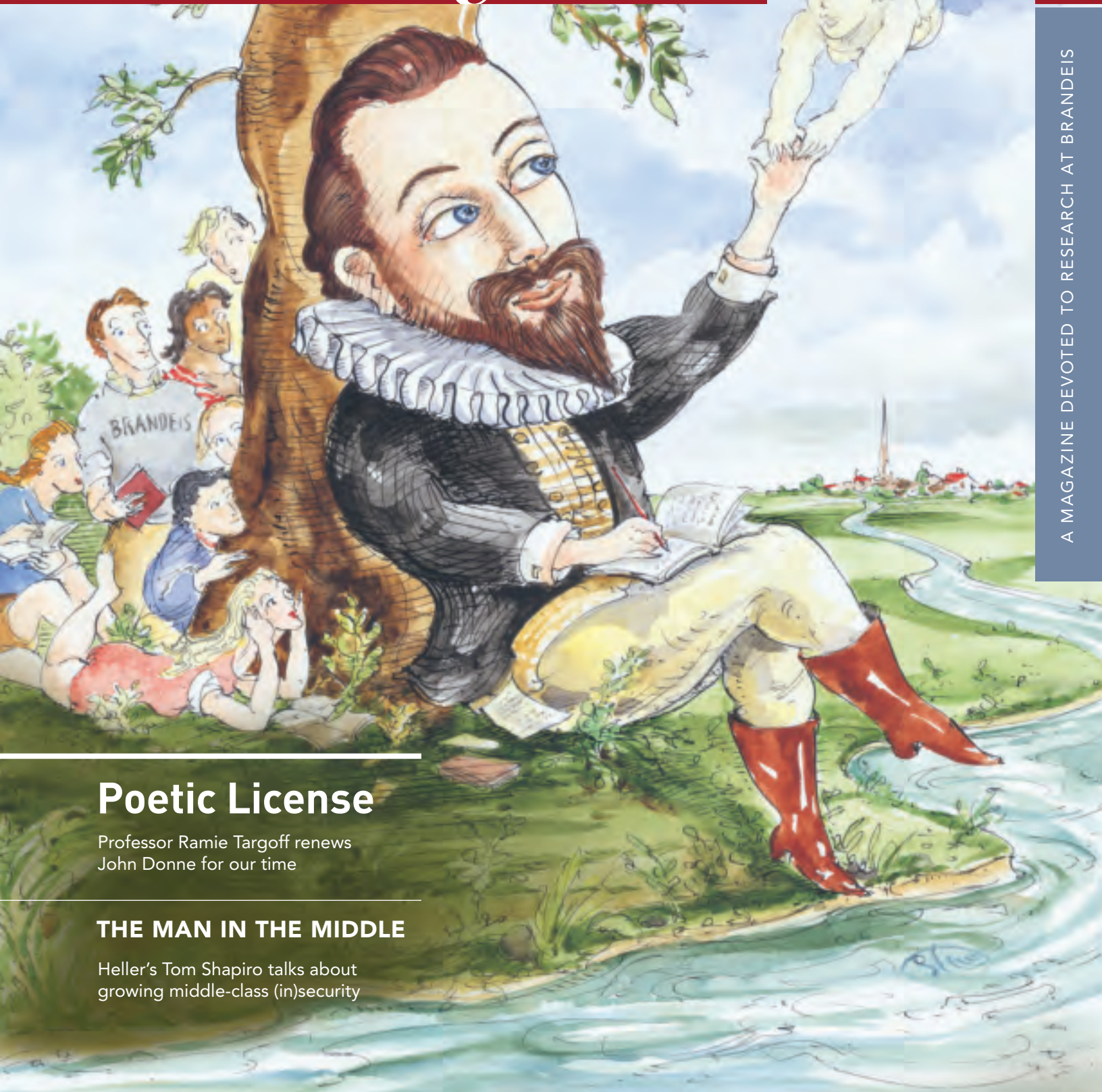


Brandeis University

Catalyst

VOLUME 3 / NUMBER 1

A MAGAZINE DEVOTED TO RESEARCH AT BRANDEIS



Poetic License

Professor Ramie Targoff renews
John Donne for our time

THE MAN IN THE MIDDLE

Heller's Tom Shapiro talks about
growing middle-class (in)security

Frontlines



Dear Reader,

Welcome to *Catalyst*, the Brandeis University research magazine that chronicles events and scholarship in the sciences, social sciences, and the humanities. This issue—the first in our newly expanded format—communicates the exciting and important work taking place in the labs and classrooms throughout the Brandeis campus, including Ramie Targoff's wonderful new book on the seventeenth-century poet John Donne; the establishment of a new materials research science and engineering center focused on nano-structured and biomolecular materials; and Margie Lachman's observations on the centenary of the influential psychologist Abraham Maslow.

The excitement surrounding research and scholarship at Brandeis today is palpable. The new Carl J. Shapiro Science Center, scheduled to open later this academic year, has begun taking shape and now towers over the campus entrance. Soon to follow will be the new Mandel Center for the Humanities, which, when it opens in fall 2010, will house classrooms, lecture halls, and a dramatic three-story glass forum for interdisciplinary discourse in the humanities and social sciences.

In an extremely challenging research funding environment, Brandeis achieved a 10.7 percent increase in sponsored research funding in fiscal year 2008. This represents an all-time record for the university—an amazing accomplishment in a world in which acceptance rates at the National Institutes of Health and other major funding agencies remain well below historical norms.

I am confident you will find much to discover in *Catalyst*.

Sincerely,

Adam B. Jaffe

Fred C. Hecht Professor in Economics
and Dean of Arts and Sciences

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Proposal and award activity of fiscal year 2008.

License to Invent

Even in the midst of a nationwide economic slowdown, the Office of Technology Licensing (OTL) has enjoyed one of its most productive years ever. Last year saw robust growth and this year our license deals and income have increased significantly. License agreements with industry tally nine, up from five last year. We've received close to thirty invention disclosures from a pool of faculty, post-docs, graduate students, senior research scientists, and staff.



IRENE ABRAMS

Moreover, revenue from our existing license agreements is up nearly 50 percent over last year. Naturally, people like to focus on the money, but there are many other equally valuable benefits of tech transfer at Brandeis, including attracting and retaining top-notch faculty; fostering corporate investment in basic research, industry collaborations, and consulting relationships; and cultivating job opportunities for grads and post-docs. All of these opportunities fuel our primary mission in OTL: to bring Brandeis inventions and discoveries to market for public benefit.

We're also bringing tech transfer to business students. In the spring semester, Professor Preeta Banerjee at the International Business School (IBS) used inventions from my office as case studies in a highly popular course on developing technology strategy. Business and science students met with faculty inventors and developed strategic business plans for Brandeis inventions. This class provided real-world experience for the students and created good chemistry between the scientists and the business students.

Our growing presence in the world of tech transfer was nicely recognized earlier this year when Brandeis won kudos for two contributions to human health from the Association of University Technology Managers. In its annual *Better World Report*, the association selected one hundred university technologies globally that are making a difference in the world, including Larry Wangh's DNA assay using LATE-PCR to test for deadly microbes in the field; and KC Hayes and Dan Perlman's cholesterol-lowering Smart Balance buttery spreads. Check out the report at www.autm.net/about/dsp.Detail.cfm?pid=219.

The main tool we use to ensure Brandeis inventions reach the public is to patent our discoveries and license them to companies that will commercialize them. Here's a sampling of this year's new license agreements:

- Link Medicine, Cambridge, Massachusetts, licensed a new discovery from biochemists Greg Petsko and Dagmar Ringe. The license covers their novel method of stabilizing a protein implicated in Parkinson's as well as other neurodegenerative diseases. Link Medicine, founded with the goal of curing Parkinson's disease, will use this discovery to develop new therapies for this incurable condition.

- Chemist Judy Herzfeld and graduate student Jianping Hu developed several improved nuclear magnetic resonance probes and licensed them to Revolution NMR in Fort Collins, Colorado. The company plans to commercialize the probes, which have unique qualities for work at the high magnetic fields increasingly used in studies of protein structure.

- Chemist Jeff Agar discovered and patented a novel class of compounds as well as an application for a class of drugs already thought to be useful in the treatment of metabolic disorders. The hope is that some of these compounds can be developed into treatments for neurodegenerative disorders, including Lou Gehrig's disease, his area of specialty. Brandeis licensed Agar's discovery to ExSAR, a pharmaceutical company in Monmouth Junction, New Jersey. ExSAR is commercializing Agar's discovery as well as funding further research in his lab.

- We licensed a patent covering our phytosterol technology developed by Hayes and Perlman to Los Angeles-based Corazonas Foods for a number of new products—heart-healthy cookies, potato chips, and crackers. Corazonas has an existing license to sell heart-healthy tortilla chips made with this Brandeis technology (which were featured on the "O List" in the July issue of *The Oprah Magazine*). Look for the potato chips soon!

- We licensed three new patents from chemist Li Deng to Daiso Co., Ltd., in Osaka, Japan. Deng's discoveries make it easier and cheaper to manufacture pharmaceuticals, while also reducing toxic byproducts. Daiso has licensed a number of Deng's other patents and supports research in his lab.

—Irene Abrams, executive director,
Office of Technology Licensing

Leader of the Posse

BY MARJORIE LYON

You know the drill. High-school students face an increasingly daunting college admission obstacle course, including pressure to excel on standardized tests that demand rigorous academic preparation available primarily in affluent suburban schools.

