Technology Spotlight

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Department of Mechanical Engineering have developed a process called Mold Shape Deposition Manufacturing (Mold SDM) to overcome these limitations. Mold SDM is a process that builds molds which can be used to gelcast ceramic green parts. It is a layered manufacturing process which allows for the fabrication of complex geometries. It uses CNC machining processes to shape the layers as they are built, resulting in smooth surfaces. The ceramic green part is made by monolithic casting. Therefore, the final part contains no layer boundaries, which are potential sources of defects.

Mold SDM is being developed for fabricating ceramic jet engine components but it can also be used to produce parts from other castable materials. A variety of ceramic and polymer parts have been made. Metal gelcasting will be investigated in future as a means of making metal parts.

For more information, please visit the website at http://www-rpl.stanford.edu/~agcooper/MoldSDM/MoldSDM.html or contact Luis Mejia at 650-723-0651 or luis@otlmail.stanford.edu.

Jaundiced Newborns See a New Light (S96-113)

Phototherapy for jaundice in newborns is a common practice, both in the hospital (Neonatal Intensive Care Nurseries) and in the baby's home.

Now this 'traditional' treatment is getting some fine tuning.

Enter Stanford inventors Daniel Seidman, David Stevenson, and Hendrik Vreman, with assistance from Martin Fejer and Roger Route in Stanford's Applied Physics Department and the Ginzton Laboratory. They were looking for a safer and more effective treatment for jaundiced newborns. Several million babies suffer from this condition each year, and without proper treatment, excessive jaundice pigment in the blood can be life-threatening.

This plastic doll is modeling a prototype bed of LEDs that could be used to treat babies with jaundice.

The inventors' discovery involves using high intensity light emitting diodes (LEDs) in the blue-green portion of the visible light spectrum instead of the most frequently used sources of light (fluorescent and halogen). These LEDs are rapidly becoming smaller and cheaper, and by using their selectable, narrow wavelength light spectrum instead of broad spectrum white light from fluorescent or halogen lights, LEDs are being demonstrated to be a more effective way to treat jaundice. The inventors are working on numerous ways to use the LEDs to treat the babies, including weaving small "chip" LEDs into a blanket or jacket.

Some of the advantages of this particular phototherapy are the small size, high intensity, stable intensity, low voltage and lack of heat generation. Due to the small size of the LEDs, it may soon be possible for parents to take their jaundiced children home with a battery-powered LED therapy jacket and avoid an extended hospital stay.

The inventors are also looking into other medical applications of LEDs. The use of light for treatment of disturbances of diurnal biorhythms, often leading to depression such as is experienced during episodes of Seasonal Affective Disorder (SAD), is gaining repute.

Furthermore, recent publications have indicated that selective light exposure may alleviate the effects of temporary disruptions of biorhythm, such as those caused by jet lag and night shift work. Small size, low weight, high intensity, and low power requirement are characteristics that make LEDs particularly suitable for incorporation into portable, computer chip-controlled, and battery-powered devices that can be used to treat or possibly prevent these troublesome disorders.

For more information, please contact Jon Sandelin at jon@otmail.stanford.edu or (650) 725-9404.

Please note that the OTL informational meetings will now be held every Friday from 10am to 11am. For more information or to attend a session, please call (650) 723-0651.

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STANFORD TECHNOLOGY
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INSIDE THIS ISSUE

BrainStorm: Not Just Another OTL Newsletter

The computer age is making our lives easier and more complicated. Although we can quickly obtain colossal amounts of information, how much of it do we really want to use? If you are a medical student studying neuroanatomy, BrainStorm: Interactive Neuroanatomy could be your solution.

Back in 1990, Stanford University Medical Media and Information Technologies (SUMMIT) was founded to create new technology that helps faculty, students and researchers develop innovative, interactive teaching software and to research methods of making these technologies easy and effective for content creators as well as users.

