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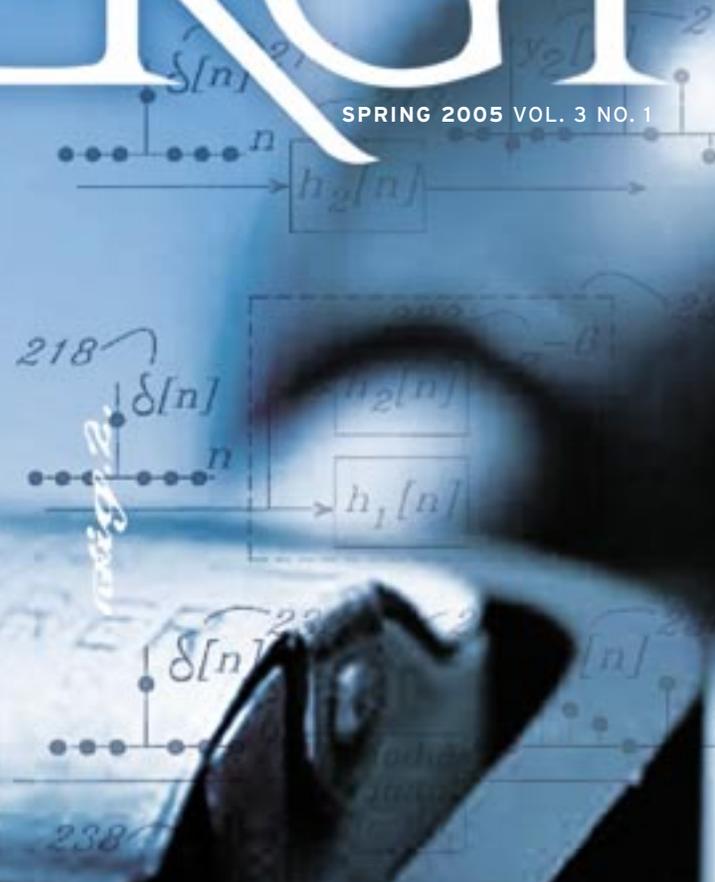
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