goddard tech transfer news
volume 1, number 2 summer 2003

Huang Wins NASA Government Invention of the Year Award

*Norden Huang (Code 971) accepts the NASA Government Invention of the Year Award from Administrator **Sean O'Keefe** (right) and **Paul Pastorek**, General Counsel for NASA (left).*

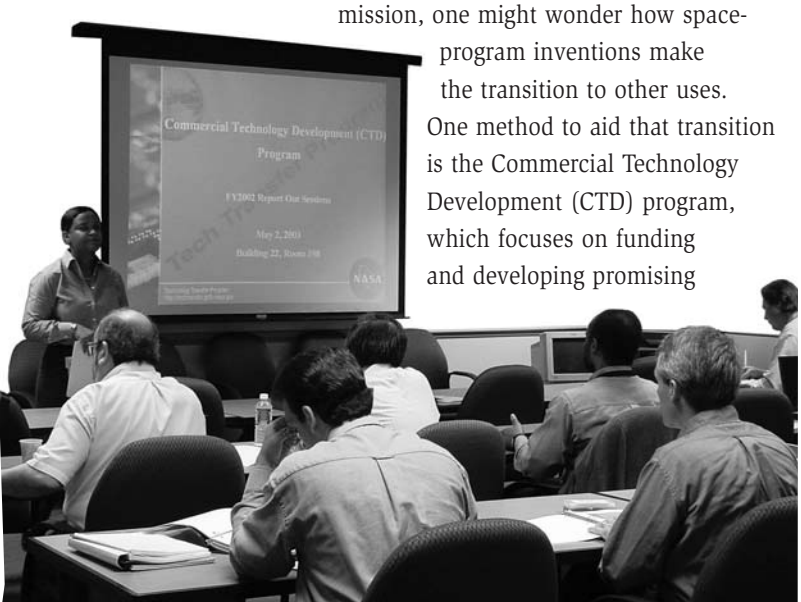
On June 5th, **Dr. Norden E. Huang** won the prestigious NASA Government Invention of the Year Award for his Hilbert-Huang Transformation (HHT).

Officially called the Computer Implemented Empirical Mode Decomposition Method, HHT is a mathematical method for analyzing time, frequency, and energy data. Due to its ability to analyze nonlinear, nonstationary frequencies, HHT proves to be a superior alternative to Fast Fourier Transformation in many situations, such as basic nonlinear mechanics, climate cycles, solar neutrinos variations, earthquake engineering, geophysical exploration, submarine design, structural damage detection, satellite data analysis, nonlinear wave evolution, turbulence flow, blood pressure variations, and heart arrhythmia. In fact, HHT has been recognized by NASA's Inventions and Contributions Board as "one of the most important applied mathematical methods in NASA's history."

The NASA Government Invention of the Year Award honors government employees who have developed a technology that has provided a significant and identifiable benefit to a NASA project or program, such as improving mission safety or saving significant time and money. In order to qualify for this and other NASA awards, innovators must submit a New Technology Report (NTR) via form 1679 or the online eNTRe system. For more information about submitting NTRs, see page 2. ■

Innovators Advance R&D via Commercial Technology Development Program

Since all of the R&D performed at Goddard is intended to further the goals of NASA's mission, one might wonder how space-program inventions make the transition to other uses. One method to aid that transition is the Commercial Technology Development (CTD) program, which focuses on funding and developing promising technologies that exhibit commercial potential.



"The CTD program helps build a bridge between basic R&D and commercial technology application," explained **James Tilton** (Code 935), one of the FY02 recipients of CTD funding. "I had developed some software that appeared to have strong commercial application possibilities but needed some focused, non-research oriented development to make this commercial application more apparent and accessible to commercial concerns."

The CTD program enables civil servant innovators to develop functional prototypes to make their NASA technologies more compatible with potential commercial applications. Award recipients adhere to aggressive technology development schedules,

(continued on page 4)

the tech transfer process:

Step 1: Scientific/Technical Staff Submit NTR

The technology transfer process is started when you—whether a civil servant employee or a contractor serving under a contract, grant, or cooperative agreement—inform us of your innovations through New Technology Reports (NTRs).

What is an NTR?

An NTR is a detailed disclosure of individual technologies or innovations.

What qualifies as a new technology?

A new technology is broadly defined as any invention, discovery, improvement, or innovation that was either conceived or first reduced to practice in the performance of NASA work. New technologies may occur at the system, subsystem, or component level. New technologies include new or improved techniques, methods, systems, and processes as well as new or improved products, devices, machines, materials, chemical compositions, apparatuses, articles, fixtures, tools, and software.

Why should I submit an NTR?

