News and Observations
John F. Holzrichter, President

As we begin the fall season, change is underway at the Hertz Foundation. When the Hertz Board of Directors meets in October, a new chairperson will be selected and five new talented Board members will bring their expertise and commitment to our team.

As the newsletter indicates, this will be an exciting year with a Hertz Fellow piloting the space shuttle and others developing and demonstrating their great innovative ideas. We look forward to their involvement in the 3rd biennial gathering of Fellows and Friends at the March 2009 Symposium. This year, sixteen Hertz Graduate Fellowships were awarded to students who possess rare talents that will drive innovation, enhance our nation’s competitiveness, and find solutions to the critical challenges we face. With the shaky economy and low investment returns, we need your assistance more than ever so we can continue supporting Fellows who can improve the science and technology leadership in the USA, and to continue building our network among alumni, in-school Fellows, and supporters.

Thank you for your support and perspectives. In future issues, we will feature comments from Board members, alumni, and student Fellows so you can become better acquainted with Hertz leadership and its family.

www.hertzfoundation.org

The Mother of Invention
Astro Teller

Over the course of the eight months since Dr. David Andre and I started Cerebellum Capital, I have been asked the same questions dozens of times. “You’re both Hertz Fellows. Why would you be working in the finance area? Is money all you care about? Why don’t you work on a hard science problem instead?” In my opinion, the answer is simple: the greatest advances in science and engineering come in the context of solving extremely difficult problems whose solutions really matter.

Before becoming an entrepreneur, my background (and Dr. Andre’s) was in the field of statistical machine learning. If you went looking for the ultimate needle-in-a-haystack/moving-target problem for statistical machine learning, you would find it in the most complex system in the world, one written in the language of numbers: the public markets. We intend to give great returns to our investors and the limited partners of our fund, of course. But we are doing that by building a self-improving trading system with the main goal of predicting the future using the oceans of data now publicly available on the Internet.

There is, to put it mildly, no “off-the-shelf” architecture in computer science that could support such a soup-to-nuts learning system. The design and refinement of this architecture both stimulate the technical team at Cerebellum Capital and serve as a significant competitive advance for our fund. A learning system that can predict the future using data from the Internet would hardly be limited in its applications to the field of finance; when described that generally, the problem could hardly be more difficult and the pressures to stretch the boundaries of what is currently thought possible could hardly be stronger. (As an interesting aside, other Hertz Fellows, including Radu Mihaescu recently at Convexus and J. Doyne Farmer ten years ago at the Prediction Company, have also worked hard and had real scientific as well as financial success in this area.)

The point is not just that finance holds as many legitimate scientific problems as areas like aerospace or material sciences, but that innovative technologies emerge wherever there are hard, important problems to be solved. If you find any exceptionally challenging problem whose solution would have dramatic impact on the world, you can dive in unafraid. The scientific questions and new technology opportunities will find you.

Astro Teller is a Hertz Alumni Fellow 1999 with a PhD in computer science from Carnegie Mellon University. He is co-founder and CEO of Cerebellum Capital and co-founder and Chairman of BodyMedia, Inc.
We are excited to announce
The Fannie and John Hertz Foundation’s
Third Biennial Symposium
Catalyzing The Future
March 20-22, 2009

Hear passionate discussions and lectures regarding our nation’s and the world’s most critical issues and problems.

Marriott Santa Clara
2700 Mission College Blvd.
Santa Clara, CA 95054
408.988.1500

Please join us in welcoming our distinguished guest speakers* who are generously bringing their challenging problems to an open forum. They include:

Wanda Austin
President and CEO of The Aerospace Corporation

Bill Gates
Chairman of Microsoft Corporation Co-Chair of Bill and Melinda Gates Foundation

Jay Keasling
Prof. of Chemical Engineering and Bioengineering, UC Berkeley, Director of the Physical Biosciences Division of LBNL

Walter Scott
Founder and CTO of DigitalGlobe

Charles Simonyi
President, CEO, and Co-Founder of Intentional Software Corporation

Carl Wieman
Hertz Fellow, Nobel Laureate and Director of the Carl Wieman Science Initiative, University of British Columbia

Xiaowei Zhuang
Howard Hughes Medical Institute Investigator, Professor of Chemistry, Chemical Biology, and Physics


Registration details will be available online in the coming months.

* Names listed alphabetically

As alumni and while working on their graduate programs, Hertz Fellows demonstrate their impact on our nation and our world.

Left to right: Astronaut Eric A. Boe, Hertz Alumni Fellow 2002, Georgia Institute of Technology, Electrical Engineering; Erez Lieberman, Hertz Current Fellow, Harvard University with his iShoe technology.

Lt. Col Eric Boe to Pilot Space Shuttle Endeavour in November

Air Force Lt. Col. Eric A. Boe will serve as the pilot for the NASA space shuttle Endeavour’s STS-126 mission. Set for launch November 10, 2008, the flight will deliver equipment to the International Space Station that will enable larger crews to reside aboard the orbiting complex.