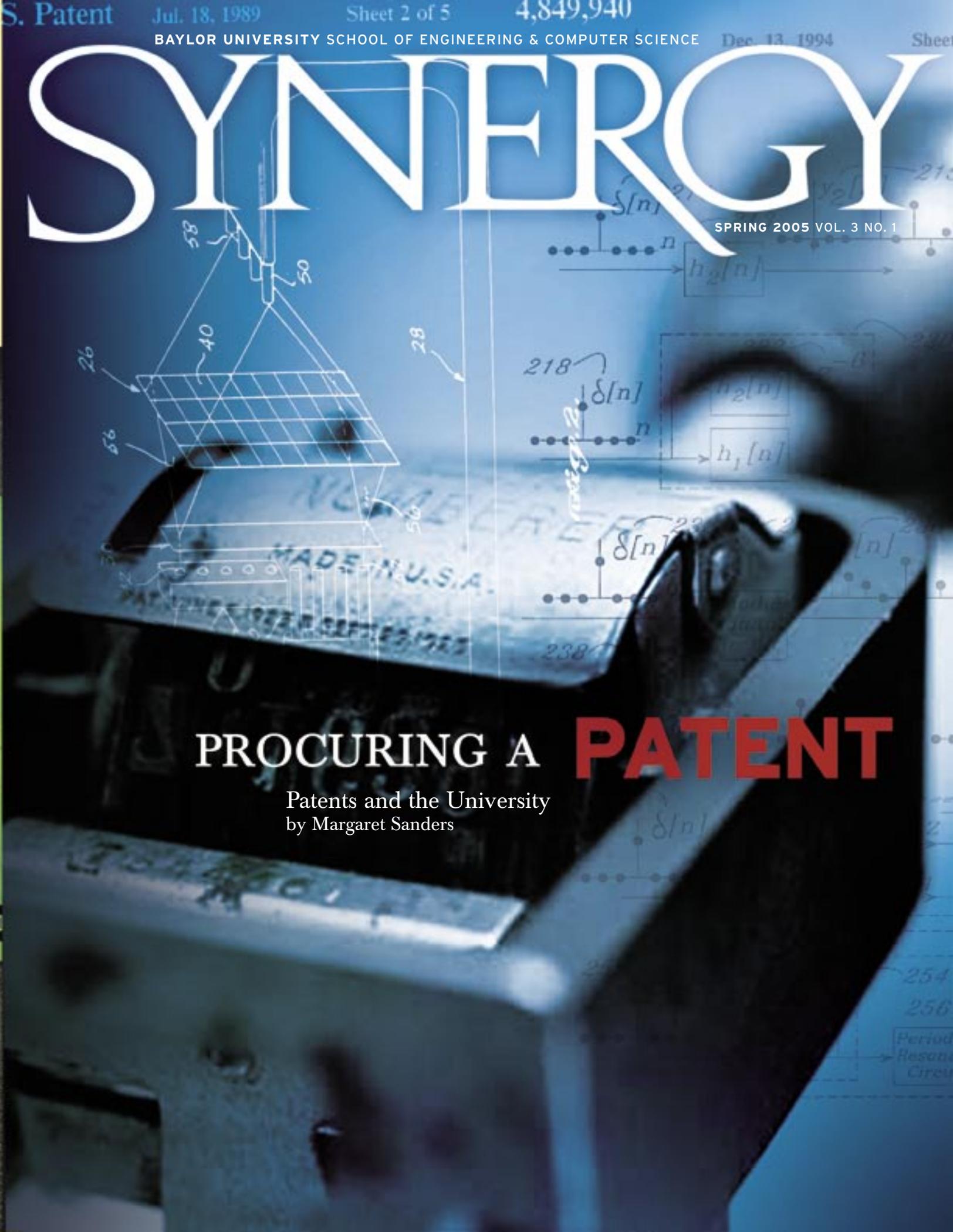
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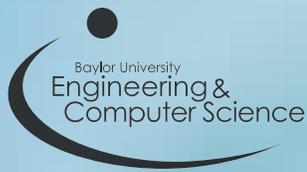


