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RESEARCH

AT BOSTON UNIVERSITY

2007

From the University Provost and Associate Provost and Vice President for Research



David K. Campbell
University Provost



Andrei E. Ruckenstein
Associate Provost and
Vice President for Research

Welcome to *Research at Boston University 2007.* This year we are delighted to present an expansion of the scope of the magazine to include research, scholarship, and creative activity in the humanities, social sciences, and fine arts. As in years past, you will also be introduced in these pages to researchers working in the natural sciences, medicine, engineering, and technology.

Given the extent of the scholarly activities in our seventeen schools and colleges, as well as dozens of centers and institutes, we realize it is impossible to provide a complete overview of research efforts at Boston University in one annual publication. But we hope the newly broadened scope will offer a more comprehensive and balanced perspective than in previous years.

Uniting researchers in all disciplines at Boston University is the conviction that research and teaching are complementary and that new discoveries augment and sustain our work as educators. *Disce ut doceas*—learn in order to teach. We hope this conviction is also reflected in the magazine.

Apart from the remarkable breadth and depth of traditional disciplinary research at Boston University, the articles demonstrate the many connections—some quite unexpected—across disciplines. As you will see, "Sights and Sounds: Explorations in the Arts" highlights collaborations between artists and scientists, while "Talking about Religion and Culture" looks at the ways in which faculty members from five very different academic disciplines—classics, economics, law, religion, and sociology—explore issues of faith. All of the articles illustrate the talent and ingenuity of our faculty and students and their engagement in the world around us.

While encouraging interdisciplinary, collective efforts, Boston University is also committed to fostering an environment that nurtures individual researchers. Our newly appointed Associate Provost and Vice President for Research, Andrei Ruckenstein, will seek to promote and advance this dynamic balance between strategic research initiatives and individual creativity. He will play a central role in enabling and enhancing research, scholarship, and inquiry throughout the University. In his own research—which extends across physics, molecular biophysics, and structural and computational biology—Dr. Ruckenstein has proven to be an influential and visionary leader. We are delighted to welcome him now and to entrust future issues of this magazine to him.

Like any publication of this nature, *Research at Boston University* is necessarily a snapshot in time. For the most up-to-date research news, please visit our website at *www.bu.edu/research.*











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SIGHTS AND SOUNDS:
EXPLORATIONS IN THE ARTS

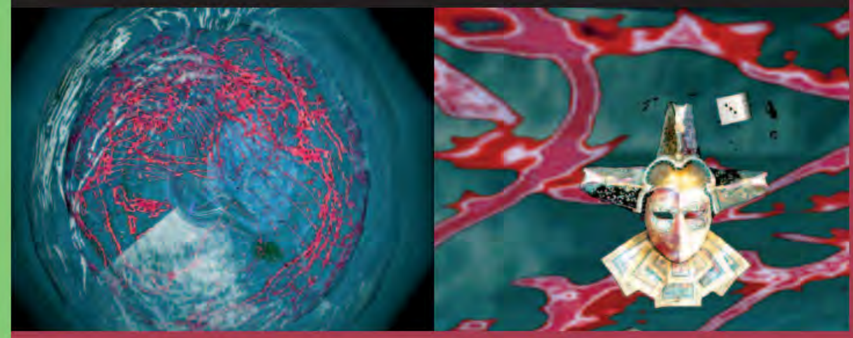
The word *research* generally evokes images of lab coats and petri dishes, or archives filled with musty volumes. Rarely would one associate research with the final creative product—a polished musical performance, finished script, or exhibited work of art. But research plays a vital role in the fine and performing arts, as demonstrated by the recent activities of five professors in the College of Fine Arts. The fruits of their labor only appear effortless. Careful scholarship, planning, and practice are needed to ensure that a finished work of site-specific art suits its environment, for instance, or that the performance of a long-unheard baroque composition sounds exactly as the composer had intended.

Art Meets Computer Science

As scientists hasten to assess the impact of climate change on our physical environment, scholars in the humanities and the arts have begun to ponder how global warming will affect human culture. Such is the inquiry posed by *Surge*, a collaborative multimedia artwork by Deborah Cornell, associate professor of art in the School of Visual Arts, and her husband Richard Cornell, associate professor of composition in the School of Music. *Surge*—which the Cornells describe as "an exploration of the reciprocal influence of environmental change on human culture"—was created with software developed by Boston University programmers and intended for exhibition in the Scientific Computing and Visualization group's Computer Graphics Laboratory. In April, the Cornells premiered the work for the 2007 Boston CyberArts Festival, a biennial festival of international artists working in cutting-edge computer-based media. *Surge* was projected onto the lab's 15' x 8' Deep Vision Display Wall, equipped with an eight-speaker sound system.

Concerned by the various effects climate change has on the world, Richard and Deborah Cornell began working on *Surge* through research that was largely experiential, informed by visits to Venice, Argentina, and other places where rising sea levels pose a distinct threat. The couple first collaborated in 1999 and have since presented three joint projects in venues such as the High-Speed Access Grid, concert halls in the United States and Taiwan, and galleries and museums both stateside and abroad. A sabbatical leave during the 2006–2007 academic year enabled both professors to spend a month in Buenos Aires, where they presented their joint project *Acqua Alta* at Proyecto'ace, a contemporary art center. Consisting of nine 3' x 5' digital prints and an original soundtrack, this installation also explored changes in sea level.

