

# NEWSWORTHY

*The Newsletter of the Thomas Jefferson Partnership Fund, a non-profit foundation dedicated to raising voluntary contributions to support Thomas Jefferson High School for Science & Technology.*

2010-2011 Donor List Issue



Students test out a high-tech mannequin as part of a tjSTAR workshop on the use of simulation technology in medical training given by TJ Alumnus Haru Okuda, MD, '90.

## **Microsoft** Donates Software and Hardware for TJ Research

Microsoft recently donated a three-year "Developer AA" license -- designed specifically for science & technology schools -- which will provide TJ students and faculty with access to dozens of programs used in Windows-based software development. Students across the school will soon be taking advantage of this multi-faceted resource.

At the same time, Microsoft donated a Kinect system to the Computer Systems Lab. This popular motion-detecting video-game system can function as a powerful research tool. In one recent example, a robot created by an MIT engineer uses Kinect to "sense its surroundings at a much higher resolution and accuracy than was previously possible without expensive equipment." [Technology Review](#) (July/August 2011).

## *At tjSTAR, Students Learn From Experts . . . and From Each Other*

Imagine the atmosphere at TJ as dozens of scientists, engineers, physicians and other professionals give lectures, lead discussions, showcase technology and present challenges, while TJ seniors and freshmen present their research. All of this and more took place at the third annual tjSTAR Symposium to Advance Research held at the School on June 1, 2011. The Partnership Fund was proud to support tjSTAR with a \$15,000 grant.

## *Partnership Fund Awards Dinner: "A Celebration of Tj Stars"*

Following the symposium, the Partnership Fund held its Awards Dinner at Westwood Country Club. At this annual event, the PF turned the spotlight on several senior research projects and recognized three individuals for their outstanding commitment to advancing excellence in education with a coveted "Tommy Award."

"Tommy Awards," named in honor of Mr. Jefferson, were presented to Nancy Conrad, Chairman and CEO, The Conrad Foundation; James C. Ellenbogen, Ph.D., Chief Scientist, Nanosystems Group & Emerging Technologies Division, The MITRE Corporation; and James Jarvis, Division Manager, Science & Technology, TJHSST (shown with Evan Glazer, TJ Principal, left, and Mark Skolnik, PF Chair, right).



THANK YOU, DONORS, FOR OUR BEST-EVER ANNUAL FUND CAMPAIGN

From the fall's Back-to-School Appeal to the spring's In Honor of Faculty Appeal, TJ's alumni, current and alumni parents, grandparents, and friends have shown themselves to be as generous as TJ kids are hard-working. This year's contributions supported every research lab, as well as biology and chemistry classrooms (see list on back page), while also providing funds for "One Question" grants to students for classroom activities, service activities, and special events; the school-wide tjSTAR research symposium (see article on page one); and faculty attendance at the NCSSSMST conference, which allows TJ faculty to exchange ideas with their colleagues at science and technology high schools from around the country. Thank you, TJ community, for your undying support.

A Few 2010 - 2011 Partnership Fund Pride Points:

- 250%:** This year's increase in alumni Annual Fund giving, in response to the PF's first-ever Alumni Annual Fund Campaign.
- 40%:** This year's increase in Junior Lab Appeal (JLA) giving.
- 30%:** This year's increase in number of parents participating in the In Honor of Faculty appeal.
- \$35,000:** Amount of United Way & Combined Federal Campaign pledges received this year.
- \$23,000:** Amount of employee matching gifts received this year.
- 117:** Number of individuals contributing \$1000 or more to this year's Annual Fund.

NEW BIOTECHNOLOGY TOOL MEASURES DNA IN REAL TIME

One of the this year's more exciting acquisitions is the Biotechnology Lab's RT-PCR machine. "PCR" stands for polymerase chain reaction, which is a reaction that makes millions of copies of small amounts of DNA, a process known as amplification. "RT" refers to reverse transcriptase, which can convert RNA into its complementary DNA for the procedure.

The Biotechnology Lab is using the \$20,000 machine, purchased with Partnership Fund donations, for real-time quantitative polymerase chain reaction experiments (real-time qPCR). Real-time qPCR is a reaction that uses fluorescent dyes to detect DNA amplification and gene expression as it occurs, rather than after the reaction is complete, which is necessary for applications that require precise quantification. (Newsworthy has heard that a local university has sent its own students to TJ's Biotechnology Lab in order to use this superior equipment.)