But what about exceptional students trapped in inner-city communities that scream “not college material”? How do admissions officers from top-notch universities capture and support these students through college (see related article, page 4)?

Enter Deborah Bial '87. She is president and founder of the Posse Foundation, a national nonprofit organization that recruits and trains groups of promising urban students who are likely to remain under the radar of admissions officials at selective colleges because their grades and test scores don't reflect their potential. Based in Manhattan and financed through private donations, the nineteen-year-old Posse Foundation uses an innovative alternative

testing process to identify and measure leadership, teamwork, and problem-solving and communication skills.

Bial designed an assessment tool to evaluate how students complete a task as a group. “We're looking at them through a nontraditional lens,” Bial explains, noting that leadership is key.

Indeed, leadership is something she knows a thing or two about. Last fall Bial received a “genius” award from the John D. and Catherine T. MacArthur Foundation.

“Suddenly I knew what it was like to be on the other side of a life-changing phone call, just like our Posse winners,” she said.

Bial was selected for her creativity, originality, and potential. She will receive \$100,000 annually for five years, no strings attached.

But Posse does not just identify individual students who have enormous potential. Bial realized that sending a disadvantaged urban student to a primarily white suburban campus is a formula for defeat.

“If I had my posse with me, I would've never dropped out of college,” one student told her after the culture shock of college proved insurmountable. “‘Posse’ was a hip word in the youth culture meaning ‘my friends,’ the people who back me up,” explains Bial.

“Why not send a posse together to college so they could back each other up?” Bial asked herself.

That simple, brilliant idea is at the core of the Posse Foundation, and it works. Posse students have a 90 percent graduation rate, far above the national average.

Consider Natalee Graham '02, a Brandeis Posse alumna from New York City. On a full-tuition Posse scholarship, Graham excelled as a politics major with minors in advanced Spanish literature, Latin American studies, and international studies. In 2001 Graham was selected for a highly coveted internship at Lehman Brothers. Now she is an assistant vice president at Barclays Capital, Inc., covering the credit business. She also received a law degree in May from New York Law School while working full time.

“People are afraid to step outside of certain conventions and stereotypes,” says Graham. “You meet people who expect that you can't do this, that, or the other. I say, ‘Why not?’”

Like a pebble dropped into a pond that creates concentric circles far beyond its initial impact, Posse has the potential to affect thousands more lives than just the young people who win the scholarships.

“I am the luckiest person in the world,” says Bial, “to see something grow from an idea to a national initiative, to see all the lives that are changed. I want to keep working on social justice, equity, and education, making a difference on as big a scale as possible.”



JENICA MILLER



CHANGING the FACE of SCIENCE

Seated behind the scattered stacks of paper piled on his desk, a whiteboard cluttered with chemical formulas on the wall to his left, Professor Irv Epstein, sporting a gray beard and glasses, looks like your archetypal scientist. And that's a problem.

"The thing I have noticed in teaching introductory science courses here is that you look out at what is essentially a sea of white faces," the Henry F. Fishbach Professor of Chemistry explains. "And as the semester goes on, that sea gets whiter and whiter. This is not just a phenomenon at Brandeis; it's at colleges and universities all across the country."

But increasing diversity in the chemistry classroom isn't just a social justice issue; Epstein thinks it can significantly boost science research as well. "If everyone has the same set of life experiences, then, when they look at the petri dish, they're more likely to see things in the same way," he says. "For breakthroughs to occur, someone has to look at that petri dish a little differently."

The million-dollar professor's plan

In 2006, Epstein had a breakthrough of his own. The Howard Hughes Medical Institute (HHMI) selected Epstein from a

pool of two hundred scientists nominated by their institutions with specific proposals to make science more engaging and meaningful to undergrads. To support their programs, HHMI gave each winning professor \$1 million. That year, Epstein became one of just twenty "million-dollar professors."

Epstein decided to adapt a singularly successful approach developed by the Posse Foundation. Created by Brandeis alumna Deborah Bial '87 (see article, page 3), the foundation identifies talented high-school students from urban areas like New York City and sends them in small groups (and on full-tuition scholarships) to elite colleges and universities. The idea is that students in the group, or "posse," will support one another through the academic challenges they're bound to face. Epstein's idea was to focus the Posse model specifically on students who showed an aptitude for science and planned on pursuing a science major in college.

Working with Dean of Academic Services Kim Godsoe, who already served as the university's Posse liaison, as well as with Jean Eddy, senior vice president for students and enrollment, Epstein proceeded to find potential students for the new program. Thanks to assistance

from a wide group of science teachers and guidance counselors, 200 promising high-school seniors from New York applied for the ten available spots, including Gloriya Nedler and Andy Sanchez, both now members of the Class of 2012.

Nedler believes the program will help her realize her dream of joining the tiny fraction of women who are neurosurgeons



VIRGINIA RAMOS '12



YVONNE PEREZ '12 AND ANDY SANCHEZ '12

Million-dollar professor Irv Epstein has brought ten students and a new perspective to the Brandeis science classroom. \ \ By Max Pearlstein '01

in the U.S. (According to the organization Women in Neurosurgery, in 2006 only 181 of the 4,000 or so certified neurosurgeons in the United States were female.)

Sanchez is still considering his options: "I might go to medical school, or I might end up teaching science because I would really like to help other people feel as passionate about it as I do."

The first-ever science posse consists of five men and five women. Four are Hispanic, three are African-American, two are South Asian (Indian and Pakistani), and one of the students is white. Most likely, none of them would have ended up at Brandeis if it weren't for Epstein's initiative.

"This is going to be a big test of how important the standard measures are in predicting success in the sciences," Epstein says. "Because it's clear if you spend time with these kids that they're really bright and enthusiastic, but if you look at them on paper, they don't fit the Brandeis profile. So you think there's no way they should be able to succeed. But if you talk to them, you realize these kids can do it. The key

is trying to create a program that will maximize that likelihood."

Science "boot camp"

That's why Sanchez, Nedler, and the other eight science posse members spent the first two weeks in July—peak time for most incoming college students to hit the beach or go to the movies—bent over beakers instead. They came to campus for a "science boot camp" designed to prepare them for the hectic pace and difficult work they'd be facing in the fall, without the threat of being graded.

During the day they conducted experiments measuring the acidity of various compounds and analyzed DNA structure. In the evening there were lab reports to fill out or disease research to compile for a concluding poster presentation.

Melissa Kosinski-Collins, the assistant professor of biology who organized the boot camp, said she knows many undergrads who would benefit from their own posse.

"So often in science I see students leave because they feel so isolated," she said. "They feel like they're the only one struggling. But there's something psychologically reassuring in being able to turn to your friend who's in the same class and realize that you're not the only one struggling with so much work."

Breaking through

Now that classes are in session, the science posse members are meeting each week with a graduate student mentor. They also have the opportunity, if they want it, to work in research labs.

"It would be great if they all graduate in science and go on to be MDs and PhDs," Epstein says, "but that's not likely. In my view, we can count success if all ten graduate, and most of them stay in the sciences. If a couple of them go off into another field and are happy and do well, that's great."

Nedler doesn't expect anything less of herself, or the rest of her posse. "We plan on making breakthroughs," she says. "We're not going to let Irv down."



THE MAN IN THE MIDDLE

Tom Shapiro's research is changing the way we look at the middle class—and policymakers are starting to pay attention. \ \ By Max Pearlstein '01

Tom Shapiro is frustrated. "This is the season of pandering," he says as we talk politics inside his third-floor office at the Heller School for Social Policy and Management. "The conversation that we hear every four years out of Democrats and Republicans is not very useful dialogue. None of the claims we hear from politicians is ever explained."

Looking out of his office window, Shapiro can see clear across the university's evolving campus, past the rising skeletons of the new Carl J. Shapiro Science Center and Ridgewood Residence Halls, beyond the boundaries of Brandeis. It's a fitting vantage point for someone who views his role as director of the Institute on Assets and Social Policy as essentially bridging the gap between the academic and the policy worlds.

This afternoon, Shapiro is hoping his pioneering research on America's middle class will bring some accountability to the presidential race. "They say whatever they think voters want to hear," he tells me, referring to the generalized claims about the middle class in daily stump speeches. "We hear that the middle class is doing better, or that the middle class is doing worse; well, it has to be one or the other—now we have the objective data."

Mapping out the middle class

Those data, collected in a series of collaborative reports released by Shapiro's team at Heller and the New York nonpartisan research and advocacy organization Demos, assess middle-class security based on five core economic factors: assets, educational achievement, housing costs, budget, and health care. By

plotting where a specific household ranked in each of the categories, the researchers were able to define it as financially “secure,” “borderline,” or “at risk.” When the original report was released in November 2007, it offered some startling figures. “By a Thread: The New Experience of the Middle Class” found that less than one-third of middle-class households were financially secure, and more than half of the middle class had no net financial assets.

“In America, we have been concerned, to some degree, about poverty,” Shapiro says. “We think it might be the case that what we have previously characterized as the conditions of poverty are going up the economic ladder and seeping into the middle class.”

Adjusting for family size, Shapiro and his colleagues have qualified the middle class as households with income ranging from \$40,000, or twice the official poverty level, up to \$140,000.

He is quick to point out that the majority of African-American and Latino households that fall into this range are concentrated at the lower level of the spectrum. In fact, “Economic (In)Security,” a follow-up report in early 2008 that focused specifically on the minority population, found that three out of four African-American and four out of five Latino households were at risk of falling out of the middle class completely.

with the same exact square footage and the same number of blades of grass. If one of the houses is located in a community that’s less than 75 percent white, it’s probably going to be valued about \$300,000 less than the same house in a community that’s 90 percent white. Realtors say ‘location, location, location.’ If you deconstruct it, what they mean is the characteristics of the location.”

