual time for us? How does a nonlinear series such as *Damages* play with our temporal expectations about the way televisual narration should work? How are both *Community* and *Damages* shaped by commercial time—that is, by the fact that almost every episode of almost every series is structured around advertisements that occur at predetermined moments? Are there types of time on television that are neither commercial nor narrative? In investigating these questions, I hope to get students to reflect on the centrality of TV to not just millions and millions of spectators' sense of time in the past 65 years, but also to their own temporal sense now. R

ADAM FENSTER

NAMESAKES: A multidisciplinary outlook is key to understanding issues facing society, says Bernard Ferrari who, along with his wife, Linda, provided support to establish the symposia series.

'Bringing Knowledge Together'

While an undergraduate studying science at Rochester, Bernard Ferrari '70, '74 (MD) took a course in medieval and Renaissance-era architecture and art. It kindled in him an enduring interest in the period and an appreciation for the arts and humanities.

Now Bernard Ferrari—a member of the Board of Trustees—and his wife, Linda Gaddis Ferrari, have established a humanities symposia and related curricula to explore collaborations between art and science. Thanks to their generous gift, which supports the $1.2 billion *Meliora Challenge:* The Campaign for the University of Rochester, students, faculty and the public will take part in the Ferrari Humanities Symposia yearly.

The symposia will feature a public talk from a visiting scholar with expertise in humanistic thought from the 14th to 17th centuries. The visiting scholar also will participate in courses designed to complement the lecture. This year's visiting scholar, Anthony Grafton—the Henry Putnam University Professor of History at Princeton—shared his most recent research project, on the science of chronology in 16th- and 17th-century Europe.

A Rochester native, Bernard Ferrari earned a law degree and an MBA while working as the chief operating officer of the Ochsner Clinic in New Orleans. He went on to have a nearly 20-year career as director and partner in the global management consulting firm of McKinsey & Company. A former medical researcher and banker, Linda Gaddis Ferrari is now a docent at the Metropolitan Museum of Art.

"The study of the humanities provides people with the ability to better appreciate beauty, and better appreciate life," says Bernard Ferrari, adding that the humanities are also relevant "to solving today's problems when that knowledge is brought together with science and other disciplines."

"Through the symposia, we hope to create another opportunity for students at the University to study, appreciate, and reflect on an extraordinary piece of history, while creating new collaborations for students in different academic disciplines," he says.

—Valerie Alhart

Got Any Advice?

A new member of the Rochester alumni community calls on the collective wisdom of her fellow alumni as she prepares to leave campus.

By Maya Dukmasova '12 (T5)

In the fall of my freshman year, **Paul Burgett** '68E, '76E (PhD) gave me and my classmates a piece of advice that I really took to heart. During one of his charismatic talks, the University dean advised us to seek out satisfaction in life, rather than happiness. No one can be happy all of the time, he noted; indeed, life never affords anyone that luxury.

Satisfaction, on the other hand, is the real barometer of your quality of life; it is having enough. To leave the dinner table full, but not painfully so.

After half a decade at Rochester, I am graduating this May. When I look back, I am clearly not the me I was in the fall of 2007, but Dean Burgett's advice has stayed with me throughout my time on campus. As I prepared to leave Rochester, I turned to him and to other alumni, hoping to get their advice for the next phase of my life as a member of the University community.

With the help of *Review* and the Office of Alumni Relations, I called on the collective wisdom of generations of Rochester alumni. Dozens of people responded to my phone calls and emails. I asked the seemingly simple question: Do you have any advice for the graduating Class of 2012?

In the spirit of a commencement ceremony, alumni shared their thoughts across a spectrum of themes—love, career, communication, and more. The result is at times inspiring, at times sobering; as light-hearted and optimistic as it is cautionary and serious.

Career: 'Passion, Ability Drive Ambition'

When I mentioned to Dean Burgett how much his talk five years ago had stuck with me, he reminded me that for most students, our choice of major has no real bearing on what we do in life. The point of college is to find our passions and then work hard to master them. "Passion and ability drive ambition," he said. But that doesn't mean, he reiterated, that our goals in life should be driven solely by a desire for happiness. "Life is too complex to reduce its objective to something like happiness. Because life has pain, it has sorrow, it has disappointment, it has failure, and none of us is immune to any of those things. Happiness is like a butterfly. A butterfly flutters around me and occasionally will treat me by landing on my shoulder, but I can't own it. Happiness, whatever that word means, is not a constant."

"Don't be afraid to move in a new direction which appears and was not part of your original goal. Arriving at goals is not as important as enjoying and fulfilling yourself as you move toward them"—**Pat Kraut Mossel** '55, former executive director of the Washington Opera and an instructor at the

DAVID COWLES FOR *ROCHESTER REVIEW*

ADVISEE: Maya Dukmasova

ABOUT THE AUTHOR

Advice from the Advisee

When not busy gathering advice for soon-to-be graduates, **Maya Dukmasova** '12 (T5) has been completing her Take Five year, researching how the American media cover current events in the Middle East.