PROCURING A

PATENT

Patents and the University
by Margaret Sanders





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A Good Report

Engineering Program Rated in *U.S. News* "Best Colleges" Survey

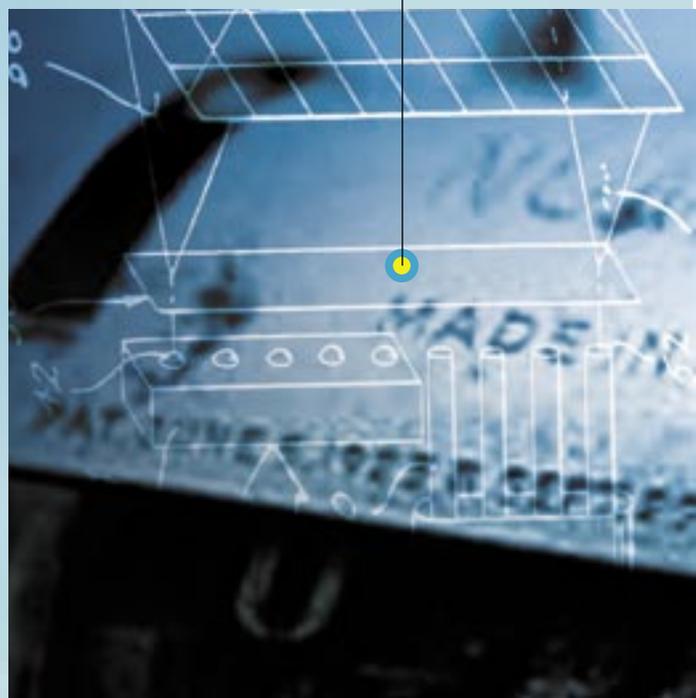
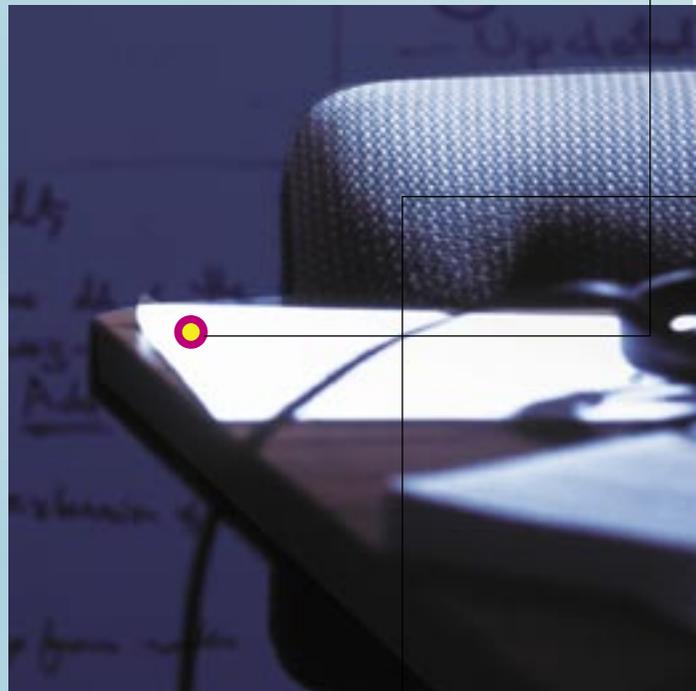
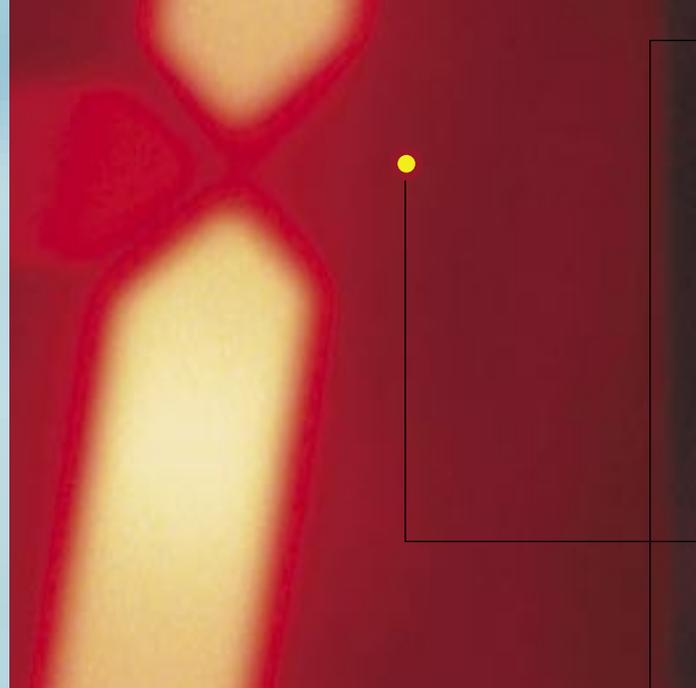
Baylor University's engineering program climbed impressively to rank as the nation's 14th best in the 2005 edition of America's Best Colleges, compiled by *U.S. News & World Report*. This is up five spots over last year when Baylor's program was ranked 19th, and an increase of 12 places over 2001, when Baylor ranked 26th in the prestigious *U.S. News* listing of undergraduate engineering programs without doctoral programs.