Shaping a passion for social justice

Shapiro, who wrote the book *The Hidden Cost of Being African-American: How Wealth Perpetuates Inequality*, has become a nationally recognized expert on the economics of race. His passion for social justice was ignited while he was growing up in Southern California during the height of the civil rights movement.

“The 1965 Watts rebellion or riot was something I observed closely,” he says. “I especially remember listening to a police-band radio and being shocked as an eighteen-year-old at the racist language and feeling expressed by law enforcement officers during this conflagration.”

While Shapiro left behind the civil unrest in his home state later that year to attend the University of Wisconsin, his desire to better understand issues of inequality remained, eventually becoming the nucleus of his scholarly research and



TOM SHAPIRO

paychecks, because their paychecks, as we know, barely cover their living expenses. They’re taking it out of their financial assets. They’re going into debt.”

Bridging the gap

Now that the Institute on Assets and Social Policy reports have defined the problem, Shapiro has been busy spreading the message of middle-class insecurity to the policymakers in Washington, D.C. He presented the findings from “By a Thread” to a congressional panel, and former U.S. secretary of Housing and Urban Development Henry Cisneros has praised the project. Due to all the attention, Shapiro is optimistic that the next presidential administration will work on crafting a solution. “I think the more we understand what’s going on, the better our chance is of doing something about it,” he says. “Then the question becomes matching a remedy to what you see in the research, and I think we’ve gotten a lot better with that.”

When I ask him how much longer he’ll be putting the information out there, into the world on the other side of his office window, Shapiro smiles and says, “It’s so much fun. I’ll never slow down.”

“In America, we have been concerned, to some degree, about poverty.”


“There is a huge difference in the financial assets between African-American and Latino households on one side and white households on the other,” Shapiro says. “By comparison, the average African-American family has a dime in wealth for every dollar that the average white family has.”

He attributes this wealth gap to the historical legacy of race in the United States and the way many American institutions continue to operate today. “For example, take identical houses

paving the way for his current focus on the increased economic demands placed on the middle class.

“We want to get a handle on what it means when American families are being asked to pay more for their health care,” Shapiro says, “whereas previously their employers did this to a much greater degree and a much deeper degree. So what does this transformation mean for families? And our hypothesis has been that families aren’t taking this money out of their





AN ABLER SOULE

Ramie Targoff's research on John Donne breathes fresh life into the master of metaphysical poetry

BY LAURA GARDNER

He's radical, rakish, and romantic, obsessively questioning himself, neurotically worrying about God, even while celebrating a healthy sexual appetite. No wonder college students love him. In so many elemental ways he mirrors their youthful occupations as he relentlessly explores the relationship between body and soul in some of the most memorable lyric poetry in the English language.

So it is hardly surprising that the seventeenth-century metaphysical poet and preacher John Donne is alive and well on YouTube, where you can watch madcap performances and heartfelt recitations of his love poetry, replete with stick-figure drawings illustrating one of his most famous poems, "The Flea," and multiple interpretations of another favorite, "A Valediction Forbidding Mourning."

A modern voice and medieval obsessions

Ironically, Donne's literary persona seems, to our modern sensibility, sympathetically tortured and humble on the one hand, and refreshingly irreverent on the other. Add eroticism and a healthy take on love (no poetics of romantic longing or sadness, or puritanical self-regard in this poet), and you've got a

Renaissance poet with a modern voice and medieval obsessions.

So says Professor of English and American Literature Ramie Targoff, an expert on Renaissance literature and the relationship between literature and religion, and the author of the new book, *John Donne: Body and Soul* (University of Chicago Press, 2008).

She explains Donne's popularity among undergraduates this way: "Students always respond to Donne with passion and interest; the reason for this, I think, is that he asks a lot of questions for which he has no answers. This is not someone who has a private line to God's ear or represents himself as a voice of authority. Students can relate to that."

Her own introduction to Donne took place when she was a seventh grader growing up in Hastings-on-Hudson, just north of Manhattan. Her assignment was to memorize a poem; she chose perhaps Donne's best-known sonnet, "Death Be Not Proud."

"There I was, this Jewish New York girl memorizing a poem by a Protestant man about death; how bizarre that of all the poems in the world, I chose a holy sonnet by Donne," muses Targoff, adding, in retrospect, that she had the poem all wrong.

Donne to the proverbial desert island

With a growing interest in religion (she spent the summer before college in a devout Muslim household in Indonesia), she entered Yale in 1985, intending to major in religious studies. But in a Renaissance poetry class with a professor "who made a lot of English professors out of his students," she became captivated by Donne, whose intertwining of religion and poetry created an irresistible intellectual gravitational field.

"I have always felt drawn by the energy and the passion of Donne's voice; I really can't think of another poet about whom I feel so strongly," she says, grabbing her thoroughly dog-eared freshman volume of Donne off the bookshelf just to underscore the point. Donne, Targoff confides, would accompany her to the proverbial desert island, not Spenser, Milton, or even the Bard.

Nevertheless, in graduate school at the University of California, Berkeley, she studied Shakespeare, perhaps not least because her then-future husband, Stephen Greenblatt, is a leading Shakespeare scholar. Returning to Yale after graduate school, she taught the same Renaissance poetry course she had taken as a freshman.

"I had a tremendous reconnection with Donne," she says. She also wrote her first

“Ramie’s verve and scrupulous scholarship, her profound sensitivity both to the poet’s voice and to his historic moment, make her *Donne the Donne* of our generation.”

book, *Common Prayer: The Language of Public Devotion in Early Modern England* (University of Chicago Press, 2001), which explores the relationship between prayer and poetry in the century following the Protestant Reformation.

The nature of the soul

With her new book, Targoff has secured her place as a leading Donne scholar. In fewer than 200 pages, she persuasively argues

with its inevitable rupture”—has escaped substantive literary scrutiny for centuries.

“I’d say that other literary critics have generally been so dazzled or so irritated by Donne’s intensity as a poet that they’ve had a hard time seeing him as anything but a deeply romantic figure or else a shallow showoff,” says Jeffrey Knapp, a colleague and English professor at the University of California, Berkeley. “But Ramie isn’t intimidated by brilliance. She thinks that the best way to appreciate Donne is to try to understand him, and her book proves that she’s right.”

Love through purely bodily mechanics

Setting the record straight in the wake of much unsatisfying, even hostile, criticism, proved unnerving at first, precisely because she approached her subject without a strong compass pointing her in any particular direction. Instead, she spent her maternity leave from Yale in 2001 at Harvard’s Houghton Library just reading all



RAMIE TARGOFF TEACHING
A CLASS ON DONNE’S POETRY.



that Donne’s writing “is fueled by a set of metaphysical questions...that coalesce most persistently around the nature of the soul and its relation to the body.” She asserts that this issue—“the body and soul’s union, and Donne’s preoccupation

of the first editions of Donne’s writing.

“I found it kind of scary, as a scholar, because I wasn’t even sure what I was looking for,” she says.

A year and a half and mountains of notes later, Targoff found her central interest

crystallized in a single poem, “The Extasie” (see sidebar). In it, two lovers lie on a riverbank fruitlessly trying to “consummate their love through purely bodily mechanics,” writes Targoff. Union remains elusive because their souls have taken off.

“The question Donne asks in this poem is how can we become one?” says Targoff. Even when their souls forge into an “abler soule,” they realize that something vital is still missing, that they’re still hapless lovers stranded on the wrong side of consummation. “If bodies without souls cannot achieve union in love, neither can souls stripped of their bodies,” writes Targoff.

“So the point is, you can’t be together just in body—or just in soul—Donne believes you need both body and soul to become one,” she explains.

Of course, Donne’s metaphysical obsession with body and soul (or mind—Donne used the terms interchangeably) is today largely a scientific issue. “If you think about how biologically driven all of our accounts of character have become, you realize that people don’t really believe anymore, as Descartes did, that the body can be separated from the mind,” says Targoff.

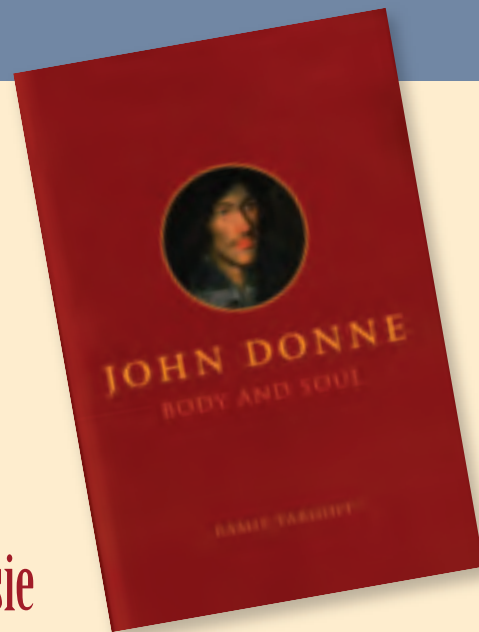
Cutting to the quick

Which may help make her approach to Donne even more meaningful to contemporary readers.

“Ramie Targoff cuts to the quick of Donne scholarship, renewing and freshening this great poet for our time,” notes Harvard professor Elisa New. “She does so by asking the essential questions about Donne in a new way—in a way learned, elegant, stylish, and entirely her own.”