One of the first projects out of the SUMMIT was the creation of BrainStorm, interactive software for students to learn and test their skills for neuroanatomy. After disclosing BrainStorm to OTL in 1993, the program was eventually exclusively licensed to Mosby Publishing.

But the story doesn't begin or end with this short description. Rather, as with all new technologies, it has a unique past which SUMMIT, OTL and Mosby hope will lead into a prosperous future.

Gary Coppa, a first year medical student in 1989/1990, joined the Media Research Group (MRG), a precursor to SUMMIT headed by Professor Robert A Chase. MRG was working mainly on Electric Cadaver, a computer-based gross anatomy program. Coppa started tackling a neuroanatomy computer project, which was difficult due to the numerous cross references a student would normally use. Instead of a medical student having four books open at once, he or she could see all of the necessary information on one screen and link it with other pertinent information at the click of a button.

After the funding for his project ran out, Coppa approached SUMMIT with his work. SUMMIT readily took it on.

As Coppa learned more programming "on the job", he continued his medical studies. During this time, Dr. Elizabeth Tancred, a neuroanatomy lecturer in Australia, was on sabbatical at Stanford. Planning on developing software to teach neuroanatomy herself, Tancred learned of the Electric Cadaver program on a local TV station. "It was fortuitous that Coppa was working on a prototype for what was to become BrainStorm and was looking for academic input," said Tancred. "With more than 10 years teaching experience behind me, I was able to provide that. We pooled our ideas and experience and BrainStorm evolved from Coppa's original concept into what it is today."

Tancred's connections also helped them obtain some of the beautiful pictures and artwork con-

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Feature Presentation: Technology Spotlight

In order to present our readers with more information on upcoming and cutting edge technologies, we're introducing a new section to the OTL Newsletter called the "Technology Spotlight. Each issue, this section will highlight a recent technology we think may be of interset to our readers.

For the premier of the Technology Spotlight, we'd like to introduce you to five technologies we hope you'll find as interesting as we do.

Bioinformatics: A Wealth of Information Growing Faster than the Stock Market (EMOTIF/IDENTIFY, S97-083)

Due to the ongoing quest for new drugs and drug targets, the world of bioinformatics is rapidly expanding. Searchable and analytical databases are a necessity in order to complete work at paces whose records are broken daily.

Protein identification and functionality are critical for discovering new drugs and drug targets. In an effort to minimize research time spent on classifying and identifying functions of proteins, Professor Douglas Brutlag and Craig Nevill-Manning created two tools that are designed to work together. The first tool, EMOTIF, analyzes and classifies aligned sequences of proteins. EMOTIF converts sets of protein sequences into a condensed form known as "motifs". Compared with other motif databases currently in use, motifs generated by EMOTIF have a far higher precision and a vanishingly small number of false predictions.

The IDENTIFY database contains more than

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STANFORD TECHNOLOGY BRAINSTORM

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Stanford Technology BRAINSTORM is published quarterly to provide information about OTL and general information of interest to the licensing community, both within and outside Stanford.

OTL's services are available to any Stanford faculty, students, or staff who invent technologies which may benefit the public or be of commercial value.

To learn about a specific technology or to disclose one of your own, contact us at the above address.

Brainstorm on BrainStorm...

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tained in the program.

In the winter of 1991, Tancred and Coppa introduced an early version of the program to Stanford medical students. They received it with enthusiasm, so the developing and refining efforts continued.

By late 1991/early 1992, beta versions of the program had been created and were being tested at a number of universities throughout the USA and Australia. In 1993, SUMMIT and the inventors felt they had a program which could be widely used in the medical community and disclosed it to OTL.

Brenda Martino, a Licensing Assistant at OTL, took on the licensing of the software. Initially Martino was making copies of the disks and sending them to licensees along with a manual. Marketing was mainly done by word of mouth.

Mosby Publishing learned of the program and proposed taking on the distribution of the program. In order to facilitate the use of the program, Mosby placed the program on CDROM.