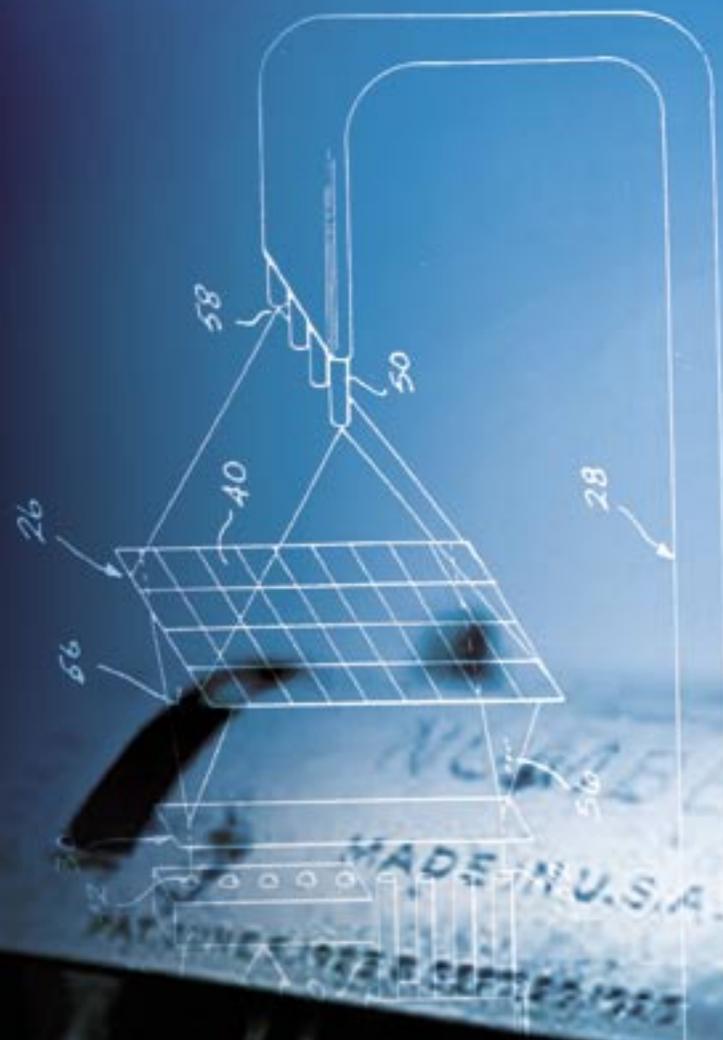
Baylor is ranked highest of the four Texas schools included in the survey, which is confined to 145 programs accredited by the Accreditation Board for Engineering and Technology. Baylor is tied at 14th nationwide with five other schools.

"I am very pleased that we have moved up five places in the rankings," said Dr. Benjamin S. Kelley, dean of the School of Engineering and Computer Science and professor of engineering. "It is an excellent recognition of our accomplishments and a fine tribute to the initiative of our faculty, students and staff. We are looking forward to even greater accomplishments and to continued national recognition of our faculty and students."

U.S. News says its engineering school rankings are based solely on the judgments of deans and senior faculty who rated each program they are familiar with on a scale from 1 (marginal) to 5 (distinguished). Baylor's undergraduate engineering program garnered a peer assessment score of 3.2, up from a score of 3.1 last year.

The *U.S. News* rankings can be found at www.USNews.com.





PROCURING A **PATENT**

Patents and the University
by Margaret Sanders

If you are an inventor who dreams of patenting your new invention and instantly gaining fame and fortune, think again. Prepare yourself for a long, expensive and often frustrating journey that may or may not lead to that coveted prize. > No matter how ingenious your idea may be, it may not be patentable. It must not only be unique, but must also be useful and “non-obvious, something that someone skilled in the art wouldn’t have thought of,” said Dr. Randall Jean, associate professor of engineering. > Earning the right to be named the original inventor is appealing enough that the patent office receives approximately 300,000 applications every year and has issued more than six million patents since 1790.

Imagine that you could drop a prescription off at the pharmacy and use a machine in the waiting area not only to monitor your blood pressure, but also to check your blood sugar – without having to draw a drop of blood. That may one day be available, said Jean, who is conducting research using microwave energy to measure the volume of sugar relative to other blood components.

The concept is an adaptation of a process Jean – along with his partners at Rhino Analytics of Round Rock – developed for the paper-making industry before coming to Baylor. That application sends low levels of microwave energy through a wave guide, measuring the frequency response of the wood pulp and water that blend to make paper. The firm has a patent pending on the process and will have sole rights to licensing and marketing the invention.

Jean, who taught at Texas A&M University before founding the engineering firm, came to Baylor in 2003. An ad in the Institute of Electrical and Electronic Engineering’s

magazine *Spectrum* seeking a professor with academic and industrial experience caught his eye. “When I read ‘active Christian commitment,’ I knew this was where I needed to be,” he said.