“When I read Donne, I really connect to him—I am honestly moved, and so are my students,” says Targoff. “He’s so quirky, so surprising, and so modern, but at the same time he’s worried about what will happen when his body turns to dust and mingles with the remains of whatever corpse lies next to him,” she notes sympathetically.

Says New, “Ramie’s verve and scrupulous scholarship, her profound sensitivity both to the poet’s voice and to his historic moment, make her Donne the Donne of our generation.”



The Extasie

*WHERE, like a pillow on a bed,
A Pregnant banke swel'd up, to rest
The violets reclining head,
Sat we two, one anothers best.
Our hands were firmly cimented
With a fast balme, which thence did spring,
Our eye-beames twisted, and did thred
Our eyes, upon one double string;
So to'entergraft our hands, as yet
Was all the meanes to make us one,
And pictures in our eyes to get
Was all our propagation.
As 'twixt two equall Armies, Fate
Suspends uncertaine victorie,
Our soules, (which to advance their state,
Were gone out,) hung 'twixt her, and mee.
And whil'st our soules negotiate there,
Wee like sepulchrell statues lay;
All day, the same our postures were,
And wee said nothing, all the day.
If any, so by love refin'd,
That he soules language understood,
And by good love were growen all minde,
Within convenient distance stood,
He (though he knew not which soule spake,
Because both meant, both spake the same)
Might thence a new concoction take,
And part farre purer then he came.
This Extasie doth unperplex
(We said) and tell us what we love,
Wee see by this, it was not sexe,
Wee see, we saw not what did move:
But as all severall soules containe
Mixture of things, they know not what,
Love, these mixt soules, doth mixe againe,
And makes both one, each this and that.
A single violet transplant,
The strength, the colour, and the size,*

*(All which before was poore, and scant,)
Redoubles still, and multiplies.
When love, with one another so
Interanimates two soules,
That abler soule, which thence doth flow,
Defects of loneliness controules.
Wee then, who are this new soule, know,
Of what we are compos'd, and made,
For, th'Atomies of which we growe,
Are soules, whom no change can invade.
But O alas, so long, so farre
Our bodies why doe wee forbear?
They are ours, though they are not wee, Wee are
The intelligences, they the speare.
We owe them thanks, because they thus,
Did us, to us, at first convey,
Yielded their forces, sense, to us,
Nor are drosse to us, but allay.
On man heavens influence workes not so,
But that it first imprints the ayre,
Soe soule into the soule may flow,
Though it to body first repaire.
As our blood labours to beget
Spirits, as like soules as it can,
Because such fingers need to knit
That subtil knot, which makes us man:
So must pure lovers soules descend
T'affections, and to faculties,
Which sense may reach and apprehend,
Else a great Prince in prison lies.
To our bodies turne wee then, that so
Weake men on love reveal'd may looke;
Loves mysteries in soules doe growe,
But yet the body is his booke.
And if some lover, such as wee,
Have heard this dialogue of one,
Let him still marke us, he shall see
Small change, when we're to bodies gone.*

the only objective. If strict competition in the classroom does not serve as a motivation for the less “fit” child to try harder, then we must not fully understand all the principles of evolutionary theory as applied to highly intelligent beings.

Teaching backgammon to robots

Along the path that led Pollack to develop the BEEweb games for children, he created some very smart machines that learn as they go and handily outwit human beings in the narrowly defined playing fields of backgammon and Tron (a game based on the 1982 sci-fi movie). Pollack’s goal was to create computers that possessed the ability to continue learning, but he found that after an initial burst of inventive behavior, these systems began slowing down and eventually reached equilibriums where all learning stopped. Once a computer got the best of its opponents, it rested on its laurels; it had no reason to get smarter and no reason to share its knowledge with other players.

In the late 1990s, Pollack put a backgammon-playing computer program that evolved through self-play on the Web, where it drew tens of thousands of human opponents. A student working with Pollack analyzed the scores and IP addresses of those human opponents and determined that their skills were improving over time. Next, Pollack did the same thing with Tron, a simple video game Web site where people played against a group of evolving computer programs. This time he saw some interesting developments in the computer’s “intelligence.”

“The computer programs actually improved and adapted to humanity, coming up with novel strategies that were hard for humans to cope with,” he said.

Pollack now had proof that computers learn through human interaction, and vice versa, and he wondered if he could develop an activity that would benefit people, rather than just entertaining them. That’s when he turned his attention toward elementary

education, experimented with children’s educational games, and had his eureka moment about the role of competition in evolution. This also led him to a clearer understanding of what makes his game-playing computers tick.

What’s necessary, Pollack realized, is a system where all players don’t simply compete to be best. But players can’t be altruistic either. The answer: a model that rewards multiple objectives, not

all YOU can BEE

Pollack says he dreams of getting BEEweb licensed into a large, “world-changing” program like Skype, the computer application that lets people worldwide make long-distance telephone calls over the Internet for free. According to his “back-of-the-envelope calculation,” in a single year, a couple of \$2,000 servers in the basement of the Volen Center could provide the equivalent teaching hours of an entire school district.

“If one million kids each play an hour of SpellBEE or PatternBEE, we’ve essentially delivered one million hours of human teaching—the equivalent of a medium-sized school district, which might have a \$1 million budget,” Pollack says.

Already BEEweb.org has 60,000 anonymous registered users, and each week the games get hundreds of additional visitors who drop by for a game or two. A Google map on the site shows that more than thirty states have registered users, with Michigan, Minnesota, and Texas outnumbering the rest. Some teachers register entire classes and use the games as regular teaching tools.

SpellBEE, GeograBEE, and PatternBee won Bessies (Best Educational Software Awards) for 2005–06 from the ComputED Center in Carlsbad, California.

—Denise Brehm

just competition. Each player takes a turn being teacher. Students get rewarded for answering correctly, and teachers get rewarded for asking questions the student can answer but not by making the questions so easy that the student fails to learn, or so hard that the student is repeatedly stumped.

“In the BEE games, the child playing ‘teacher’ will win by asking questions in the area where the student is almost ready to learn, not in the easy or hard zone, but in the zone of proximal development,” explains Pollack. “This motivates the teacher to do continual assessment, provides the student with appropriately difficult problems to learn from, and keeps the students engaged in educational activities.”

So, when an anonymous child in Michigan logs in to BEEweb.org and plays GeograBEE with an anonymous child in Texas, she learns to use the computer, picks up some new state capitals, becomes a bit of a teacher herself, and, most important to her, has some fun playing a game. Now that’s effective child’s play.



COMPUTER SCIENTIST JORDAN POLLACK

Brandeis faculty members take the classroom to the waterways, planning boards, and farms to teach students about the state of the environment.

BY KATHERINE M. PARISKY, PhD

The Environmental

What does it take to be a student environmentalist these days? A lot more than being able to talk about global warming and reducing your carbon footprint. You'll have to get your hands dirty, inspect a sewage system up close, research historical land records, and even make a case before a local planning board.

For an intense fifteen weeks each semester, students and two or three professors immerse themselves in studying local environmental issues from diverse perspectives—ecological, legal, and historical—and even develop solutions. This year's class continues the work of last year's group, learning about the Waltham sewer system, participating in sustainable farming, examining land-use records going back two centuries, developing conservation and stewardship proposals for the town of nearby Weston, presenting their research findings on a land parcel at a town meeting, and studying the history of the Charles River. One day, the group canoes to "class."

On another, they make lunch from vegetables they farm locally.

No ivory tower

The only program of its kind nationwide, the Environmental Field Semester (EFS) is the brainchild of three Brandeis professors: Brian Donahue, an environmental historian; Laura Goldin, director of the environmental studies internship program; and Dan Perlman, conservation biologist and chair of environmental studies.

Perhaps Goldin sums up their collective approach to environmental education best: "There should be no ivory tower during my students' Brandeis education."

The immersion program combines experiential learning, cross-disciplinary study, and rigorous intellectual inquiry and debate, with its team problem solving, adventure, and countless bonding opportunities. With hands-on fieldwork, students also benefit from learning the diverse perspectives of farmers, career environmentalists, government, and community leaders.

Perlman says the excitement and intensity of the field semester "are similar to a study-abroad program but with all the benefits and resources of being based here at the university."

Joshua Daskin '09, agrees, "The semester has felt like a study abroad program, graduate school, and summer camp all mixed into one. We've learned a lot already."

On the second day of the fall 2007 semester, "the group basically canoed to the classroom," says Lindsey Sarquilla '10, who grew up in California. Students paddled to the Newton/Weston town line, then walked to the sixty-two-acre Case Estates in Weston. Harvard University owns the Case Estates but is selling the parcel to Weston for more than \$20 million. Beginning on that sunny day, the students, divided into five teams, set out to research and document the land's history and use. Sarquilla's "history" team later visited the Arnold Arboretum archives in Boston's Jamaica Plain area, probing records to uncover the Case Estates' wide-ranging land-use history.

"We could see in handwritten documents who had actually bought and sold the land and for what use from 1750 to the present," she says.

A second team researched documentation on the orchards, woods, and vineyards that were heavily sprayed with lead arsenate (an insecticide commonly used against insect pests) in the days when the land was known as Hillcrest Farm. The students researched the health effects and relevant legal issues, expressing concern about the methods of soil sample extraction



PROFESSOR BRIAN DONAHUE CANOEING WITH JONATHAN SHUSTER '08.



Classroom

and testing with a Weston town selectman, who agreed with their recommendations.

Other students began an ecological inventory of the Case Estates, while a stewardship team analyzed the potential future use of the land and its historic buildings. Meanwhile, the planning team outlined for town leaders a conservation plan focusing on educational opportunities for elementary-age students and open space for the town.