Eric will pilot Endeavour on its 15 day mission as it carries a reusable logistics module that will hold supplies and equipment essential to sustain a crew of six on the International Space Station, including additional crew quarters, a second treadmill, equipment for the regenerative life support system and spare hardware. STS-126 is the 27th shuttle mission to the International Space Station.

From over 3,000 applicants, Eric was selected as one of 17 astronaut candidates in the class of 2000. Prior to his selection, Eric piloted a variety of aircraft. He has served as a combat ready pilot in the F-4E, a T-38 instructor pilot, and an F-15C flight commander. He flew 55 combat missions over Iraq in support of Operation Southern Watch, and also served as a test pilot flying all models of the F-15 and the UH-1N. In all, Eric has logged over 4,000 flight hours in more than 45 different aircraft. As the pilot of Endeavour, Eric will be making his first spaceflight.

Eric has offered to take the “Hertz Foundation” into space. He will be carrying a flag displaying the names of the Hertz Fellows, Directors, current Interviewers, and staff. We hope his schedule will allow him to join us at the March 2009 symposium to present the flag in person.

Erez Lieberman Develops NASA Technology that May Save Thousands of Lives on Earth

As an intern at NASA, Erez Lieberman focused on developing innovative ideas for astronauts returning from space. The zero gravity environment can wreak havoc on an astronaut’s vestibular system, one of three body systems that control balance. To aid astronauts in regaining their balance, Erez and a team of three others developed a device that monitors balance problems and gathers data on it. They also developed an algorithm to analyze the data. The creation was dubbed the iShoe.

Erez quickly released the life-saving implications of the emerging technology he invented. His own grandmother suffered a bad fall several years ago, and he recognized that the iShoe could also help doctors catch balance problems in elderly patients before such a fall occurs. According to the Centers for Disease Control and Prevention, in 2005 nearly 8,000 senior citizens died from traumatic brain injuries following falls.
The iShoe insole measures and analyzes the pressure distribution of a patient’s foot and reports the information back to their doctor. Erez is currently testing the iShoe technology in a group of 60 patients. He hopes to generate enough data that will help to create an iShoe model that will predict the risk of a fall.

Erez and the iShoe team members have applied for a patent on the technology, to be jointly held by MIT, Harvard and NASA. In April, the company won a $50,000 grant from the Lunar Ventures Competition to help with start-up costs.

**Hertz Foundation Network for Success Kickoff Meeting**

A group of Hertz Fellows gathered at the Molecular Foundry at Lawrence Berkeley Laboratory July 18 to envision Hertz Foundation’s new “Network for Success”. When it is launched in the coming months, the pilot program will match alumni Fellows as mentors to in-school and early-career women Fellows and provide them with networking and professional development opportunities. The decision to focus the new program, at least initially, on women Fellows stems from research on—and first-hand knowledge of—the high rates of attrition of women scientists and engineers and the need for more intentional support to ensure their retention.1

Thanks to host LBL Staff Scientist Dierdre Olynick, Hertz Fellow 1996, the Fellows met all day with Foundation representatives at the state-of-the-art facility. The discussion was led by Hertz Foundation Director Candidate Wendy Cieslak, Fellow 1983 and now Senior Manager, Science, Technology and Engineering Strategic Initiatives at Sandia National Laboratories. The conversation ranged from the myriad challenges facing young women (and men) scientists and engineers to the need for academic and professional mentoring, networking with former Fellows, and professional skills training.

Among the ideas for the new program generated at the planning meeting were the following draft goals and suggested workshop topics:

**Goals**
- Promote the leadership skills of early-career Hertz female Fellows
- Promote the success of all Hertz women in science and engineering
- Reduce the “brain drain” of women leaving science and engineering

**Workshop Topics:**
- Goal-setting and career planning
- Communication skills
- Managing people
- Time management

1While more than 54% of graduate students in the sciences and engineering were women, less than 33% of PhDs in these fields were awarded to women, according to 2003 research by Jane Z. Daniels, PhD and Sue V. Rosser, PhD, “Examining the Problem of Underrepresentation Through a Study of Award-winning Women Faculty”, *AWIS Magazine*, Summer 2003; Only 6% of full professorships in the physical sciences were held by women, according to the same study; and fully one in four women who entered engineering left the profession after the age of 30, compared to one in ten of their male counterparts, according to a 2007 study by the Society of Women Engineers.

**Hertz Fellows**

Hertz Fellows and friends who gathered on May 20, 2008 in Chicago, Illinois enjoyed lively interactions on the topic of communication skills arising from discussion on the difference in working in industry contrasted to the well-defined problems of the university setting. Vijay Pai, Hertz Fellow 1999 now at Purdue, and Steve Kent, Hertz Fellow 1979 at Fermilab, brought their experiences to the discussion. Lydia Finney, Hertz Fellow 2004, offered her perspectives on women’s issues. Selfless service to the Foundation was articulated enthusiastically by current Fellow on active duty with the Army, Dean Mitchell. The group included Brad Micklich, Hertz Fellow 1983, who represented the positive outlook of the Hertz Foundation’s interviewers.
Annual Fund FY 2008
July 1, 2007 to June 30, 2008

Our deep appreciation to our loyal Hertz donors who are committed to the continued excellence of our programs. To recognize those who provide annual support, we plan to list the donors to our Annual Fund in our fall newsletter. In the spring we will acknowledge individuals whose accumulated giving distinguishes them as Hertz Partners and Patrons.