The experiments being run by senior Kathleen Atkatsh, which examine several aspects of plasmid copy number, are just the kind of quantification experiments that could not have been conducted without this new machine. After inserting plasmids for two different types of antibiotic resistance into E. coli cells, Kathleen will use the RT-PCR machine to take real-time measurements of the effect of changes in antibiotic concentration, altered antibiotic gene expression, and protein level on the quantities of the two antibiotic-resistant vectors. The results of Kathleen's experiment may have implications for research into antibiotic resistance, among other important areas.

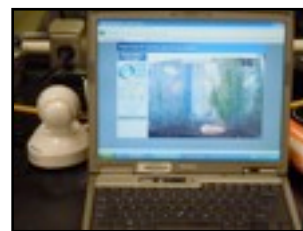
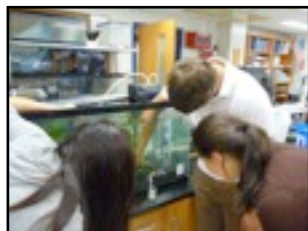


INEXPENSIVE, INDISPENSABLE LITTLE GADGET MAKES BIG SPLASH IN OCEANOGRAPHY LAB

For a mere \$85 each, the Oceanography Lab obtained three Real Time Internet Protocol cameras that made possible a senior research project designed to identify optimum conditions for raising seahorses (hippocampus erectus) in captivity. These wireless

internet cameras gave seniors Olivia Walton, Debbie Yu and Alex Hoffman unlimited remote access, allowing them to control zoom and pan-tilt functions and to observe, record, and review seahorse behavior from home.

The moral of the story? Every gift counts.



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## WALL OF HONOR CUMULATIVE ANNUAL GIVING LIST

*The Partnership Fund Wall of Honor is displayed in the School's front entrance. This Wall of Honor ensures that future corporate, foundation, and government partners and future generations of parents, alumni, faculty, students, and friends will recognize and appreciate the generosity of those donors who have contributed a minimum of \$10,000 in Annual Giving to support educational excellence at TJ (the "Wall of Honor" page on the PF website also includes the Technology Circle donors, listed below, who have contributed over \$5,000 in cumulative gifts).*

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*This list recognizes those employers who have matched employee direct contributions to the Annual Fund this fiscal year.*

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*TJHSST Partnership Fund's United Way "Expense Ratio" for the 2010-2011 fiscal year is 10.2%.*

*We have made every effort to ensure that the Annual Fund Donor List includes everyone who contributed to the Thomas Jefferson Partnership Fund during the 2010-2011 fiscal year. (Please note that many United Way/CFC gifts are reported to us without donor information and that matching gifts are often received months after the initial gift). Gifts received after June 30, 2011 will be recognized in our 2011-2012 Donor List. To correct any errors or omissions, please contact Ellen Smith, Development Manager, in the Partnership Fund Office at 703.750.8317; [ellen.smith@tjhsst.edu](mailto:ellen.smith@tjhsst.edu).*

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## TJ 2.0 CAPITAL CAMPAIGN LIST

*This year the Partnership Fund launched a Capital Campaign to support TJ 2.0, the major renovation that will transform TJ into a 21st century school (see page 11 for more information on the renovation plans). To date, the following corporations and individuals have made leadership gifts or pledges to the TJ 2.0 Capital Campaign:*

### **Jefferson Founding Partner (\$250,000 & Above)**

*Lockheed Martin*

### **Founding Partner (\$100,000 to \$249,999)**

### **Monticello Partner (\$50,000 to \$99,999)**

Mark & Jean Skolnik

### **Rotunda Partner (\$25,000 to \$49,999)**

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### **Dome Partner (\$10,000 to \$24,999)**

John & Soon-Hee Eagle

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George & Lien Galloway

Jack & Deborah Roney

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### **Portico Partner (\$5,000 to \$9,999)**

### **Colonnade Partner (\$2,500 to \$4,999)**

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### **Capstone Partner (\$1,000 to \$2,499)**

### **Red Brick Partner (Under \$1000)**

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**We would also like to thank Ed and Lauren Montgomery for their invaluable video production assistance.**

## TJ 2.0: A Blueprint for the Future of STEM Education

*Prepared by TJHSST Administration and Faculty, Spring 2011*

TJ 2.0 will modernize TJ's infrastructure and update its labs' equipment in order to support the School's unique curriculum, which has made TJ one of the top schools in the nation. This two-pronged modernization features:

Underlying **research infrastructure**, the essential facility and building environment for scientific inquiry that is shared among multiple research disciplines.

**Advanced tools and equipment\***, driven by the future vision for each of TJ's research labs and made possible by their increased size and the addition of connected classroom space, which will enable students to engage in meaningful cutting-edge scientific and technological inquiry.