Toward the end of the semester, the teams formally presented their findings to a large audience that included Weston residents and the Brandeis community. The students documented their research findings in lengthy research papers as well as in concise glossy summaries that will be posted on the environmental studies program's Web site.

But learning about land management is just one facet of the immersion experience. Throughout the semester the students regularly visit several Massachusetts farms, including Land's Sake in Weston, cofounded by Donahue. Community and educational outreach through farming provides many life-changing moments for the students, who begin to appreciate the complex and conflicting pressures of short-term financial stability and long-term environmental responsibility.

Students get their hands dirty

"The farms made the biggest impact on me," explains Chris Del Vecchio '09. "I am actually considering a career in education now, though I came to college to study international relations and global studies. There must have been about twelve times this semester that I was learning something new and said 'I want to do this' as a career."

"It's one thing to just be a visitor, or tourist, on the farm, but my students get their hands dirty," said Donahue. "They know the land more; all the bits and pieces fit together in a different way."

Any immersion into environmentalism worth its salt would have to explore that sometimes thorny fact of urban life, sewage

systems, and storm-water runoff. Last fall, the EFS students got a crash course in Waltham sewer systems from city and Environmental Protection Agency officials. With a new understanding of how the city manages residue runoff from entering storm drains that in turn feed the Charles River, EFS students set out to help educate the next generation about environmentalism: local first graders.

Though the issues they explore defy simple solutions, the EFS students emerge from the semester with just the kind of understanding, optimism, and commitment that can make real environmental change possible.

Says Del Vecchio, "The eleven of us from the immersion group are so positive about the future; we see what is wrong and we are motivated to go out and fix it."



JESSICA NU '09 (LEFT), JONATHAN SHUSTER '08 (CENTER), AND STEPHANIE SHUMSKY '08.

Kicking AIDS in Africa

BY CARRIE SIMMONS

Former Brandeis varsity soccer player Brooke Rosenbauer '09 knows firsthand about the power of sports to heal. After a serious car accident last spring, she faced a long road to recovery. But she took it in stride.

"When you're an athlete, being injured is just part of the game," says the Vermont native philosophically. "Patience is one of the hardest things to learn, but it's important for recovery."

Still, when it comes to certain things, there's no time to lose. So after two seasons on the Brandeis team, Rosenbauer traded in her varsity cleats to feed a passion combining her athletic prowess, her intellectual interests, and her talent for community organizing. She began working with Grassroot Soccer (GRS), a nonprofit organization dedicated to leveraging soccer's international popularity and social influence to galvanize kids and their communities to confront HIV/AIDS with a figurative header.

While most of the group's programming takes place in sub-Saharan Africa, the epicenter of the HIV/AIDS pandemic, Rosenbauer began as a volunteer KickAIDS ambassador in Massachusetts. There she worked with soccer teams and health

classes in Bay State high schools to raise awareness about HIV/AIDS and the organization's efforts, and to plan fundraisers.

In January 2007, Rosenbauer organized the first KickAIDS soccer tournament at Brandeis. More than 100 students from both the activist and athletic communities raised \$1,000 for GRS programs in Africa. Later that spring, she collaborated with a fellow GRS colleague to develop the "Lose the Shoes" campaign, a 3v3 barefoot soccer tournament model that has gained national popularity. Since September 2006, "Lose the Shoes" tournaments have raised more than \$100,000 at fifty high schools and colleges across the country in support of GRS.

"These activities channel all my passions; when I found GRS it was about more than just playing on a team—it could be something for life," explains Rosenbauer. Earlier this year, her proven leadership with GRS, combined with her stellar academic record, helped land her a nationally competitive \$30,000 Truman scholarship to pay for graduate studies in public health.

Now, as a director of the "Lose the Shoes" campaign, Rosenbauer is charged with getting American youth involved in the organization's efforts to use the power of soccer to fight HIV/AIDS in Africa. Since 2003, more than 230,000 youth have graduated from GRS programs. GRS partners with African youth organizations to train local teachers, community soccer coaches, and professional players to teach middle-school children about HIV/AIDS and its prevention while imparting important life skills to make healthy choices.

"These children are learning how to protect themselves," says Rosenbauer. "But they are also going home, talking about it with their families, and breaking down the incredible stigma surrounding the disease in their communities."

For her senior thesis, Rosenbauer, who is majoring in Health: Science, Society, and Policy, is researching the psychological and social learning theories that support the use of sport in community development.

"The programs help build the resilience of children who have to deal with things they can't control," says Rosenbauer. "When they have self-confidence and a sense of empowerment, they make healthier decisions about their lives."

Before starting graduate school, Rosenbauer hopes to spend a year in Africa as a field intern for GRS writing grants, developing curricula, and evaluating programs. The biggest challenge for the organization, which is supported by the Bill and Melinda Gates Foundation and Johnson & Johnson, is building credibility, she says.

"It's so hard to measure behavior change and the true effect the programs are having on these kids," she says. "But I've seen grown men cry from the impact they felt they have made. That's pretty convincing."



LINCOLN BENEDICT

TRUMAN SCHOLAR BROOKE ROSENBAUER '09 USES SOCCER TALENT TO INSPIRE YOUTH TO FIGHT THE HIV/AIDS PANDEMIC.



“This crisis also highlights a greater need to revisit our social contract. What are the advantages and disadvantages of unfettered markets versus markets that have more rigorous regulatory oversight?”

our government policymakers are able to structure a rescue package that uses this money to address the first problem, we might not actually lose much money. If instead the focus ends up on the second problem, we will end up spending much more, and that will significantly restrict the amount of money available to make investments in expanding health-care coverage, education and training, and infrastructure for this country. I think this crisis also highlights a greater need to revisit our social contract. What are the advantages and disadvantages of unfettered markets versus markets that have more rigorous regulatory oversight? How do the gains and blame in our economy get shared? Finally, can we continue to design policies to regulate our capital and labor markets at the nation-state level when these markets are increasingly organized across borders?

You’ve often said that what interests you is the interaction between theory,

practice, and teaching. How will you apply this approach as the new dean of the Heller School?

As we approach Heller’s fiftieth anniversary, we have a special opportunity to look back and see how far we have come. But there is nothing like a big anniversary to get us to look forward and identify what it will take to be on the cutting edge of social policy and management in the decades ahead. So over the next year I will engage the Heller community, leading social policy researchers, and key social policy-makers in a frank discussion about how we see social policy evolving over the next decade. In particular, we will examine how our research and educational programs need to be preserved, enhanced, and augmented to prepare the next generation of leaders in social policy and management and to deliver on our mission statement’s promise of “knowledge advancing social justice.”

A View on Healthy Development

This year marks the centenary of the great American psychologist Abraham Maslow. From where I sit—occupying the same office he did as chair of the Brandeis University psychology department until 1969—I marvel at how he helped shape current thinking about human development.

In the hundred years since his birth on April 1, 1908, psychology has grown from a young science focusing on instincts and early childhood development to a holistic approach that celebrates lifelong development and potential—just as the aging population is exploding with the first of the large baby-boomer cohort entering their sixties and expecting to live another twenty to forty years.

A founder of the third force in psychology, Maslow developed his ideas in the fifties and sixties at Brandeis in reaction to what is called “the first force,” the Freudian psychoanalytic approach, and the “second force,” the behavioral approach championed by B. F. Skinner. Maslow’s third force brought a humanistic approach to psychological development that emphasized the great human potential and possibilities for doing good things in the world.

At the height of his career in the revolutionary and rebellious 1960s, Maslow held ideas that were brave and bold, even radical. He is best known for his writings on the hierarchy of needs (basic survival needs

must be satisfied before the higher-order growth needs) and the self-actualizing person (highly creative, self-accepting, and fulfilled), but his body of work was much more extensive.

Four main themes capture and contrast his views to earlier theories, and they link to current psychological work and broader issues for healthy living in today’s world. First, he believed that human beings are inherently good and well intentioned rather than evil or mean-spirited. Second, he asserted that people act based on their motivations and needs, rather than in response to uncontrollable, unconscious urges, or externally determined factors. Third, he believed in individuals’ potential to grow and develop throughout life rather than in the Freudian idea of personality being formed and fixed by adolescence. Finally, and perhaps most important, he focused on the healthy as a way of understanding behavior and optimizing well-being rather than studying the neurotic or ill—a significant departure from much of the conventional psychological thinking of the time.

Today, Maslow’s teachings are more relevant than ever. Our burgeoning interest in exploring what makes people happy, optimistic, and healthy, for example, can be traced to Maslow’s ideas, which are being subjected to scientific scrutiny and empirical testing within the new positive psychology movement.

By challenging the ideas of his towering predecessors, Maslow championed the value of focusing on what’s right with the person rather than what’s wrong, paving the way for science to explore how to enhance and enrich psychological and physical functioning. Decades before the psychological mainstream caught on, he understood the key role psychological resilience plays in promoting overall health.

In less than fifty years, for the first time in human history, one quarter of the world’s population will be at least sixty-five years



PSYCHOLOGIST MARGIE E. LACHMAN

old. There is growing recognition in fields like medicine and psychology that by focusing on the healthy, we can learn a lot about disease before it develops. For example, we have begun to research cognitive functioning during midlife, a period when most of us are healthy but the seeds of decline and disease may be germinating. This work will allow us to identify risk and protective factors that explain why some people remain cognitively healthy well into old age and others develop problems such as dementia. We are also learning there is much we can do to optimize memory, reasoning, and decision making, and to slow the aging process, for those suffering steep declines and even for those who are doing quite well.