He is one of several Baylor engineering professors who hold patents. Another, Distinguished Professor of Engineering and graduate director Robert Marks, also joined the faculty in 2003. While teaching at the University of Washington, he developed three patents in the field of artificial neural networks and signal processing. One found a more efficient way to compute the Fourier transform, the mathematical process that converts functions of time into frequencies. His second patent is for a method of digitizing volume holograms, an extremely efficient method of storing information. His most recent patent is for optical memory systems that allow neural networks to complete required feedback at the speed of light, greatly improving efficiency and reliability.

If Dr. Truell Hyde, vice provost for research, has his way, the number of Baylor faculty and staff who develop new patents will grow, and those who already hold patents will work with the University to seek licensing rights and marketing opportunities. As Baylor’s representative to federal agencies and industrial groups, Hyde seeks out external funding opportunities for research projects that may develop into new ideas, processes or technologies. When that happens, an array of resources is available to help in the research, patenting and marketing processes.



“Our job in this office is to protect and serve the faculty and staff in their research efforts,” said Hyde. “Getting a patent is neither easy nor cheap,” he said, “and most faculty and staff really don’t have the resources – lawyers, licensing research, etc. – or the interest to pursue a patent or the licensing.” Plus, professor Jean added that procuring a patent can often take as long as two years and cost more than \$50,000, and barely one percent of patent applications actually make it that far.

Obtaining a patent does not automatically translate into profits or fame, however. In fact, the inventor’s work has just begun. “You can conceivably patent anything, but even if it is unique, the key is discovering if it is something that people might want to buy,” Hyde said. Often more than 90 percent of a patent’s value comes through licensing and marketing after the patent is issued, making it important to follow through on the process. But those steps often prove more time consuming and expensive than actually procuring the patent.

“That’s where our office can probably help faculty and staff the most,” Hyde said. “If an idea appears to be a moneymaker, we will work with the faculty member to determine a licensing opportunity. We will act as the faculty’s surrogate, investigating the idea’s marketability, pursuing the patent and identifying possible licensing opportunities.”

Baylor’s new intellectual property policy – nearing the final stages – is the product of five years of work by a 15-member faculty committee. It outlines rights and responsibilities of employee inventors and the University. The committee researched similar policies at other universities and industry to draft the document, which was then reviewed by the offices of the vice provost for research, the office of general counsel and an external firm specializing in patent law and licensing. “What we have is good and tight, with no legal loopholes,” Hyde said, “and more importantly, it does a good job of protecting the faculty and addressing their concerns.”

Finding a way to use technology to help people is all part of what engineers do, professor Jean says. “Engineers solve problems. We have to be well grounded in fundamental science because those are the laws we have to obey, but we have to figure out how to design a process or an instrument to do some useful function. We answer the big whys and hows.”

He’s been searching for those kinds of answers as long as he can remember. “When I was a kid, I took all my toys apart,” he said. “I didn’t realize it then, but that was how God made me, how I was engineered. It was more fun for me to see how the toy was put together and how it worked than to actually play with it.”

Like Jean, Marks admits to a lifelong interest in discovering the how and why behind the laws of the universe. As an undergraduate, he considered math and chemistry before choosing the electrical engineering major that opened so many new worlds. He came to Baylor after 26 years at the University of Washington, attracted by an engineering research environment that demonstrates the consistency between intellectual pursuit and Christian faith and encourages both – a concept reflected throughout history.

“Newton, Pascal and other scientists were Christians

who were motivated by the fact that God was the lawgiver and the realization that the things around us must have laws associated with them,” Marks said. “That was the foundation of modern science in Europe. They wanted to find out what He created and learn more about it. It’s like getting to know a great painter by looking at his paintings.

“That’s what engineers and physicists do. We look at the painting God’s given us and we go, ‘Wow! This is really beautiful stuff!’”

Green Goes for the Gold

Baylor Student Among Top Five Engineering Seniors In U.S.