A philosophy and religion major, she has been president of the Undergraduate Philosophy Council and is a member of Phi Beta Kappa. She's also an aspiring journalist who has freelanced for *Rochester Magazine*, the *Phoenix New Times*, and the *Daily News Egypt*.

A native of St. Petersburg, Russia, Dukmasova grew up moving around the United States, finally settling near Syracuse, N.Y.

Her own advice for students and graduates is to "take any opportunity, or make an opportunity, to travel.

"Nothing makes you grow more and understand yourself and the world better than being far away from home."

—Kathleen McGarvey

Osher Lifelong Learning Institute at the University of Delaware in Rehoboth Beach, Del.

"Stay positive, as it will serve you always"—**Terri Feinglass Ross** '55, a real estate agent in Rochester.

"Keep your mind open to possibilities and you can accomplish anything you set your mind to do"—**Patricia Dundon Larrabee** '77 (MS), founder and CEO of Rochester Clinical Research Inc. in Penfield, N.Y.

"Carve out at least a half an hour of time every day to read something that is thought provoking. And it does not have to be something related to your own field"—**Les Loysen** '60, a nonprofit organization consultant in Middletown, N.J.

Ethics: 'Your Personal Integrity Is Really the Only Thing You Have'

Regardless of the field in which we choose to focus our lives, alumni put a high priority on a strong commitment to ethical standards.

Speaking directly to Hajim School of Engineering graduates, **Joe Carson** '76, an engineer for the Department of Energy in Knoxville, Tenn., said: "There are significant and persistent deficiencies to the scope and implementation of engineering ethics and, as a result, our profession enables much institutional evil around the world. My challenge to you—on your commencement as members of the engineering profession—is what can or should Meliora mean, given the significant and persistent deficiencies in the scope and implementation of engineering ethics."

"Make sure you leave the University with a deep understanding of ethics, morality, and an appreciation of the extent to which history, ethnicity, culture, and economics give rise to the meaning of globalization in different countries"—**J. Nelson Hoffman** '55, CEO of Rice Manufacturing in Snowmass Village, Colo.

"Your personal integrity is really the only thing you have, and it will last, and people will remember that. You'll be judged on the quality of your work and not whether you outshine the person in the next office"—**Robert Scala** '58M (PhD), a retired senior scientific advisor at Exxon Corp., now living in Tucson, Ariz.

"There are so many needs in the community and so many ways that a graduate of our University can help. We should all plan to participate in giving back throughout our lives to make the world a better place for everyone"—**Carol Bieck Henretta** '62N (MS), '94W (EdD), assistant professor emerita of clinical nursing at the School of Nursing.

Relationships: 'Don't Neglect Them'

Theresa Guenther '90, an associate court attorney in Erie County Family Court, says it's easy to dismiss the importance of other people's perspectives. "I would urge students going out into the world to realize that everyone they come into contact with has something to offer; remember that, and respect others."

"After 30 years of consulting with people and organizations, I have come to believe that success in anything you do—anything you do—is based on creating, developing and maintaining effective and meaningful relationships"—**Jerry Gardner** '58, '65 (MA), an executive coach in Atlanta, who specializes in following up on the "360-Degree Feedback" process.

"Do not neglect the importance of positive relationships with friends and family. This seems so trivial, but over the next few years, the memories you have with your classmates will be the ones that sustain you in the trenches of the real world. Preserve them, cherish them, and continue to nurture them"—**Rene Herbert** '05, a program and budget analyst for the U.S. Department of Health and Human Services in Silver Spring, Md.

"I realize it sounds very elementary, but proper communication is one of the most important components in a successful, productive career. And a good marriage between husband and wife. If I could go back to enhance my education and better myself, I would have taken a course in communication. I would have improved my diction, my enunciation of words, and the pace and cadence of how I spoke"—**Howard Silbersher** '60, a retired family dentist from Princeton, N.J.

"You will meet individuals in the workplace who are not always supportive. This can be because of lots of subjective and irrational feelings—resentment, envy, etc. Just try to ignore them"—**Chita Angeli Duval** '57, '78W (EdD), an educational consultant from Eastham, Mass.

Networking: 'Every Person You Meet Is a Connection'

As a recent graduate, **Alvin Lomibao** '09, an academic associate at North Shore-LIJ Health System in Manhasset, N.Y., knows all about making the transition from college life. "Be aggressive in networking—every person you meet is a connection that might help you further down the road," he wrote.

BRANDON VICK

"Two words: Burt Nadler. He has been instrumental in helping me meet my career goals. As alumni, we are so fortunate to have access to experts like Burt and other individuals at the UR Career Center"—**Mary Delbalso Salter** '04, '07M (MPH), a social worker at Strong Memorial Hospital, referring to the director of the Gwen M. Greene Career and Internship Center at the University.