On the centennial of his birth, I gaze out my office window with Maslow’s visionary legacy in mind. This year, as the oldest baby boomers turn sixty-two, the age at which Maslow’s life was cut short, many can expect to make it to one hundred. As we age over the next forty years, we would do well to follow Maslow’s wisdom about healthy development, making the most of our potential and finding meaning in our lives, especially by nurturing social connections. This could help to make our lives not only longer, but also richer.

Margie E. Lachman is professor and chair of the psychology department and director of the Lifespan Developmental Psychology Lab at Brandeis University.



Research Notes

First Beam Event

Early on the morning of September 10, scientists at the Large Hadron Collider (LHC) in Geneva, Switzerland, for the first time sent a proton beam around the twenty-seven-kilometer-long tunnel of the world's most powerful particle accelerator. The Brandeis high-energy physics group has been involved with the world's largest physics experiment since 1994. Brandeis scientists and students in the high-energy group helped design, prototype, construct, and commission much of the ATLAS experiment that will take place within the LHC over the next two decades or so.

Northern Exposure

University Professor David Hackett Fischer, who won the Pulitzer Prize for his book *Washington's Crossing* in 2005, explores the founding of the first European settlement in Canada in his new biography of Samuel de Champlain. An adventurer and able leader, Champlain had a rare vision for a new world founded on harmony and respect. *Champlain's Dream*, published by Knopf Canada,



DAVID HACKETT FISCHER

is about a complex, elusive man who participated in palace intrigues, endured raging storms at sea, and fought beside his Indian allies in ferocious wars.

For the Love of Reading

Associate Professor of French and Comparative Literature Jane Hale received a grant of \$20,000 from the Kellogg Foundation for her Sesotho-language children's book-publishing initiative, Family Literacy Lesotho (FLL). A small nonprofit organization based in the United States and Lesotho, FLL has as its mission to encourage the development of picture books for Basotho children in the Sesotho language about Lesotho.

Boston Books

Historian Jane Kamensky's book *The Exchange Artist: A Tale of High-Flying Speculation and America's First Banking Collapse* was published by Viking in January 2008. It tells the story of Andrew Dexter Jr. and the seven-story skyscraper in Boston for which he amassed—and then lost—a paper fortune, triggering a crisis of value that shook the nation's confidence in money itself. Her next book, *Blindspot*, a historical novel she co-wrote with Harvard historian Jill Lepore, is set in rebellious Boston on the eve of the American Revolution. Published by Spiegel & Grau, it is due out in December 2008.

Music Man

Yehudi Wyner, Walter W. Naumburg Professor of Composition, emeritus, was elected a fellow of the American Academy of Arts & Sciences (AAAS), one of the nation's oldest and most prestigious honorary societies and independent policy research centers.

Drawn from the sciences, the arts and humanities, business, public affairs, and



YEHUDI WYNER

the nonprofit sector, fellows are leaders in their fields and include Nobel laureates and recipients of Pulitzer and Pritzker prizes, Academy and Grammy awards, and Kennedy Center Honors.

Wyner says his main objectives are "to write the best, the most personal, and the most communicative music I can and to play the music of others with clarity and eloquence." His other honors include the Pulitzer Prize in Music in 2006 for his Piano Concerto "Chiavi in Mano."

Granting Time and Money

Biochemists Gregory Petsko and Dagmar Ringe of the Rosenstiel Basic Medical Sciences Research Center won a MERIT award from the National Institutes of Health (NIH) in recognition of their outstanding achievements in structural enzymology. The grant program, whose name stands for "Method to Extend Research in Time,"

provides long-term support to investigators who have demonstrated superior competence and outstanding productivity during their previous research endeavors. The grant will provide about \$2 million to support their research over five years, and it may be extended for another five years after that.

In July, Petsko, Gyula and Katica Tauber Professor of Biochemistry and Chemistry, became president of the American Society for Biochemistry and Molecular Biology (ASBMB) for a two-year term. ASBMB has more than 12,000 members.

Accolades to Antler

Professor Joyce Antler '63, a prolific author known for her compelling and imaginative scholarly and cultural pursuits, won the Brandeis National Committee's Abram L. Sachar Medallion in June. Antler, Samuel B. Lane Professor of American Jewish History and Culture, was honored for her exceptional contributions as a creative historian and educator. She is the author and editor of nine books in Jewish and women's history, including the recent *You Never Call! You Never Write! A History of the Jewish Mother*.

Pulitzer Prize-Winning Professor

Journalism professor Mark Feeney, an arts writer and photography reviewer for the *Boston Globe*, won the 2008 Pulitzer Prize for criticism. He is the third faculty



member to capture the prestigious award in the last four years. Feeney won for ten essays he wrote on visual culture ranging from photography to painting and film. Joining the *Globe* in 1979 as a researcher in the library, he later served as book editor and editor of the *Globe's* weekly "Focus" section. He is currently on the *Globe's* arts staff.

Electron Microscopy Award

Biologists Piali Sengupta, Daniela Nicastro, and Eve Marder were awarded \$929,000 from the National Science Foundation's Major Research Instrumentation program to establish a correlative light and electron microscopy (CLEM) facility. The facility is expected to be operational in late 2008.

Kudos to Kaplan

Edward Kaplan, Kevy and Hortense Kaiserman Professor in the Humanities and chair of the Department of Romance Studies, has won a National Jewish Book Award in the American Jewish Studies category for *Spiritual Radical: Abraham Joshua Heschel in America*. This book follows Kaplan's *Abraham Joshua Heschel: Prophetic Witness*, completing a two-volume biography.

Minimizing Memory Declines

Psychology department chair Margie E. Lachman has been awarded a \$1.45 million five-year grant from the National Institute on Aging to learn more about factors that can minimize memory declines in middle-aged and older adults. The research will identify modifiable beliefs and behaviors that are tied to better memory and enhanced functioning in everyday life.

Investigating Homelessness

The Schuster Institute for Investigative Journalism garnered two awards for reporting earlier this year. Founding director Florence Graves and research assistant Hadar Sayfan won first place in the second annual Cushing Niles Dolbear Media Awards for "First Things First," a *Boston Sunday Globe* article that explored a new approach to ending chronic homelessness.

E. J. Graff, resident scholar at the Brandeis Women's Studies Research



Small wheel developed and built by Brandeis and other area universities is unveiled for the ATLAS experiment in the Large Hadron Collider.

Center, was honored for excellence in reporting on the media by the Council on Contemporary Families. Graff's award-winning article, "The Opt-Out Myth," appeared in the *Columbia Journalism Review*.

Mellon Grant for the Humanities

The Andrew W. Mellon Foundation has awarded Brandeis a \$1.65 million four-year grant to support graduate students in the humanities and social sciences. The grant will fund students' research, two interdisciplinary seminars, and ten dissertation-writing fellowships.

McClendon Wins Medieval Academy's Highest Honor

The Medieval Academy of America gave its most prestigious award, the Haskins Medal, to Charles McClendon, professor and chair of the Department of Fine Arts. He received the award for his book *The Origins of Medieval Architecture*, published in 2005 by Yale University Press.

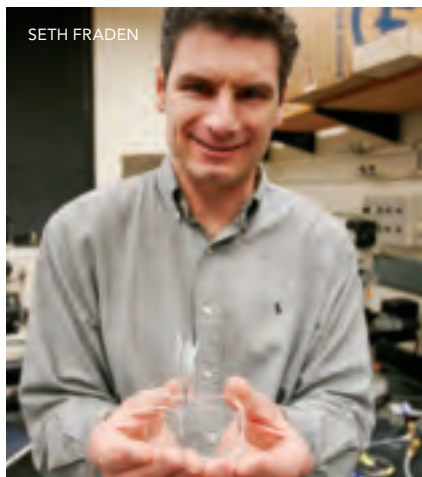
The book offers a broad study of the important innovations in church building in Western Europe from the sixth to the tenth centuries, which contributed to later, better-known achievements during the Romanesque and Gothic periods. The book was also awarded the 2007 Otto Grundler Prize for the best book in medieval studies at the 42nd International Congress on Medieval Studies.

Nota Bene

Richard Lansing, professor of Italian and comparative literature, has been appointed editor-in-chief of *Dante Studies*, an annual journal published for the Dante Society of America, the oldest literary journal in the United States.

Revolutionary Biotechnology

The International Organization for Biological Crystallization awarded its 2008 innovation prize to physics professor Seth Fraden for his lab's development of the Phase Chip, a palm-sized microfluidic device that uses an intricate system of plumbing passages to carry out multiple experiments on the microscale. By reducing the volume of chemicals used in common laboratory practices by factors of thousands or more, while improving the precision with which chemicals and proteins can be manipulated, the Phase Chip promises to help revolutionize biotechnology.



By the Numbers

Mathematicians Dmitry Kleinbock and Joel Bellaïche each won grants from the National Science Foundation. Kleinbock received \$230,677 to research algebraic dynamical systems and their applications to number theory. Bellaïche's \$138,000 award will support his research in p-adic L-functions, geometry of eigenvarieties, and Selmer groups.

Call for Papers

Assistant Professor of Sociology Sara Shostak is coeditor of a special issue of *The*

American Journal of Sociology on genetics and social structure, out in November.