The NTR allows the Technology Transfer Program to begin looking for commercial applications for the technology and to protect it as intellectual property. Publicly discussing your invention can prevent NASA from securing patent protection and reaping the benefits that can accompany intellectual property protection, so it is important that you submit the NTR first and then check with us before presenting or announcing your innovation. Also, an NTR is required for you to be eligible for a Space Act Award, the Invention of the Year Awards (see page 1), and other recognition. (See the "Awards" section of http://techtransfer. gsfc.nasa.gov). Finally, reporting technologies is required of NASA employees and contractors (see NASA Policy Directive 2091.A).

When do I submit an NTR?

An NTR should be submitted as soon as you recognize you have a new invention. This may occur in the middle of a project while R&D is still ongoing, or it may be recognized at the end during normal project reporting. The process of writing programmatic and mission progress reports also may assist you in recognizing and describing a new innovation. The earlier your invention is reported to the Technology Transfer Program, the more effectively and efficiently we can help you find successful commercial partners and market applications.

Most importantly, you should submit the NTR before making any public disclosure of the innovation.

How do I submit an NTR?

Use the online system eNTRe (http://entre.nasa.gov) to report new technology. The eNTRe system requires you to describe what motivated the development, the benefits of the technology, and possible commercial applications. The Technology Transfer Program is exploring additional ways to make this process even easier. ■

Next issue – Step 2: Technology Assessment.

researcher profile:

Jeannette B. Benavides

Code 562 • 17 years at NASA
• ***Education:*** B.S, chemistry, University of Costa Rica, 1975
• M.S., biochemistry, American University, 1982
• Ph.D., physical chemistry, American University, 1998
Born: Heredia, Costa Rica

What invention are you currently working to transfer?

A manufacturing process for single-walled carbon nanotubes (SWCNTs) that uses a helium arc welding process to vaporize an amorphous carbon rod and then form nanotubes by depositing the vapor onto a water-cooled carbon cathode. By avoiding the use of a metal catalyst, the production process is simpler, safer, and much less expensive.

What has the Technology Transfer Program done to introduce your invention to new users?

Program staff have arranged for me to present my technology at many conferences, including SAMPE (see page 3), the National Design and Engineering Show, and the NASA Medical Technology Summit.

What do you see as the future for your technology?

I'd like my invention to make SWCNTs reach their full potential. They can be used in medicine, microelectronics, scanning force/tunneling microscopy, materials, and molecular containment.

Any advice for your colleagues?

Don't forget to submit your NTR. The Technology Transfer Program can really help you a lot, but they can't do it if they don't know about your inventions. ■

Goddard's Larger Role in Tech Transfer

In covering the June 3rd Potomac Conference of the Greater Washington Board of Trade, *The Washington Post* noted that "Even though the Washington area is a national leader in federal and university research spending, few of the fruits of that work make it into the private sector." That is why the Technology Transfer Program at Goddard is so important.

"By getting our technologies into the hands of local companies, we can help make the metro-Washington economy resemble that of Boston or Silicon Valley or Seattle," said Nona Cheeks, Chief of Goddard's Technology Transfer Program. Ms. Cheeks attends meetings such as the Potomac Conference and the Federal Laboratory Consortium for Technology Transfer (FLC) annual conference for new insight into what the Program can do to meet the needs of the many stakeholders involved in tech transfer: the innovators, Goddard, NASA as a whole, the licensing companies, the local and national economies, and the U.S. taxpayers.

Held annually so that top local leaders can discuss major issues facing the region, the Potomac Conference this year focused on transferring federal and university technology, including the cultural and legal barriers to tech transfer and how to create more partnerships between researchers and companies looking to sell and market the technologies.

The FLC national meeting was held May 5–9 in Tucson, Arizona. The theme was "Adding Value to the T2 Frontier." The week included advanced training on intellectual property (IP) management and licensing and sessions on leveraging technologies for economic development.

"The FLC meetings allow us to share best practices with other research labs," said Ms. Cheeks. "Doing so helps all of us to continually improve the technology transfer process and reach the goals of all our stakeholders." ■

Interest in Goddard Inventions at SAMPE Meeting

Photo courtesy of SAMPE

The annual conference for the Society for the Advancement of Material and Process Engineering (SAMPE) was the ideal staging ground for Goddard technologies to be presented to potential licensees. Held May 11–15 in Long Beach, California, SAMPE 2003 was attended by about 4,300 professionals interested in nanotechnology, wind energy, resin infusion technology and preforms, fire safe materials and infrastructure, and other cutting-edge materials.

Three Goddard technologies were featured at the NASA booth:

- Noncatalytic Manufacturing Method for Carbon Nanotubes, **Jeannette Benavides** (Code 562)
- Multi-Stage Adiabatic Demagnetization Refrigerator and the Passive Gas-Gap Heat Switch, **Peter Shirron** (Code 552)
- Aluminum Super Polishing Technique, **Jim Lyons** and **John Zaniewski** (former NASA employees)

In addition, Dr. Benavides gave a technical briefing regarding her noncatalytic carbon nanotube manufacturing technology. Drawing an audience of about 65, the briefing generated significant interest among attendees. "I came specifically to SAMPE today to hear this talk," said one interested company representative.