TJ 2.0 also seeks to establish a 21<sup>st</sup>-century information and collaboration infrastructure throughout the school that supports and extends TJ's mission and provides advanced tools and opportunities for its students and faculty. This infrastructure should be designed with the following capabilities:



1. Technology that allows for collaboration
  - Two-way communication with professionals in the field and in academia, as well as with teachers and students at other institutions
  - Information-sharing can take place directly from the lab or classroom via effective video communication
2. Ubiquitous connectivity and interoperability
  - Wireless sensor network allows the school building itself to become the object of inquiry
  - Any standards-based network-addressable device or system could be connected anywhere in the school
3. Sufficient capacity to sustain a large-scale virtual learning environment
  - Remains operable despite a large numbers of users
  - Provides tele-learn flexibility for half-days, snow days, emergencies and unanticipated future needs
  - Promotes off-site mentoring
  - Allows student enrollment at TJ from other sites
  - Offers the potential to depart from a fixed master schedule
4. Limited Operations and Maintenance (O&M) accessibility
  - Student experimentation with, and routine use of, the IT infrastructure is possible without disruption of daily operations
  - Infrastructure becomes a teaching tool
5. A more effective means to fulfill our mission as a Regional Governor's School
  - Routine access to the unique tools at TJ from other locations
  - Extend the capacity of the school to more users in the region
6. Adaptability in the face of change
  - Ability to continuously update the technology without rebuilding the infrastructure
7. Security and privacy for all users
  - Meets the standards for security and privacy demanded by the school system in recognition of the fact that users are minors and required by law to be in school
  - Protects all users from intentional or unintentional interference by a highly-capable and energetic user base
8. Sustains operations despite unfavorable environmental conditions
  - Labs maintain power in support of ongoing experimentation
  - Insures optimal conditions for living organisms dependent on artificial systems to sustain life

*\*The School is in the midst of conducting a thorough needs assessment, and a Renovation Wish List will be available by the time work commences.*

**2010-2011 LIST OF SCIENCE & TECHNOLOGY EQUIPMENT PURCHASED WITH PF FUNDS:**

- Astronomy: Telescope support mount; wide-screen monitors (10). \$4,300.
- Biology classrooms: Laptop cart w/ 25 laptops. \$32,000.
- Biotechnology: RT-PCR system (see article, page 2); label maker; microplate washer; environmental growth chamber. \$35,800.
- CAD: Wide-screen monitors (28). \$7,600.
- Chemical Analysis: ChemBioDraw Ultra & GRAMS site software licenses; lab upgrades & miscellaneous hardware; potentiostat; computers (12); refrigerator/freezer. \$55,000.
- Chemistry classrooms: Precision balances (4): \$4,000.
- Communications: Adobe Premier Pro/After Effects software (8): \$4,000.
- Computer Systems: Wide-screen monitors (52). \$17,300.
- Energy Systems: Laser cutter; deep cycle batteries (16); BotMill glider for parts construction; battery packs (12); dynamometer stand. \$30,400.
- Microelectronics: Bench multimeters (10); CD players (2), amplifier; power supplies (5). \$7,350.
- Neuroscience: Hydraulic micromanipulator; digital camera for microscope; LabSite software license; amplifiers (2); dissection tools; power meter. \$21,500.
- Oceanography: Extreme operating environments camera system; wireless pan/tilt IP cameras (3) (see article, page 2); laptop cart w/ 16 laptops; extreme low-light video camera. \$30,700.
- Optics & Modern Physics: Precision multi-mode interferometer; document cameras (2); mountable precision camera. \$5,100.
- Prototyping: Storage racks with bins; variable speed drill press; linear motion and bearing sets. \$9,400.
- Robotics: Makerbot 3-D printer; benchtop oscilloscopes (4); power supplies. \$10,000.

**WIDE-SCREEN MONITOR MAKEOVER**

**Computer Systems Lab:**



Before



After

(screens tilt to vertical for writing code)

**CAD Lab:**



Before



After

(wider screens are particularly helpful for architectural and engineering projects)

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TJ could not fulfill its mission without the voluntary contributions of parents, grandparents, friends, alumni, and our corporate partners. To learn how you can support TJ through the Thomas Jefferson Partnership Fund, please visit our website at [www.tjpartnershipfund.org](http://www.tjpartnershipfund.org), email us at [eesmith@tjhsst.edu](mailto:eesmith@tjhsst.edu), or call us at 703-750-8317.

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