With the success of BrainStorm and a couple other programs, including gross anatomy software, SUMMIT has thrived since its inception. "BrainStorm helped to get SUMMIT going," noted Parvati Dev, Ph.D., director of SUMMIT.

Most of the funding for SUMMIT comes from government agencies and on-campus funds. But despite the successes over the past few years, SUMMIT still cannot take on all of the innovative ideas people approach them with. Students and faculty are constantly coming up with technological ideas on how to improve their education.

"A lot of our ideas come from students because they arise from the students' needs and the way they learn," said Dev.

Although BrainStorm is mainly used by medical students, it can be used by virtually anyone who wants to learn neuroanatomy. "BrainStorm is very user friendly," said Martino. "Even high school students could use it." Its convenient and easy format allows a smooth ride and the frustration of cross-referencing through different heavy books is left behind. Even a novice like the author of this article could navigate through it.

Neuroanatomy Test Spin

With a past in biological sciences, I could not help but help myself to a spin through BrainStorm. Once you start, it's difficult to stop.

Upon entering the program, you are asked to choose between three sections:

- CrossSections- magnified photographs of stained cross sections of Central Nervous System structures, in which anatomical structures can be selected and followed through consecutive sections.
- Gross Dissections- photographs of dissected brain, brainstem and spinal cord specimens.
- Diagrams- line drawings illustrating specific structural and functional relationships.

You can also choose to have a guided tour through the program which will help you to learn quickly from the program, or you can choose the index button to search from a given list or for something specific. The handy "Help" function gives you information about your location in the program.

I went for the meat first- Gross Dissections. From the menu given, I chose Cerebrum-Medial for scientific reasons (I liked the picture). I was given a choice of thirty structures which could be outlined in red on the halved brain at the click of a button. For each structure you can also find out the brief function and links to diagrams, cross sections, and possibly other gross dissection views. There is also an information card which gives a very detailed explanation of the structure along with further references (in case, like me, you can't remember those notes you copied down years ago in anatomy class).

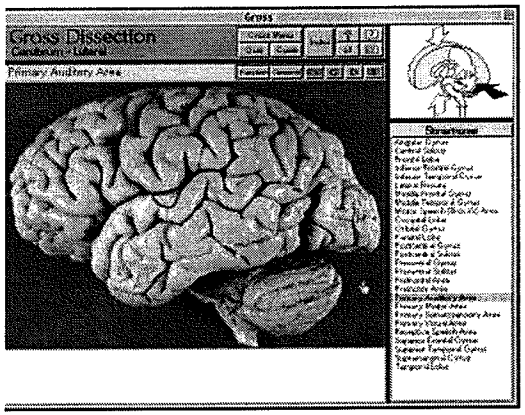
After cruising through a couple of the gross dissections, I thought I'd see how I would do on a quiz. After attempting to answer a few questions, I knew it was time to REALLY study.

Another fun thing about BrainStorm is that you get to "play doctor." Although most of the people who are using the program are on their way to attaining this position, for those of us whose paths diverted to other directions, doing basic tests and then making simple diagnoses on sample patients can be an exhilarating sensation.

If you are an instructor that uses the BrainStorm program as a part of your classes, you can create customized tutorials and exams within the program. This additional feature is available only on the institutional version of the program. Yet another upcoming improvement is the conversion of the program to JAVA, allowing functionality via the web.

Naturally this description doesn't give nearly the depth of functionality and information that the BrainStorm program provides. We hope those in need of such training will discover how effortlessly they can use and learn from the program.

For further information about SUMMIT, please visit their website at http://summit.stanford.edu/



A sample screen from the Gross Dissections part of the BrainStorm program.

SUTECH Trademark: quality and recognition

A trademark is an important way for a consumer to identify the source and quality of a product. In order to build brand-name recognition of the highest standard of quality for special Stanford-created technologies, we are pleased to announce SUTECH™and its trademark logo (right).