We value your participation as donors, interviewers, volunteers, and friends. Together, each in our own ways, we are addressing some of the nation's most critical problems. Thank you for being a part of a distinguished team.

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Ray Sidney

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Hertz Fellow Images (left to right): Dario Amodei, Princeton University; Jennifer Roberts, Massachusetts Institute of Technology; Adam Pivonka, Harvard University; Jeremy Zartman, Princeton University; Maya Chandru, University of California, San Francisco

Expenses FY2008

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<th>Percentage</th>
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<td>Fellows</td>
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<td>Support</td>
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<td>Development</td>
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Figure 1

Income FY2008

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<td>Contributions</td>
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<td>Dividends</td>
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Figure 2

* See IRS 990 financial and audit forms for each fiscal year. In the 2008 fiscal year discussed above, costs and income will be reported according to accrual auditing standards. In past years, modified-cash accounting was used. In this note, I have chosen to show pie-chart summaries using the old method because it shows income and fees from alternative investments more clearly. This causes a difference of about $500k/yr from accrual reporting of income and expenses ($4.2M) and what I show ($3.6M). This approach enables you (and us) to compare present expenses to those of past years. In point of fact, we are decreasing our costs (net of inflation) each year.

Hertz Foundation Finances 2008

Since 1963, the Hertz Foundation has been identifying, selecting, and supporting the country’s most innovative young scientists and engineers during their graduate school years. Over $120M has been spent on tuition and stipends, supporting over 1,070 Fellows. While this accomplishment was first made possible by Fannie and John Hertz, it is you who are making the Foundation and its Fellows so successful today. Correcting for inflation, we would need invested funds of about $60M to accomplish the same tasks as we did 15 years ago; instead the Foundation has $26M under investment. Your support—both your intellectual contributions and your financial help—continues to keep Hertz effective.

Presently Hertz spends ~$50K/yr per Fellow including the stipend, living costs, and program services expenditures, although the marginal cost of adding an additional Fellow can be significantly lower. The Foundation is able to continue supporting ~65 Fellows in graduate school each year because of tuition agreements with tenable universities, reasonable living expenses, and savings from the coordinated fellowship programs. Without these actions, a typical Fellowship of $10k/yr in 1970 would cost at least $75k today.

Acting on advice from alumni Fellows who are part of the professional investing community and our long-time friends at Neuberger Berman, we diversified the Foundation’s portfolio among conventional and alternative investors. This has worked well. During the past fiscal year, July 07 thru June 08, Hertz earned 3.6% (net of fees). In contrast, several reference funds lost -8% to -13% during this same period. While Hertz’s returns are relatively good, on an absolute basis the returns are less than Hertz needs. As seen from the charts, your donations have been very, very important.

Hertz spends* ~$3.6 M/yr to identify and select 16 Fellows, and then supports ~65 Fellows in school (with 10 more on leave). We are also using some of the funds to develop financial resources to meet the 25 Fellowships/year goal of the 2007 Strategic Plan (~120 Fellows under support). To achieve this target, we are working to rebuild the invested funds to $60M.

The pie charts illustrate expense and income allocations for fiscal year ending June 30, 2008. Figure 1 shows expenses of Fellows’ support (76%), overhead (12%), and development (12%). The supporting costs have increased somewhat from last year due to our transition to public charity status and related auditing costs. Hertz income, in Figure 2, shows investment and dividend income of $0.7M and $0.1M respectively, and donations of $1.2M. The shortfall of about $1.6M has been covered by Foundation funds. In a normal investment climate, Hertz’s investments and your continued contributions would have enabled us to do somewhat better than “breakeven”.

* See IRS 990 financial and audit forms for each fiscal year.
News and Announcements

Kenneth S. Suslick, Hertz Fellow 1978 and Marvin T. Schmidt Professor of Chemistry, Professor of Materials Science and Engineering, and Beckman Institute Professor at the University of Illinois at Urbana-Champaign, has been awarded the 2007 Sir George Stokes Medal of the Royal Society of Chemistry. The medal is awarded biennially for outstanding and sustained contributions to analytical science. Professor Suslick’s award citations reads: “for his interdisciplinary research on the chemical effects of ultrasound, including pioneering work on acoustic cavitation, sonocatalysis and sonoluminescence, and research on the bioinorganic and materials chemistry of metalloporphyrins and their applications as chemical sensors.”

Alexander Wissner-Gross, Hertz Fellow 2008, has been named a 2008 Environmental Fellow at the Harvard Center for the Environment. The Center created the Environmental Fellows program to enable recent doctorate recipients to use and expand Harvard’s extraordinary resources to tackle complex environmental problems. Dr. Wissner-Gross is a condensed matter physicist whose broad research interests concern the science and technology of programmable media, with a recent focus on the intersection of computation, energy, and the environment.

Do you have News to Share?

Please contact Robin Roth at robin@hertzfoundation.org or by phone 925.373.1642.