Researching Liver and Lung Disease

Assistant Professor of Chemistry Anne Gershenson has won a two-year, \$130,000 award from the Alpha-1 Foundation and Talecris Biotherapeutics to research α -Antitrypsin (AAT), a protease inhibitor associated with liver and lung disease. The overall goal of the research is to provide critical structural information for the design of small molecule drugs aimed at preventing liver and lung disease by stopping the formation of AAT polymers.

In Concert

Concerto for Violin and Orchestra is premiering at Jordan Hall in Boston in November. Martin Boykan, Irving G. Fine Professor of Music, composed the work in three movements, played without pause. Eminent New York violinist Curt Macomber is the soloist; Gil Rose is the conductor. Following its world premiere, Albany Records will record the work.

National Science Foundation Awards \$7.8 Million for Materials Research

Brandeis has won a highly competitive \$7.8 million grant from the National Science Foundation to establish a Materials Research Science and Engineering Center (MRSEC). The center will study the effects of imposing constraints on materials, such as DNA confined in cells, and the packing of viruses in shapes and forms suitable for applications, such as biosensors and solar cells.

The collaborative, interdisciplinary center will try to produce a new category of materials known as "active matter." Distinct from normal inert materials such as plastics and steel, active matter can move on its own and exhibits properties previously observed only in living materials, such as muscle and cells.

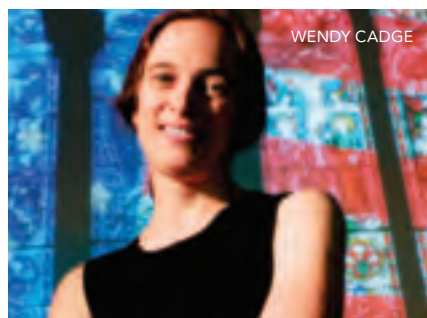
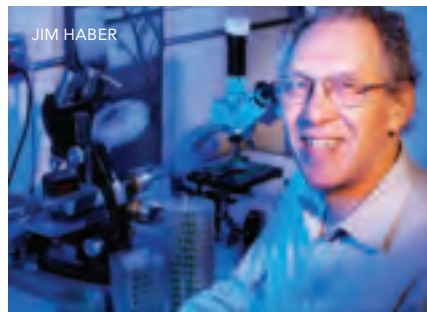
Combating Cryptosporidiosis

Biochemist Liz Hedstrom received a \$3.3 million grant from the National Institute of Allergy and Infectious Diseases to develop an urgently needed drug to

treat cryptosporidiosis in AIDS patients and epidemic outbreaks. Cryptosporidiosis is caused by a water-borne pathogen and is a potential biowarfare agent.

Radcliffe Fellows

Assistant Professor of Sociology Wendy Cadge and Jim Haber, the Abraham and Etta Goodman Professor of Biology and director of the Rosenstiel Basic Medical Sciences Research Center, are both spending the 2008–09 academic year as fellows of the Radcliffe Institute for Advanced Study at Harvard University. They are among fifty-two fellows selected from a pool of 785 for the quality of their scholarship and the long-term impact of their projects. Cadge is working on her book *Paging God: Religion in the Halls of Medicine*; Haber is researching mechanisms of recombination and DNA repair.



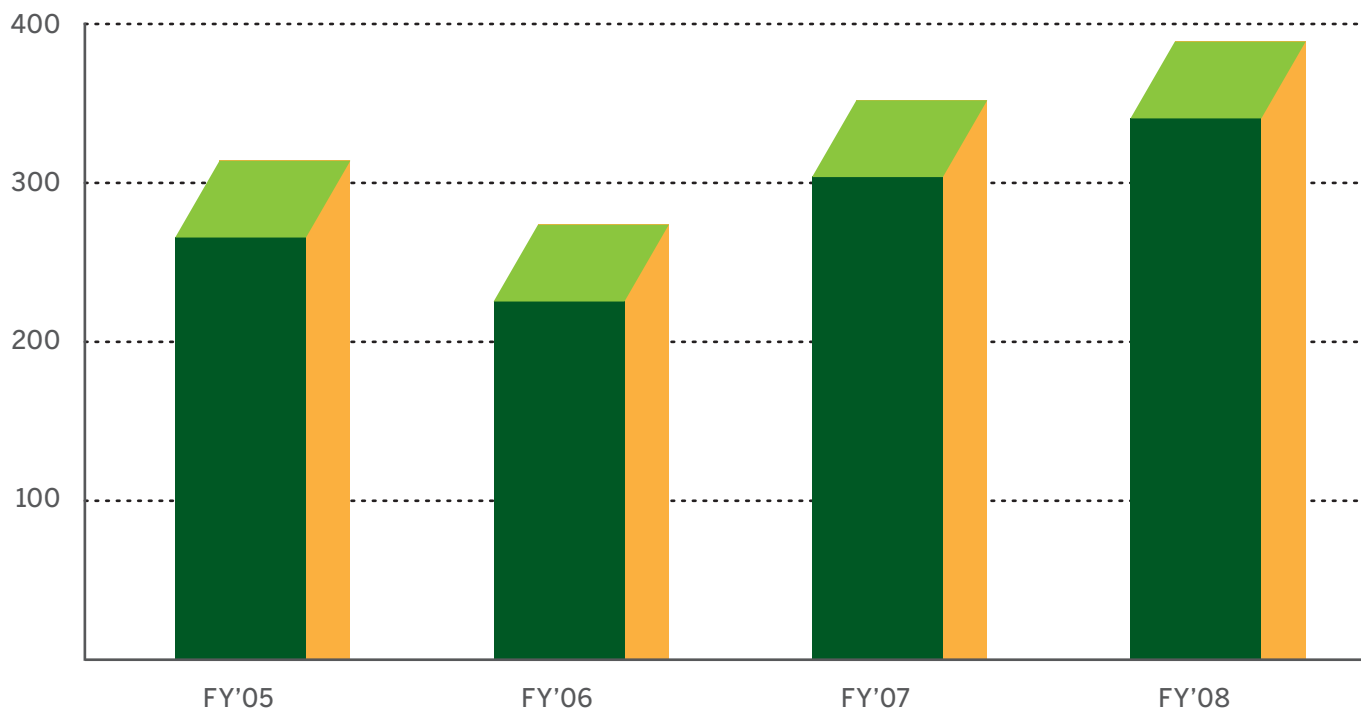
Music Maker

Composer Yu-Hui Chang has received an Aaron Copland Award, which provides for a residency at the historic Copland House in New York State. During her stay this fall, she will write a new work commissioned by the Left Coast Chamber Ensemble. This new work will be performed in a program centering on Schubert's "Trout" Quintet and scored in the same instrumentation—violin, viola, violoncello, double bass, and piano. It will premiere in San Francisco in May 2009.

By the Numbers

RESEARCH PROPOSAL AND AWARD ACTIVITY

PROPOSALS SUBMITTED FY'05–FY'08



- Total funds awarded rose to \$55,051,532, an increase of 10.7% over FY2007.
- Awarded Facilities & Administration costs rose to \$12,938,793, an increase of 11.4% over FY2007.
- The largest source of funds remains the NIH (\$24,979,487, up 12%), at 46% of the total awarded, and other federal sources accounting for an additional 28% of the total. Foundation funding increased substantially, to \$9,518,954, up 24%.
- The number of proposals submitted went up 11%, to a total of 386, and the total amount requested was up 20%, to \$211,236,201.

Fostering Connections



The new Mandel Center for the Humanities and the Mandel Humanities Quadrangle will foster connections between faculty and students, inquiry and research, and the humanities and social sciences. The Mandel Center and Quadrangle are made possible by a generous gift from Jack, Joseph, Barbara, and Morton Mandel, founders of the Mandel Foundation, Cleveland.



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BEE smart

By Denise Brehm

Computer scientist Jordan Pollack applies evolutionary theory to elementary ed in online games for kids

First he taught computers to learn from people. Then he taught computers to learn from one another. Next, he taught computers to teach children. Finally—after learning some new ABCs himself—he taught computers to teach children how to teach one another. Now there are thousands of children in grades K to 8 learning to spell better and locate state capitals by playing his online computer games.

The free games, called BEEweb, run off servers in the basement of the Volen National Center for Complex Systems. Their creator, Jordan B. Pollack, professor of computer science and of the Volen Center, believes it's possible to build machines that learn and evolve into entities of ever-increasing complexity and intelligence. It's a quest, really, to find a mathematical and computable definition of evolution. The philosophical principle that drives his science—the conviction that there is a form of intelligence in nature that impels biological self-assembly that he can model in computer programming—led him to develop the BEEweb games in which children develop their own skills in spelling and geography, mathematics, and spatial reasoning.

The games also encourage children to help other kids improve their skills, because in SpellBEE, GeograBEE, PatternBEE, and MoneyBEE, winning is based on cooperation rather than strict competition. Children learn something useful while interacting with one another

safely online. A child logs on anonymously, chooses which game she wants to play, pings another player on the site, and the two trade spelling words or geography questions or set up money-counting questions. All play occurs within the strict confines of the game, so there's no possibility of extracurricular conversation.

Cooperation trumps competition

"The first games we wrote for children were very simple; we tried to get them to type as fast as they could or spell better than other kids," says Pollack. "Kids really liked it, but the teachers didn't. As we did more research, we found out that the educational community hates competition in the classroom because it can lock in negative habits and lower children's self-esteem, which decreases their motivation.

"For me—for my science—that was an interesting moment. Because the idea behind evolution is that there is a limited resource that species compete for," he says. "So the idea that a system based on competition would lead to a negative outcome really surprised me. Society is organized by the principles abstracted from nature long ago. But in a classroom, it's clearly a failure. To me this was a wake-up call."

