

Spring: Time for a Fresh Start

Since spring is the season of new beginnings, this is the perfect time to unveil our revised newsletter dedicated to technology transfer at Goddard. In this and future issues of *Goddard Tech Transfer News*, we hope to help you become actively involved in this important endeavor.

As most of you know, technology transfer is a vital part of Goddard's mission. Your innovations and expertise are national assets that can be used not only to achieve NASA's space program goals but also to develop new products and processes that benefit the U.S. in other ways. Therefore, your participation is imperative if we are to succeed.



Nona Minnifield Cheeks, Chief, Technology Transfer Program

With this newsletter, you can learn more about Goddard's Technology Transfer Program:

- Explanations of each step of the tech transfer process
- Awards, upcoming conferences, and other opportunities to gain recognition for your innovations
- Programs that provide funding for research projects
- Profiles of researchers active in tech transfer

I hope you find *Goddard Tech Transfer News* a useful resource. And I invite you to share your comments, ideas, suggestions—about this newsletter or the Technology Transfer Program in general. Just e-mail us at techtransfer@tco.gsfc.nasa.gov. Give us the chance to make Goddard's Technology Transfer Program a model to follow. ■

Awards at 2003 NTR Program

The Newton White Mansion in Mitchellville was the site of the 11th annual New Technology Reporting (NTR) Program. Held April 9th and attended by civil servants who have reported new inventions to the Technology Transfer Program, the event is held every year to recognize the efforts of Goddard's scientific and technical staff.

The keynote speakers at the event were from Enduro Medical Technology, which is introducing a new product based on Goddard technology. Kenneth Messier, Patrick Summers, and Peter Summers demonstrated the Secure Ambulation Module (SAM), a walker used in physical therapy and restorative nursing. For more information about this successful transfer effort, see page 2.

Kerley Award

Named after the late James Kerley, a Goddard scientist who championed technology transfer, this award is presented annually to recognize a Goddard researcher's commitment to new technology reporting and the technology transfer process. This year's award winner was **Norden Huang**, who has been exceptionally active in the transfer of his Hilbert-Huang transformation (HHT) technology. (See page 2 for more on Huang and his participation.) **Peter Hildebrand**, Chief of the Laboratory for Hydrospheric Processes, accepted the Kerley Award on behalf of Huang, who was unable to attend the event.



Peter Hildebrand (Code 970) accepts the Kerley Award on behalf of winner Norden Huang. Also pictured (l to r): Veronica Johnson, meteorologist for NEWS4; Alison McNally, Associate Center Director; and Nona Minnifield Cheeks, Chief of Goddard's Technology Transfer Program.

Patent Awards

Patent counsel Keith Dixon presented Patent Awards to the following inventors for patents issued in 2002:

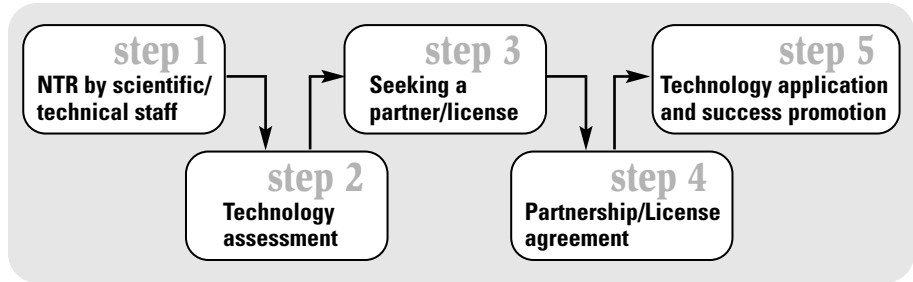
- Kenneth Blumenstock (Code 544)
- Edward Cheung (Code 442)
- Norden Huang (Code 971)
- Michele Manuel (Code 562)
- Geary Schwemmer (Code 912)
- Harry Shaw (Code 562) ■

Success Depends on You

The benefits of Goddard's efforts to transfer space technology to the private sector are extensive. From generating funding for future research to improving the nation's economy and quality of life, tech transfer has far-reaching effects. And the success of these efforts depends primarily on you: the scientific and technical staff who inform us of your innovations through New Technology Reports (NTRs) and who participate throughout the tech transfer process.

To familiarize you with the vital role you play in achieving tech transfer success, *Goddard Tech Transfer News* will present a series of articles explaining the five-step process.