*"Network, network, network. Always take advantage of getting to know your classmates, colleagues, and peers"***—Jonathan Mahoney** '03, a credit risk manager, and **Amy O'Byrne** '04, an elementary school teacher, in Buffalo, N.Y.

*"Networking with people from different backgrounds expands your knowledge base and prepares you for a diverse world"***—Malik Evans** '02, president of an M&T Bank branch in Rochester and president of the Rochester City School Board.

Jobs, Jobs, Jobs: 'Be Prepared to Create an Industry'

Gregory Meditz '08, a law student at American University in Washington, D.C., is convinced that the economic and personal challenges our generation faces will forge us into stronger, better people. "Surround yourself with people who make you happy, and never stop setting goals for yourself, including moving into your own place!"

*"You are going to have to do real tough work to get ahead; no more easy opportunities to the top of any industry"***—Thomas Kraus** '05, '07 (MS), an optical scientist in Springfield, Va.

*"Don't hesitate to change even midstream if it's something you don't like. Nowadays we live so much longer than we used to; we've got time"***—Mark Zaid** '89, an attorney in Washington, D.C.

*"The idea of coming out of college and finding a job somewhere, I think that's a dying concept. I think the mentality should be to be prepared to create an industry, to create some sort of marketable skill that you can use to employ yourself"***—Henri Muhammad** '98, who after graduating from the College's Department of Music, opened his own music school in Buffalo.

*"You will probably spend half of your weekday working hours—8 out of every 16 hours—at a job for decades. So, unless you truly wish to waste your entire working life and be miserable, figure out what you love, and then do it! That means not chasing money, not listening to your parents' career lectures, not trying to figure out where the job growth market will be, or any other such extraneous factors"***—Bill Dingfelder** '74, a freelance grant writer in Bala Cynwyd, Pa.

*"Try especially hard to avoid allowing the future to loom large over you. Take the time to find a passion by exploring the world, its people and its many jobs"***—March Bishop** '08, a Harvard Business School student.

*"Remember that few young people are adequately paid for the job they do on the way up. You have to earn the salary of the next position in order to eventually receive it"***—Ed Russell** '55, a volunteer analyst for the Alzheimer's Association in Charlottesville, Va.

*"Find the best job that matches your strengths (resources) to the job opportunity in an organization. This relationship can change as you gain experience. You must have passion for that fit. And that fit should meet your moral and ethical values"***—John Mather** '64, executive director of master's programs at the Tepper School of Business at Carnegie Mellon University in Pittsburgh.

*"Take pride in your work, dot your i's and cross your t's. If you do a great job each day, in the end you will be financially rewarded. In life, success takes place when one recognizes the problem to be solved and then offers a solution"***—Barry Swidler** '77, an owner of several small businesses in Brookville, N.Y.

*"While a nice boss might make you happy, a tough boss with high expectations might actually drive you to become the best version of yourself"***—Alexander Pearlman** '07, director of human capital at ReNEW Schools in New Orleans.

Don't Forget the U of R: 'Stay Connected'

Marlene Caroselli '80W (EdD), a Pittsford, N.Y., author, keynoter, and corporate trainer who has published more than 60 books, told me of the value of her Rochester education. "My degree opened many doors as I worked to establish my business. But it also helped me determine when to knock on which doors, when to put my foot into certain other doors, and when to avoid some doors that would not advance my career. The University enriches beyond the education and degree programs it provides."

*"UR taught you how to be humble and how to work hard. Those two traits that you now own will get you further than any one thing you learned your entire life"***—Chris Johnston** '04, '06S (MBA), a sales and marketing expert from Newburyport, Mass.

*"Stay connected to your alma mater and with the friends you made during your time at UR. Those relationships helped shape you into a young adult setting out in the world and they can continue to nurture you all through life"***—Lorri Kahn Diggory** '88, who works in public relations from her home in Webster, N.Y.

Listening to Advice: 'Have the Confidence to Question Yourself'

Bill Robinson '72, director of legal affairs and counsel for a Cambridge, Mass., health care company, has a veritable decision-making game plan: "Be confident in, and realistic about, your strengths and qualities and have the confidence to question yourself. Then act on your decisions, avoiding both impulse and foot dragging. "Afterward, live honestly with your choice long enough to evaluate how you are doing and with realistic confidence. Again, question and decide."

But with all the advice being given to the graduating students, sometimes it's hard to know what to take to heart. When all is said and done, sometimes you just have to blaze your own trail. As **Bill Dingfelder** says, "Ignore all advice."

And maybe that's the real lesson: It seems that the most important thing good advice does is that it inspires confidence. Good advice reinforces your power and capacity to make decisions that are good for *you,* and not live someone else's vision for your life.

There is seldom a right answer or path. Think critically and take the time to realize who you are. Look to the advice of the people you trust. Seek out satisfaction and never stop trying to make the world and yourself better.

Perhaps it all comes down to one thing: Meliora.