In fact, three one-on-one meetings were held with potential licensees, and one license application has already been received. ■

Tech Transfer Metrics – March 1 to June 30, 2003

New technologies reported: 40

New technologies were reported by the following civil servants, contractors, and universities:

Civil Servants

Michael Barthelmy (Code 541)
Michael Beamesderfer (Code 541)
Jeannette Benavides (Code 562)
Kris Brown (Code 592)
Robert Candey (Code 632)
Reine Chimiak (Code 583)
Gregory Clarke (Code 541)
Carmel Conaty (Code 531)
Steven Curtis (Code 695)
Keith DeWeese (Code 571)
Terence Doiron (Code 555)
Denise Duignan (Code 230)
Gene Feldman (Code 902)
Jeffrey Ferrara (Code 584)
David Folta (Code 572)
Rene Gosselin (Code 555)
Bernard Harris (Code 583)
Edward Hicks (Code 565)
Carl Hostetter (Code 588)
Steven Hughes (Code 595)
Hollis Jones (Code 553)
Jeremy Jones (Code 588)
Edward Kim (Code 975)
Douglas Leviton (Code 551)
Donald Lokerson (Code 532)
Richard Lyon (Code 935)
Charles McClain (Code 970)
Mark Matsumura (Code 550)
Johnny Medina (Code 531)
Raymond Ohl (Code 551)
Fernando Pellerano (Code 555)
Thomas Perricone (Code 295)
David Petrick (Code 565)
Robin Pfister (Code 586)
Jeffrey Piepmeier (Code 555)
Paul Racette (Code 555)
Glenn Rakow (Code 561)
John Riley (Code 556)
Richard Schnurr (Code 560)
Ronald Toland (Code 551)
George Voellmer (Code 543)
Philip Ward (Code 598)
Thomas Winkert (Code 561)
Mark Woodard (Code 572)
Said Zewari (Code 544)

Contractors

Association of Universities for Research in Astronomy
B Line Express
Carnegie Institution of Washington
Commerce One
Composite Optics Inc.
Energen Inc.
General Sciences Corp.
Global Science & Technology, Inc.
QSS Group Inc.
TTH Research Inc.
Thinking Systems

Universities

Massachusetts Institute of Technology
New Mexico State University–Las Cruces
Pennsylvania State University–University Park
Purdue University
University of Alabama–Huntsville
University of California–San Diego
University of Maryland–Baltimore County
University of New Mexico

Issued Patents: 3

- U.S. Patent #6,538,796: MEMS Devices for Spacecraft Thermal Control Applications, **Theodore Swanson** (Code 545)
- U.S. Patent #6,566,854: Apparatus for Measuring High-Frequency Currents, **John Sutton** (Code 564) and **Mark Hagmann** (contractor)
- U.S. Patent #6,558,742: Hot-Filament Assisted Methanol-Based Method for Chemical Vapor Deposition of Diamond, **Yonhua Tzeng** (contractor)

Signed Licenses/Partnerships: 5

- Gear Bearings, prototyping license to ACS (Advanced CAD/CAM Service Corp.) of Peoria, Illinois
- Process for Producing High-Quality Optically Polished Surfaces on Bare Aluminum Substrates, licensed to Nu-Tek of Aberdeen, Maryland
- Process for Producing High-Quality Optically Polished Surfaces on Bare Aluminum Substrates, Space Act Agreement with the University of Arizona in Tucson
- Regional Applications Center Software: RODIN, licensed to Global Science and Technology of Greenbelt, Maryland
- The Turbotrap: A Method for Containing a Gas in an Open Container, Space Act Agreement with Global Systems & Technologies, Corp. of Oxon Hill, Maryland ■

a publication of
Technology Transfer Program
Mailstop 504
Building 22, Room 290
(301) 286-5810
techtransfer@tco.gsfc.nasa.gov
http://techtransfer.gsfc.nasa.gov

CTD Program *(continued from page 1)*

incorporating commercial industry's needs. In addition to funding, the Technology Transfer Office offers guidance to aid in the development toward technology transfer.

"CTD helped me fund prototypes to prove out ideas; establish commercial importance of my various ideas; … and prepare presentations, Technology Opportunity Sheets, and a Web site to advertise the technology," said **John Vranish** (Code 544).

In addition to further developing technologies for commercial benefits, the CTD program also yields real benefits for NASA. Mr. Vranish calls it reverse technology transfer. "Lessons learned from interacting with industry and helping industry have made the NASA applications better from a technical point of view and have provided industrial suppliers and prototypers with the NASA applications." ■