Watch for the Summer 2003 issue, where we explain when and how to report a new technology, including details of a new submission system that **simplifies the NTR paperwork.** ■

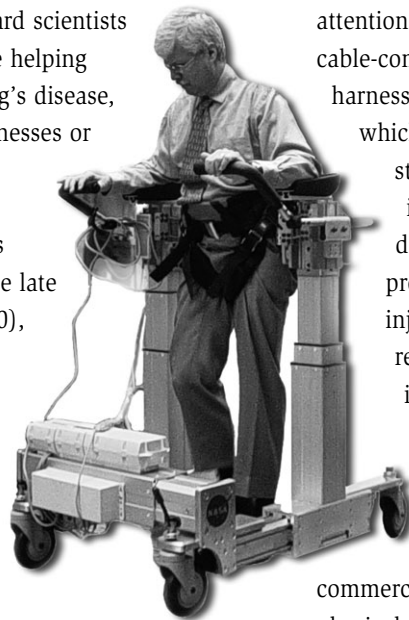


spotlighting success:

Goddard Technology Used to Aid Physical Therapy

At this year's NTR Program, Goddard scientists saw how space-program inventions are helping people with severe arthritis, Lou Gehrig's disease, Parkinson's, and other degenerative illnesses or traumatic injuries. Enduro Medical Technology demonstrated the Secure Ambulation Module (SAM), which was based on technologies developed by the late James Kerley, Wayne Eklund (Code 540), and Allen Crane (Code 543).

SAM is a walker with a harness that supports patients' body weight, allowing those who cannot stand independently to receive physical therapy in a safe, stable, fall-free environment without constant



attention from a therapist. SAM's key feature is Goddard's cable-compliant joint (CCJ) technology, which allows the harness to control the patient's pelvis. The CCJ technology, which consists of connected cable segments, provides stability while allowing subtle twisting and cushioning and providing shock absorption and energy damping. Because of the CCJ technology, SAM can provide several important benefits, including reduced injuries for patients and therapists, a faster path to rehabilitation, significant medical benefits, and increased staff efficiency.

Kerley invented the CCJ technology and later teamed up with Eklund and Crane to develop an early version of the walker. Enduro licensed the CCJ technology and walker, developing a commercially viable product that is expected to revolutionize physical therapy and restorative nursing. ■

researcher profile:



Norden E. Huang

Code 971
26 Years at NASA

Education:

B.S., Civil engineering, majored in structural theory, National Taiwan University, 1960

Ph.D., Fluid mechanics and mathematics, Johns Hopkins University, 1967

Post-Doctor, Oceanography, University of Washington, 1967-1969

Born: Wuhan, Hubei, China

What invention are you currently working to transfer?

The Hilbert-Huang transformation (HHT) technology, which is a new method for time-frequency-energy analysis. HHT algorithms accurately analyze nonlinear, nonstationary energy frequencies as a function of time, providing a superior alternative to fast Fourier transformation (FFT). HHT can be used in a wide range of applications, including analysis of underwater acoustic signals; design of noise-blocking headphones; structure and

machine health diagnosis; earthquake monitoring; and heart rate, blood pressure, or other biomedical monitoring.

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

Program staff prepared a Technology Opportunity Sheet, which has been used to solicit partners for continued development and licensing. They also submitted the application to win an R&D 100 Award and the Federal Laboratory Consortium award for excellence in

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NASA Medical Technology Summit Features Three Goddard Inventions



On February 11–13, NASA hosted nearly 200 attendees from industry, academia, and government agencies at the NASA Medical Technology Summit: Forging Partnerships to Commercialize Emerging Medical Technologies. By introducing industry leaders to NASA’s most exciting and innovative medical technologies, the summit sought to stimulate joint development and licensing partnerships with industry.

Among the more than 20 NASA technologies featured at the summit were three developed at Goddard:

- Hilbert-Huang transformation (see article below), which can be used to analyze heart rate, blood pressure,

and other biological signals, developed by **Norden Huang** (Code 971)

- Single-walled carbon nanotubes, which can be used in pacemakers, implantable biosensors, hearing aids, and other medical devices, developed by **Jeannette Benavides** (Code 562)
- Sol-gel filled fiber optics, which can be used in biosensors, developed by **Harry Shaw, Melanie Ott, and Michele Manuel** (Code 562)

In addition to hearing presentations on these and other NASA technologies, attendees were able to meet one-on-one with inventors and technology transfer

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50 Attend Technology Briefing on Hilbert-Huang Transformation (HHT)

What do the FBI, the Federal Highway Administration, the University of Delaware, and Bartron Medical Imaging have in common? They all attended the March 24th HHT Advanced Analysis Software Technology Briefing, and they are now working with Goddard to transfer the technology to the marketplace.

The briefing was attended by representatives from several companies, universities, and government agencies.