Engaging with similar themes and imagery, the virtual environment in *Surge* consists of a luminous spherical shape floating in black space. Equipped with a navigation device similar to a Playstation controller and a pair of 3-D vision glasses, the viewer—or, more accurately, the participant—enters the virtual realm. Inside, he or she meets a variety of objects and creatures, each symbolic of humankind's impact on the natural environment. Three "lifeboats"



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The profound effect of climate change on human life plays out in images from *Surge* and *Acqua Alta* by Deborah Cornell. In virtual reality and large-scale digital prints, cultural expressions combine with images of natural forces. *Clockwise from top left:* Still images from *Surge*, including a global view of the *Surge* environment and a Venetian mask with dice; details from *Memory*, *City of Dust*, and *Faces Vanish*—large-scale digital prints with transparent overlays from the installation *Acqua Alta*; viewers navigate through the 3-D immersive environment of *Surge* using the Deep Vision Display Wall in BU's Computer Graphics Laboratory.

containing images of human chromosomes float in the center of the sphere, while a colorful jester's head and Venetian Carnivale masks remind the audience of the threat Venice faces from rising water levels. Hovering nearby, a quotation from *The Tempest* takes on a new connotation in the context of global warming: "Nothing of him that doth fade / But doth suffer a sea-change."

Surge's soundtrack, carefully synched to one's movement through the virtual space, enhances the journey. Running water, a rumbling thunderstorm, and other nature noises combine with sounds evocative of human culture, such as a Monteverdi choral passage and the ringing of the Lutine bell, recovered from a sunken British vessel of the same name.

Boston University students in Laura Giannitrapani's 3-D Animation and Design class also participated in the CyberArts Festival. As the manager of graphics consulting for BU's Scientific Computing and Visualization lab, Giannitrapani has collaborated with the Cornells on several of their virtual artworks. Her students' piece, *Interactions*, uses technology similar to that of *Surge* and also addresses humankind's effect on the environment. Zoom in on a polar bear, for example, and watch it lumber across an iceberg while a chunk of the mass breaks off and falls into the water below. Both entertaining and educational, *Interactions* presents an innovative method for instructing young children about climate change.

"Cyberart can be anything from an examination of complex ideas about the nature of reality to sheer unadulterated fun," wrote BBC reporter Rachel Rawlins of the 2007 CyberArts Festival. "And if you're lucky," she added, "both at the same time." *Surge* and *Interactions* fulfill these criteria in encouraging playful exploration of the virtual realm, as well as serious reflection upon our relationship with the natural environment.

For more information, see *http://people.bu.edu/rcrnl* and *http://scv.bu.edu/SCV/cgl.html*.

Bringing Baroque Music to Life

When Martin Pearlman joined the faculty of the College of Fine Arts as professor of music and director of the Historical Performance program in 2002, he offered the College more than his expertise as a renowned conductor. Boston Baroque, an acclaimed orchestra and chorus founded by Pearlman in 1973, also joined the School of Music as a resident professional ensemble. This innovative collaboration allows graduate students in the Historical Performance program to work alongside professional musicians.

Boston Baroque has received wide recognition for both its live performances and its many recordings. The most recent season featured two Beethoven symphonies, Handel's *Messiah*, Mozart's *Don Giovanni*, and Vivaldi's only surviving oratorio, *Juditha Triumphans*, composed in 1716. While works by Mozart and Beethoven are certain crowd-pleasers—*Don Giovanni*, for example, was radio broadcast by WGBH—Pearlman particularly enjoys performing pieces that contemporary audiences rarely hear, such as the Vivaldi oratorio and Cherubini's *Requiem in C minor*, one of the previous season's highlights. Most audiences are acquainted with Vivaldi's concertos, but not with his vocal music. *Juditha Triumphans*, Pearlman says, is "not only one of the biggest, but also one of the best Vivaldi pieces that people haven't heard."

The preparation and performance of little-known music presents a distinct challenge to the conductor, especially if he or she wishes to re-create the music exactly as the composer himself had imagined it. Because instruments and methods of musical notation have evolved over time, Pearlman's historical interpretation of a Baroque piece may differ considerably from a standard modern interpretation. In order to perform a work like Vivaldi's oratorio, Pearlman must first find a suitable score, and then check it against the original manuscript, if it still exists, and against reproductions made over a period of nearly three centuries. Compiling variants and choosing the best among them involves a great deal of painstaking detective work and considered judgment. Because Vivaldi did not include cadenzas or ornamentation in his scores, Pearlman must also decide whether, and how, to ornament the music.

Determining the piece's instrumentation can also be an arduous task. Contemporary instruments differ—often quite drastically—from their Baroque predecessors, and some manuscripts refer to instruments that no longer exist. Ensembles that wish to perform music in its historical form must determine what sorts of instruments the composer originally wrote for—is a *salmo*, for example, related to the Baroque *chalumeau*, an ancestor to the modern clarinet? Pearlman's investigations might continue with a review of recent literature by music historians to determine whether a similar instrument exists, or whether it has to be specially constructed. Last but not least, he must find performers who are proficient with these nearly obsolete instruments.

Graduate students in the Historical Performance program not only learn to play such instruments, they also observe and engage in the research process leading up to a performance. By understanding how a conductor decides to assign a certain instrument to a specific part, or why he might add a cadenza at the end of an aria, students prepare for careers in ensembles like Boston Baroque.

In re-creating music of the 17th and 18th centuries, Pearlman aims to avoid presenting audiences with a mere "history lesson." "In the end," he says, "a performance can't be about the research." The audience should be captivated, oblivious to the months of preparation needed to perform a piece of music in its historical form. A successful performance brings the music to life, making it a part of our contemporary world.

For more information, see *www.bostonbaroque.org*.



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Above: The orchestra and chorus of Boston Baroque perform Monteverdi's *Vespers* in Jordan Hall, Boston. Conductor Martin Pearlman is a professor at BU's School of Music, and soloist Kristen Watson (in purple dress) is an alumna. *Right:* During a recording session, Pearlman conducts Boston Baroque in Bach's *Orchestral Suites*.