Engineering student Eric Green, a senior from Sugar Land, has been selected as one of the top five senior engineering students in the United States by the national electrical and computer engineering honor society, Eta Kappa Nu. He was recognized at the Eta Kappa Nu annual banquet in October at the University of Illinois in Champaign.

Green also was recognized as the spring 2004 outstanding student in engineering at Baylor. As he finishes his undergraduate degree with a math minor, he has begun work on a master’s degree in biomedical engineering and is a student of Dr. Randall Jean.

His master’s thesis topic is “Using the Dielectric Properties of Body Tissues to Non-invasively Determine Blood Glucose Concentrations,” an interest he developed in childhood by watching his grandfather conduct the daily glucose test—a finger prick—for diabetes.

Green plans to attend law school after finishing his master’s degree at Baylor to train as an intellectual property attorney. He has served in Baylor’s chapter of Habitat for Humanity for three and a half years.

As a corresponding member of the Institute of Electrical and Electronics Engineers Intellectual Property Committee, Green submits his opinions for review by the policy-making committee. Green also has published several articles in **Today’s Engineer** and other scholarly journals.

To learn more about Eric Green, go to <http://pr.baylor.edu/story.php?id=005452>.



FACULTY NEWS

WALTER L. BRADLEY and Steven W. Bradley, "Increasing Retention by Incorporating Time Management and Study Skills into a Freshman Engineering Course." Baylor University, Success 4 Students.

David Makofske, MICHAEL J. DONAHOO and Kenneth L. Calvert, *TCP/IP Sockets in C#: Practical Guide for Programmers*, Practical Guide Series, Morgan-Kaufmann.

STEVEN R. EISENBARTH and KENNETH W. VAN TREUREN, "Sustainable and Responsible Design from a Christian Worldview," *Science and Engineering Ethics*, Vol. 10, Issue 2, April 2004.

JIM FARISON and BYRON NEWBERRY, "The current status and uses of the general (undesignated) engineering program with a case study," ASEE Annual Conference and Exhibition (Proceedings, CD-ROM, #1765, 9 pages), Nashville, Tenn., June 22-25, 2003.

JIM FARISON, "ASEE initiative in multidisciplinary engineering education programs," ASEE Gulf Southwest Section Conference (Proceedings, CD-ROM, 8 pages), Lubbock, Texas, March 10-12, 2004.

JIM FARISON and BYRON NEWBERRY, "Curricular and student characteristics of accredited engineering/general engineering programs," ASEE Annual Conference and Exhibition, Session 1471, (Proceedings, CD-ROM, 19 pages), Salt Lake City, Utah, June 20-23, 2004.

FRY, CYNTHIA C., "The Development of a Summer Study Abroad Program for Engineering and Computer Science Students at Baylor University," 34th Annual ASEE/IEEE Frontiers in Education Conference, Savannah, Ga., Oct. 20-23, 2004.

John Seng and GREG HAMERLY, "Exploring perceptron-based register value prediction," In the second Value-Prediction and Value-Based Optimization Workshop, October 2004.

BENJAMIN S. KELLEY, CYNTHIA C. FRY, DAVID B. STURGILL and J. BRIAN THOMAS, "Faith-Based and Secular Experience on Rebuilding Engineering and Computer Science Higher Education in Kurdistan of Iraq," Proceedings of the 5th Christian Engineering Education Conference, pp. 35-47, Westminster College, Salt Lake City, Utah, June 23-25, 2004.

Steve T. Lam, Paul S. Cho, ROBERT J. MARKS II and Sreeram Narayanan, "Three-dimensional seed reconstruction for prostate brachytherapy using Hough trajectories," *Phys. Med. Biol.* Vol. 49, pp. 557-569, 2004.

L.S. Moulin, A.P.A. da Silva, M.A. El-Sharkawi and ROBERT J. MARKS II, "Support vector machines for transient stability analysis of large-scale power systems," *IEEE Transactions on Power Systems*, Vol. 19, Issue 2, pp. 818-825, May 2004.

S. Narayanan, P.S. Cho and ROBERT J. MARKS II, "Three-dimensional seed reconstruction from an incomplete data set for prostate brachytherapy," *Phys. Med. Biol.*, Vol. 49, pp. 3483-3494, 2004.