Pollack saw that he was missing a key concept in his application of evolutionary theory to artificial intelligence: competition can't be

Q&A with Lisa Lynch

BY LAURA GARDNER

Economist Lisa Lynch, PhD, became dean of the Heller School for Social Policy and Management in July 2008.

Much of your recent research has focused on how investments in workplace design and organization impact workers' pay and the ability of companies to innovate. What are some of the most important aspects of organizational innovation that you see making a difference for workers and firms?

There has been a great deal of discussion in the popular press and in academic journals on what explains rising productivity growth in the United States over the past ten to fifteen years—the so-called New Economy phenomenon. While many have focused on just the role of investments in information technology, my work with UCLA economist Sandra Black has looked at how investments in IT, along with investments in organizational innovation such as workplace education and training, employee involvement in decision making, and incentive-based pay, have jointly contributed to the marked increase we have seen in productivity in the United States since 1995. We found that organizational innovation has a significant impact on productivity, both directly and through synergies with other forms of investment, like information and communications technology. More specifically, we discovered that organizational innovation accounted for as much as 30 percent of output growth in manufacturing in the 1990s. We also determined that organizational innovation has a mixed impact on employees. There is more wage inequality within firms that invest in both technological and organizational innovation.

Are there specific results from your research that surprised you or others?

Our work was the first to examine how such investments impacted the economy as a whole. We found that organizational



innovation in unionized workplaces, especially in the manufacturing sector, resulted in much greater productivity gains than the returns to organizational innovation in nonunionized firms. This generated enormous interest by trade unions and employers, not just in the United States but in Europe, Australia, and New Zealand. Another key finding was the link between education and organizational innovation. Firms that have a more educated work force are more likely to invest in organizational innovation. This last result underscores the importance of investing in education to ensure our ability to innovate in the long run.

Are there any implications of this work for the current economic crisis?

There is a deeper structural problem that faces policymakers here in the United States and that is the overall skill level of

the work force. From survey work we know that only half of the U.S. adult population aged sixteen to sixty-five years has the minimum reading and quantitative literacy skills as identified by the National Institute for Literacy to succeed in the labor market. This problem will need to be addressed both through improvements and innovation in our education system for those entering the work force and job-training programs for those already in the work force.

Given the current events in financial markets, what types of challenges will the next president inherit?

The U.S. government is now trying to resolve a crisis in our financial markets that began well over a year ago. It is important to distinguish between two problems in the financial markets now—illiquidity triggered by panic and the potential insolvency of many financial institutions. If

Matches Made in Heaven?

BY JACOB OLIDORT '07

It was on a trip one evening to the fabled oasis at Al Ain with a local friend that I had my first real insight into the cultural tremors rocking this corner of the Arabian Peninsula, which I have called home for the past year. I came to the United Arab Emirates (UAE) on a Fulbright fellowship to study the country's marriage customs. At the outset, I had little understanding how these traditions, like shifting tectonic plates, are colliding with modernity, causing cultural and psychological earthquakes among the country's leaders and citizenry.

Driving down Jabel Hafeet in a Lexus SUV while sipping Mountain Dew, my friend Hamad and I talked about differences in dating culture between the United States and the UAE. After making glib comments about the UAE's cultural evolution, Hamad boasted that he had been in relationships with eleven girls in his life before marrying.

I was stunned. That kind of record would be impressive in any culture, but to me it seemed unimaginable in a socially conservative state like the UAE, where gender segregation pervades every aspect of daily life. Responding to my seeming bewilderment, he hurriedly clarified that he had exchanged glances and maybe a smile with a girl. In local dialect, this was tantamount to a relationship.

Cultural clashes in the Gulf

This exchange crystallized for me the profound transformation under way in the UAE. Dubai's global ambitions and rapid industrialization and development are creating an increasingly cosmopolitan environment that appears to be swallowing up the tribal culture of the Gulf. The trend is evident in other Gulf hubs, such as Bahrain

and Qatar, but it is accelerated in Dubai, where foreigners (probably more than 150 nationalities) have created their own communities and brought their cultures to this corner of the Arabian Peninsula.

The final bulwark against foreign threats to tradition

For the local native population, nevertheless, stolen glances are indeed the extent to which a boy may interact with a girl. In fact, though many marry by their mid-twenties, one rarely sees a husband with his wife or wives but rather sees him with other men. And even more rarely does one find an unmarried Emirati couple sitting together in a café. In this unsettling juxtaposition of economic globalism and social traditionalism, I found a compelling research topic: How do personal relationships represent the final bulwark against foreign threats to tradition?

I discovered that the answer lies in a relatively new institution known as the Marriage Fund. Introduced by the government sixteen years ago, it was designed to reverse the byproducts of modernism—the exorbitant dowries, costly Western-style wedding celebrations, and the social influence of foreigners that seemed to conspire to make the traditional Emirati marriage a thing of the past. The fund pays only for local Emirati, read tribal, marriages, giving bride and groom roughly \$19,000.

The Marriage Fund was conceived to restore some of the pre-oil-boom tribal customs of nomadic Bedouin culture. Just forty years ago local Bedouin tribes revered the family unit and lived simple subsistence lives hunting and preparing food. Communities were intimate, with personal relationships symbolizing the epitome of trust and strength. Divorce, though permitted, followed the detailed guidelines set out in the Quran.

Today, divorce rates are soaring while many local women remain unmarried, a deplorable situation in tribal culture. The result: native Emiratis comprise less than 20 percent of the population, while the country's elders assert that outside influences threaten to extinguish local customs and, along with them, the native population itself.

Embracing modernism, not marriage

But it seems that in modernizing a country, placing family life on the political agenda undermines its true personal essence. Despite the \$912 million allocated to the Marriage Fund over the last two decades, results have been disappointing.

What, then, is the role of tradition in the birth of a modern nation? This question brewed in my mind as Hamad and I drove down Jabel Hafeet that evening when, suddenly, our conversation was interrupted by a phone call from a girl. After a terse exchange he slammed the phone shut, explaining that she was one of many girls his grandfather sent his way for a second marriage, an ancient option in which this modern man apparently had no interest.



JACOB OLIDORT

Scholarly Pursuits

Brandeis has a long and rich tradition of undergraduates conducting research in partnership with award-winning faculty. Approximately half of each graduating class conducts an independent study, and about one-third of each class completes an honors thesis. All told, such intensive research experiences lead to more than seventy students coauthoring studies with faculty in peer-reviewed journals on average each year.

Academic fellowships offer an exceptional opportunity to students seeking funding to conduct original research.

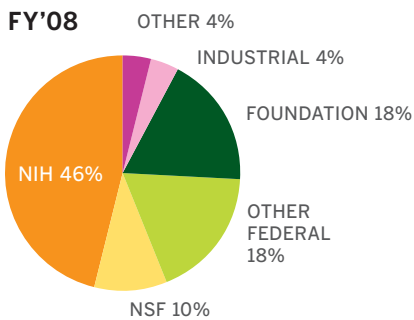
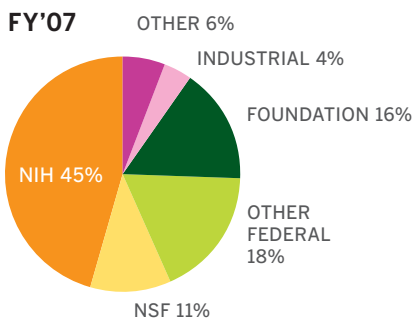
Students report that their fellowship experiences often transform the course of their undergrad education—allowing them to discover their own interests more fully, and also to feel a sense of “ownership” of the work in which they’ve become so invested.

Last year, Brandeis celebrated a record number of Fulbright winners when four graduating seniors received grants to conduct research abroad. Jacob Olidort '07 studied marriage customs in the United Arab Emirates (see article, page 20). Stuart Kottle '07 is living in the Wuhan province of China, studying the developing migratory patterns of rural Chinese to the urban centers and the impact on migrants’ access to health care and education. Laura Gerber '07 joined a chemistry research project at the University of Bergen in Norway. And Annie Rosenberg '07 is teaching English in Germany. This year, Brooke Rosenbauer '09 won a highly competitive Truman scholarship (see article page 16) to support graduate studies.

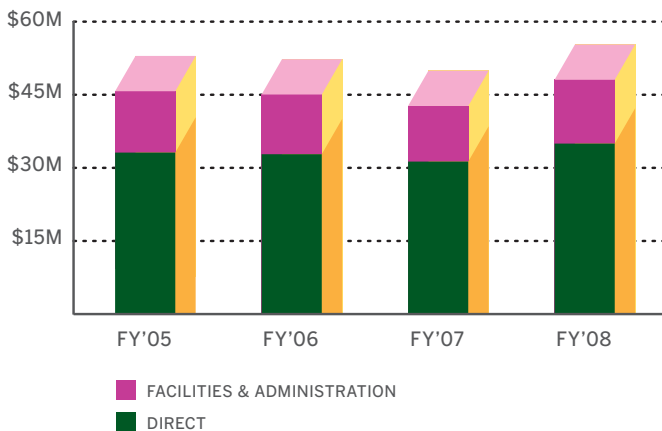
The number of students conducting innovative research supported by internal competitions continues to grow. The competitive Schiff Undergraduate Fellows Program funded eleven students earlier this year to work with a faculty mentor on a collaborative project. The Undergraduate Research Program funds student projects for a semester or summer. To learn more about academic fellowships, visit www.brandeis.edu/as/scholarships.

—Sheilah Coleman,
director of fellowships

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