Presentations explored the potential applications for the HHT technology:

- Biomedical signal analysis
- Speech analysis
- Machine tool fault detection
- Vibrometers
- Data processing

These presentations were followed by one-on-one meetings, where seven organizations discussed possible partnerships with inventor **Norden**

Huang (see page 2) and Technology Transfer Program staff.

“HHT is a particularly exciting tech transfer effort because of its potential internally to NASA as well as externally,” said Nona Cheeks, Chief of Goddard’s Technology Transfer Program. “NASA’s goals are broad: to improve life on Earth, to take ourselves outside the confines of Earth, and to discover life beyond Earth. HHT can help in all of these aspects.” ■

Goddard Technologies Featured at NDES

This year’s National Design and Engineering Show (NDES)—held at National Manufacturing Week March 3–6 in Chicago, Illinois—included a new event designed to bring together companies looking for technical solutions and the research labs that might meet their needs. The Technology Transfer Conference and Expo was an ideal opportunity to present potential licensees with several Goddard technologies:

- Encoder technologies, developed by **Doug Leviton** (Code 551)
- Half-tooth gear bearings, developed by **John Vranish** (Code 544)

- Noncatalytic manufacturing method for carbon nanotubes, developed by **Jeannette Benavides** (Code 562)

The Technology Transfer Program not only organized technology briefings for two of these technologies but also scheduled one-on-one meetings with representatives from interested companies. “These meetings not only allowed us to gauge the interest of the companies, but they also gave industry a more in-depth look at our technologies,” explained Joe Famiglietti of the Technology Transfer Program. Goddard held 12 of these one-on-one meetings during NDES. ■



New technologies reported: 22

Civil Servants

Jason Budinoff (Code 544)
Amy Fedorchak (Code 547)
Gregory Greer (Code 545)
Jessica Hauss (Code 551)
Virginia Kalb (Code 922)
Jacqueline LeMoigne-Stewa (Code 935)
Nargess Memarsadeghi (Code 588)
Rajeev Sharma (Code 544)
John Vranish (Code 544)
Howard Wood (Code 551)

Contractors

CSA Engineering Inc.
Hughes Aircraft Company
Luxel Corp.
Mathsoft Inc.
Nanosciences Corp.
QSS Group Inc.
Space Telescope-European Coordinating Facility
Swales & Associates Inc.

Universities

Case Western Reserve University
Cornell University
Johns Hopkins University
Southern University-Baton Rouge
Stanford University
University of Chicago
University of Maryland-College Park
University of Washington

Send Us Your Ideas

We want to do all we can to make it easy and rewarding for you to participate in the Technology Transfer Program. But we need your help. Send us your ideas for program improvements or *News* articles via e-mail (techtransfer@tco.gsfc.nasa.gov). ■

Medical Summit (continued from page 3)

staff. Goddard inventors participated in eight such meetings. Said Benevides, "I learned a lot about how to bring together R&D and technology transfer and also how valuable this transition is."

Technology Transfer Program staff are following up with the National Institutes of Health and companies that expressed interest in Goddard's inventions. ■

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>

Provisional Patents Filed: 4

- Holographic Plossl Retroreflector, **Eugene Waluschka** (Code 551)
- Half Tooth Gear Bearings, **John Vranish** (Code 544)
- Conceptual Design of a 3D Imaging Lidar for High-Resolution Mapping of the Surface Topography of Moons or Planets from Space, **John Degnan** (Code 920)
- Real-Time Software Receiver, **Brent Ledvina, Mark Psiaki, Steven Powell, Paul Kintner** (contractors) ■

Submit Your New Technologies

You can report new project technologies by downloading Form 1679 from the "Forms" section of our Web site (<http://techtransfer.gsfc.nasa.gov>) or by submitting the online form on eNTRe (<http://entre.nasa.gov>).

And watch for the next issue of *Goddard Tech Transfer News*, where we will unveil a new submission system that further simplifies the NTR paperwork. ■

Huang (continued from page 2)

technology transfer. They also have recommended me for the Special Space Act Award three times, which carries cash awards, as well as nominated me for the Invention of the Year Award. This year they arranged for me to present at the NASA Medical Technology Summit and organized a technology briefing for industry, academia, and government to learn more about HHT.

What do you see as the future for your technology?

I see HHT becoming as widespread as FFT, for HHT can produce the iden-

tical results as FFT if the processes producing the data are linear and stationary. If the processes are nonlinear and nonstationary, HHT gives more meaningful results. As such, HHT could be viewed as a generalized Fourier analysis method.

Any advice for your colleagues?

Think the unthinkable and examine the fundamentals more critically. In doing so, you might find a simple method that represents a conceptual departure from accepted methods. ■