Jiho Park, ROBERT J. MARKS II, D.C. Park and M.A. El-Sharkawi, "Content-Based Adaptive Spatio-Temporal Methods for MPEG Repair," *IEEE Transactions on Image Processing*, Vol. 13, #8, pp. 1066-1077, August 2004.

Jaemin Kim, Seongwon Cho, Jinsu Choi and ROBERT J. MARKS II, "Iris Recognition Using Wavelet Features," *Journal of VLSI Signal Processing Systems*, Vol. 38, pp. 147-156, September 2004.

William E. Combs, Jeffrey J. Weinschenk and ROBERT J. MARKS II, "Genomic Systems Design: A novel, biologically based framework for enhancing the adaptive, autonomous capabilities of computer systems," FUZZ-IEEE 2004, IEEE International Conference on Fuzzy Systems, pp. 25-29, Budapest, July 2004.

Jeffrey J. Weinschenk, ROBERT J. MARKS II and William E. Combs, "On the use of Fourier methods in URC fuzzy system design," FUZZ-IEEE 2004, IEEE International Conference on Fuzzy Systems, pp. 25-29, Budapest, July 2004.

Arindam K. Das, Mohamed El-Sharkawi, ROBERT J. MARKS II, Payman Arabshahi and Andrew Gray, "Minimum Hop Multicasting in Broadcast Wireless Networks with Omni-Directional Antennas," Military Communications Conference, 2004. MILCOM 2004, Monterey, Calif., Oct. 31-Nov. 3.

Arindam K. Das, Mohamed El-Sharkawi, ROBERT J. MARKS II, Payman Arabshahi and Andrew Gray, "Maximization of Time-to-First-Failure for Multicasting in Wireless Networks: Optimal Solution," Military Communications Conference, 2004. MILCOM 2004, Monterey, Calif., Oct. 31-Nov. 3.

SKURLA, C.P. and James, S.P., "Assessing the Dog as a Model for Human Total Hip Replacement: Analysis of 38 Postmortem Retrieved Canine Cemented Acetabular Components," *Journal of Biomedical Materials Research Part B: Applied Biomaterials*, 2004, In Press.

Frankel D.J., Pluhar G.E., SKURLA C.P., James S.P. and Egger E.L., "Radiographic Evaluation of Mechanically Tested Cemented Total Hip Arthroplasty Femoral Components Retrieved Postmortem," *Veterinary and Comparative Orthopaedics and Traumatology*, 2004, In Press.

SKURLA C.P., Pluhar G.E., Frankel D.J., Egger E.L. and James S.P., "Assessing the Dog as a Model for Human Total Hip Replacement: Analysis of 38 Postmortem Retrieved Canine Cemented Femoral Components," *The Journal of Bone and Joint Surgery (Br)*, 86-B, November 2004, In Press.

Reed, A.K. and VAN TREUREN, K.W., "Expansion of a Modified Transient Liquid Crystal Method for Thin Plates of Different Materials," IMECE2004-60934, 2004 ASME International Mechanical Engineering Congress and RD&D Expo, Anaheim, Calif., Nov. 13-19, 2004.

VAN TREUREN, K.W. and EISENBARTH, S., "Incorporating Christian Worldview into an Engineering Program and its Assessment at Baylor University," Christian Engineering Education Conference, Salt Lake City, Utah, June 23-25, 2004.

EISENBARTH, S. and VAN TREUREN, K.W., "Christian Worldview and the Engineering Context," Christian Engineering Education Conference, Salt Lake City, Utah, June 23-25, 2004.

VAN TREUREN, K.W. and EISENBARTH, S., "Profile of a Successful Engineering Student at a Private, Liberal Arts University," 2004 ASEE Annual Conference & Exposition, Salt Lake City, Utah, June 20-23, 2004.

VAN TREUREN, K.W., "An Applications-Oriented Gas Turbine Laboratory Experience," GT2004-53761, ASME IGTI Turbo Expo 2004, Vienna, Austria, June 14-17, 2004.