SUTECH™

Individual Stanford lab groups who have appropriate technologies may want to display the SUTECH™ logo on their websites. We invite you to visit the site of one of our heaviest SUTECH™ users, the Stanford Sequencing and Technology Center's Technology Development Group (http://sequence-www.stanford.edu/group/techdev/index/html). The Technology Development Group develops custom biological instruments and novel automated technologies to increase the throughput and lower the price of certain biological techniques and analyses.

We are interested in finding more Stanford products which can qualify for the SUTECH™ trademark. If you have innovative, high quality technology that can benefit from trademark recognition, please contact Jessica Smith at jessica@otlmail.stanford.edu or (650) 723-1586.

Technology Spotlight

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50,000 sequence motifs that were derived by EMOTIF, and each has an associated biological function. IDENTIFY scans newly sequenced open reading frames (ORFs) from genomic sequences for function. The database is able to determine the function of 25% to 30% of all of the proteins analyzed with minimal false assignments.

To try either tool, please visit http://motif.stanford.edu/emotif or http://motif.stanford.edu/identify. To request more information, please contact Kirsten Leute at (650) 725-9407 or kirsten@otlmail.stanford.edu.

Making Automobiles Automated (S97-093)

Driving in the valleys of California or in the plains of the midwest, one is awed at the large land vehicles advancing through the fields of grains. Now imagine these vehicles without human drivers. No, we're not talking about other animals taking the place of people; instead the farmers would use the increasingly popular Global Positioning System to steer their tractors.

Created by Thomas Bell, Professor Bradford Parkinson, Michael O'Conner, and Gabriel Elkaim in the Aeronautics and Astronautics department at Stanford, the automated control system for land vehicles offers low cost precision navigation that does not require specific external cues for successful operation. It could be useful in clearing minefields, cleaning up toxic waste, applying hazardous pesticides, transporting disabled people and, as noted above, endless crop harvesting.

Please contact Luis Mejia at (650) 723-0651 or luis@otlmail.stanford.edu for more information regarding this invention.

Looking for Low Fat? AGRP (S97-025)

As is evidenced daily in our lives, people are obsessed with their weight. From fad diets to miracle pills to weight loss centers, people go to extraordinary lengths to lose a few pounds. As more products and protocols are brought to market, the problems of obesity and anorexia just appear to get worse.

A newly discovered protein, agouti-related protein (Agrp), may be a key to regulating body weight. Agrp is produced by humans in the hypothalamus and the adrenal gland and has been shown to control body weight in response to signaling by leptin, a protein involved in the weight control process. In studies done by Stanford researchers Gregory Barsh, Julie Kerns, Brent Wilson and Michael Ollmann, deficiency of leptin in mice without certain control genes caused nearly a tenfold increase in Agrp expression. Overexpression in transgenic mice of human Agrp causes increased weight gain and body length.

Agrp is not involved in any physiological processes besides body weight regulation and therefore may be an ideal pharmaceutical target. Previous drugs have been involved in multiple processes and therefore had problematic side effects. Agrp agonists may be useful for the treatment of cachexia or anorexia, while Agrp antagonists may be useful for treatment of obesity.

For further information on Agrp, please contact Kirsten Leute at (650) 725-9407 or kirsten@otlmail.stanford.edu.

Shaping the future (S97-141)

Ceramics have excellent high temperature mechanical properties which make them desirable for use in modern jet engines. Current engines use metal components, but changing to ceramics would enable the operating temperatures to be increased, thus increasing the efficiency.

It is difficult to make complex parts, such as jet engine components, using traditional ceramic manufacturing processes. Within the past decade a variety of rapid prototyping methods have been developed which can produce complex shapes but these techniques cannot produce good enough surface finishes for high performance structural ceramic components.

Professor Friedrich Prinz, Alexander Cooper and John Kietzman of the

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